HMDJ

HITEC Medical and Dental Journal

REVIEWERS

INTERNATIONAL

1. Dr. Kashif Ali, Countess of Chester Hospital, Chester, UK.
2. Dr. Maujid Masood Malik, Department of Biomedical Sciences, College of Medicine, King Faisal University, Hofuf, Al-Ahsa, KSA
3. Dr. Asif Afzal Haq, King Faisal University, Dammam, KSA.
4. Dr. Javed Suleman, Icahn School of Medicine at Mount Sinai, New York City.
5. Dr. Faisal Salim, Royal National Orthopedic Hospital Stanmore, Middlesex, HA7-4LP, UK.
6. Dr Sadia Zeeshan, Dorset county hospital, NHS Foundation Trust, UK.
7. Dr. Zaheer Ahmed, Consultant Pediatric Cardiologist, King Faisal Specialist Hospital, Jeddah, KSA.
8. Dr. Imtiaz Ahmed, Hamad Medical Corporation, Qatar Medical University, Al Wukair, Al Wakrah, Qatar.
9. Dr. Ahmad Badar, Dammam Medical College, Dammam, KSA.
10. Dr. Syed Imtiaz Ali, Medcare Hospital L.L.C. Jumeirah, Dubai, UAE.
11. Dr. Saleem Khamisani, MD Neurologist, 1201, 5th, Avenue, North Saint Petersburg, Florida, USA.
12. Dr. Mohammed Nadir Shah, Oral and Maxillofacial Surgeon, King Abdul Aziz University, KSA.
13. Dr. Iain H Mcvicar, Oral and Maxillofacial Surgeon, Queens Medical Centre, Nottingham University Hospitals NHS Trust, Nottingham, UK.
14. Dr. Mohammad Bayat, Oral and Maxillofacial Surgeon, Shariati Hospital, Tehran, Iran.

NATIONAL

15. Prof. Dr. Aneeq Mirza Islamic International Medical College, Islamabad.
16. Prof. Dr. Ayesha Farooq, Al-Nafees Medical College. Islamabad.
17. Prof. Dr. Sarah Sadiq, CMH Medical Collage, Kharian.
18. Dr. Babar Chughtai, Wah Medical College, Wah.
19. Prof. Dr. Abida Sultana, HBS Medical College, Islamabad.
20. Prof. Dr. Shezadi Sabah Imran, Wah Medical College, Wah.
21. Brig(R) Prof. Dr. Muzzamil Hasan Najmi, Foundation University Medical College, Rawalpindi.
22. Brig(R) Prof. Dr. Akbar Waheed, Islamic International Medical College, Rawalpindi.
23. Prof. Dr. Sohail Ahmed, Fazaia Ruth Pfau Medical College, PAF Faisal base, Karachi.
24. Prof. Dr. Fareed Aslam Minhas, 12,Lane1, Peshawar Road, Rawalpindi.
25. Prof. Dr. Zubia Athar, A-183,Phase-5 Officers Colony, Wah Cantt.
26. Prof. Dr. Farheen Masood, 34 college road, Safari villas 1, Bahria Town, Rawalpindi.
27. Dr. Uruj Zehra, University of Health Sciences, Lahore.
28. Prof. Dr. Tahir Hussain, Fatima Hospital, Baqai Medical University, Deh Tor, Gadap, Karachi.
29. Prof. Dr. Nargis Anjum, Dean, Faculty of Medicine, University of Karachi.
30. Prof. Dr. Sohail Ahmed, Fazaia Ruth Pfau Medical College, PAF Faisal base, Karachi.
31. Prof. Maj Gen (R) Waqas Ahmed Kazi, House no 20, 4th Avenue Orchard-C DHA-1, Islamabad.
32. Prof. Brig (R) Tassadaq Khursheed, Al Nafees medical College and Hospital, Islamabad.
33. Dr. Ahsen Farooq, Islamic International Medical college, Islamabad.
34. Dr. Maryam Amjad, KRL Hospital, Islamabad.
35. Prof. Dr. Raheela Yasmin, Islamic International Medical College, Riphah University, Rawalpindi.
36. Prof. Dr. Rehan Ahmed Khan, Islamic International Medical College, Riphah University, Rawalpindi.
37. Prof. Irshad Bhutto, LUMHS, Hyderabad.
38. Prof. Sikandar Hayat, Khyber Teaching Hospital, Peshawar.
39. Prof. Dr. Muhammad Ayub, Muzaffarabad Medical College, AJK.
40. Prof. Dr. Munazza Asad, Al-Nafees Medical College, Islamabad.
41. Prof. Dr. Brig. Abdul Haleem, Mohi ud Din Medical College, Mirpur, AJK.
42. Col Qamar Zia, CMH Malir Cantt, Karachi.
43. Prof. Dr. Aqib Sohail, Oral & maxillofacial Surgeon, College of Dentistry, Lahore Medical & Dental College, Lahore.
44. Prof. Dr. Mohtada Hassan, Dental Section, Watin Medical & Dental College, Rawalpindi.
45. Prof. Dr. Syed Nasir Shah, Khyber College of Dentistry, Peshawar.
46. Dr. Zahra Khalid, Armed Forces Institute of Dentistry, Rawalpindi.
47. Maimoona Siddiq, Oral & Maxillofacial Surgeon Dental College HITEC-1MS, Taxila.

HMDJ

HITEC Medical and Dental Journal

AIMS & SCOPE

HITEC Medical & Dental Journal (HMDJ) is the medical and dental journal of HITEC Institute of Medical Sciences (HITEC-IMS), Taxila. It is an open access, peer-reviewed, bi-annual journal that aims to keep the medical & dental health professionals updated with the latest information relevant to their fields.

HMDJ welcomes scholarly work from medical and allied subjects (basic & clinical), community health issues and medical education. It publishes original research, review articles, case reports, editorials, letters to editor, short communication, book reviews, recent advances, new techniques, debates, adverse drug reports, current practices, and conference reports. All publications of HMDJ are peer reviewed by subject specialists from Pakistan and abroad.

OBJECTIVES

1. To publish original, peer reviewed clinical and basic sciences articles.
2. To promote research culture in our institute and beyond, by inculcating the habit of medical writing among doctors.
3. To assist physicians to stay informed about the developments in their own & related fields.
4. To support knowledge & experience sharing among the health professionals for the benefit of patients.
5. To attain the top-notch ethical medical journalism by delivering credible and reader- friendly publications.

HMDJ

HITEC Medical and Dental Journal

DECEMBER 2021 / VOLUME 1 / NUMBER 1

CONTENTS

HERD IMMUNITY FROM COVID-19

Maj Gen (R) Prof. Dr. Hamid Shafiq, HI(M)
Department of Medicine, HITEC IMS, Taxila, Pakistan

The term "herd immunity" is used when enough members of a population get immune from an infection to successfully interrupt the chain of human-to-human transmission. In this way, spread of infection to the remaining susceptible individuals gets stopped. Herd immunity is also called community immunity or herd protection1.

To achieve herd immunity, a large enough percentage of the population needs to either get infected by it or get vaccinated against it. As far as Covid- 19 is concerned, nobody knows how long and strong a protection would be provided by either of these ways. Young and vulnerable people who can't be vaccinated can be protected by herd immunity.

Typically for any infectious disease, 60% to 90% of the population is required to get vaccinated or infected before herd immunity could be achieved. As of now, approximately 10% of the world's population has been exposed to infection. Israel has taken the lead in moving towards herd immunity by vaccinating 60% of its population within a short span of time.

Statistically speaking herd immunity is said to be achieved if one infected person infects less than one person on average (effective reproduction number R).
$R = (1 - pC)(1 - pI)R0$
pC (relative reduction in transmission rates due to non-pharmaceutical interventions)
pI (proportion of immune individuals)

R0 (reproduction number in the absence of control measures). For R0 = 3, herd immunity threshold is expected to require 67% population immunity at the same point in time.

Children less than 10 years of age may be less infectious and less susceptible. In that case they can be omitted for the calculation of herd immunity.

T-cell reactivity has been noted in the absence of detectable humoral immunity among contacts of patients. However, their protective role, if any, is not clear. Similarly, the protective role of common cold Corona virus immunity is also not clear. Immunity to seasonal Corona virus infection is short lived yet no one is sure about immunity to novel Corona virus (SARS-CoV-2). Re-infection has already been noted in many cases. Our immune systems are quick to forget certain viruses, but it's unclear whether the same is true for COVID-19 [2].

Fatality with COVID-19 is estimated to be 0.3 to 1.3%. An even higher proportion of patients suffer lasting health consequences of COVID-19 including blood clotting disorders (such as stroke and pulmonary embolism), autoimmune disorders (such as rheumatoid arthritis), and "long COVID" (encompassing a variety of symptoms such as headache, fatigue, "brain fog", shortness of breath, and depression or anxiety). Trying to reach herd immunity through natural infection would come at a very high cost and not guarantee successful attainment of herd immunity either. Even with a 50% threshold of immunity, it would translate into millions of deaths. Men older than 60 years, especially with co morbidities are more susceptible to devastating consequences of COVID-19 infection. Their fatality rates go up to 3.3% and many more suffer other debilitating health consequences even if they survive the infection.

Effective vaccination is the acceptable way to reach herd immunity. At least 6 different vaccines are now available for public use. Each one of them comes with impressive safety and efficacy data that has been published and vetted in peer-reviewed journals.

In order to reduce the morbidity and mortality of COVID-19 as quickly as possible, vaccination is being first offered to the most vulnerable individuals in any community. If needed, vaccines can be routinely boosted[3].

We know that herd effect has eradicated smallpox, reduced pertussis spread and has protective effects against influenza / pneumococcal infections. Generally high vaccination rate is needed to be successful[4].

The ongoing SARS-CoV-2 pandemic has caused millions of deaths in clinically confirmed cases. Knowing the devastating consequences of achieving herd immunity through natural infection, and the chances that it may not work, it cannot be deemed a sensible path to take[5]. It is important to note that acquisition of herd immunity is not guaranteed through natural infection, because there may always be a sizeable reservoir of vulnerable individuals available to (re-) develop and transmit the disease. A coordinated mass vaccination campaign that

Correspondence to: Maj Gen (R) Prof. Dr. Hamid Shafiq, HI(M)
Chief Editor HITEC Medical and Dental Journal
Email: hamidshafiq.amc@gmail.com

Conflict of interest: None
Financial Disclosure: Nil

Received: 03-06-2021
Accepted: 01-07-2021

immunizes a majority of the population, within a short span of time (leaving behind too few unvaccinated and vulnerable individuals to continue the chain of transmission), is our best hope of ending this pandemic.

By the time COVID 19 pandemic ends, a large proportion of the population would be infected far above expected herd immunity threshold (around 2/3 rd.). Additional infections above threshold are referred as "overshoot"[6]. However, these infections will have occurred over a long span of time, with many formerly infected patients already having lost their natural immunity and being susceptible to getting re-infected and thereby infecting other members of the community as well.

Autumn and winter seasons are challenging because of the spread of infections especially in underdeveloped countries like ours. Protective measures like social distancing, use of face mask, and hand hygiene will further help in controlling the spread of infection. These measures can't be overemphasized in Pakistan. Use of antiviral drugs and other evidence-based treatments (such as steroids and awake proning for patients with hypoxia and avoidance of potentially harmful and ineffective medication) is the best way forward until herd immunity is achieved.

REFERENCES

1. "Herd Immunity". Oxford Vaccine Group, University of Oxford. Archived from the original on 2 August 2019. Retrieved 12 December 2017.
2. "Cold-Causing Coronaviruses Don't Seem to Confer Lasting Immunity". The Scientist Magazine®. Archived from the original on 7 January 2021. Retrieved 26 January 2021.
3. Fontanet A, Cauchemez S (October 2020). "COVID-19 herd immunity: where are we?". Nature Reviews. Immunology. 20 (10): 583–584. doi:10.1038/s41577-020-00451-5. PMC 7480627. PMID 32908300.
4. Kim TH, Johnstone J, Loeb M (September 2011). "Vaccine herd effect". Scandinavian Journal of Infectious Diseases. 43 (9): 683–9. doi:10.3109/00365548.2011.582247. PMC 3171704. PMID 21604922.
5. Randolph HE, Barreiro LB (May 2020). "Herd Immunity: Understanding COVID-19". Immunity. 52 (5): 737–741. doi:10.1016/j.immuni.2020.04.012. PMC 7236739. PMID 32433946.
6. Bergstrom CT, Dean N (1 May 2020). "Opinion: What the Proponents of 'Natural' Herd Immunity Don't Say". The New York Times. Archived from the original on 3 June 2020. Retrieved 30 May 2020.

ORIGINAL ARTICLE

GENETIC MUTATIONAL AND EXPRESSION ANALYSIS OF SCAVENGER RECEPTOR CLASS B1 *(SR-B1)* GENE IN TYPE 2 DIABETIC DYSLIPIDEMIC PATIENTS

Tayyaba Batool[1], Asifa Majeed[2]

[1]Department of Biochemistry and Molecular Biology, National University of Sciences and Technology, Rawalpindi Pakistan
[2]Department of Biochemistry and Molecular Biology, Army Medical College, Rawalpindi Pakistan

ABSTRACT

Objective: Genetic mutational and expression analysis of Scavenger Receptor class B1 *(SR-B1)* gene in type 2 diabetic dyslipidemic patients.

Study Design: Cross sectional Comparative study.

Place and Duration of Study: The study was caried out at Army Medical Collage Rawalpindi and took one year to complete.

Material and Methods: Sixty subjects were divided into three groups which were comprised of type 2 diabetic dyslipidemia patients, type 2 diabetic patients without dyslipidemia and healthy individuals. DNA was extracted and DNA sequencing of *SR-B1* gene was performed to find genetic mutation in exon-8. RNA was extracted from blood samples and used in quantitative PCR to analyse the expression of the SR-B1 receptor gene. The comparative ΔΔCT method was applied to quantify the expression in diseased groups and control. BioEdit, and SPSS 17 software was applied to find genetic variation, association and statistical significance.

Results: DNA sequencing of *SR-B1* gene revealed presence of rs5888 (GCC) polymorphism with CC genotype in exon-8 in 18 samples of group I, 3 samples of group II and 2 samples of group III. However, rs5888 polymorphism at position c.1050 did not change the amino acid and was synonymous. The expression of SR-B1 receptor gene was found down-regulated in diabetic dyslipidemia patients compared to diabetic and controls. These patients had shown poor glycemic control and deranged lipid profile where HDL-C was most deranged.

Conclusion: The exon-8 of SR-B1 did not contain any genetic mutation and identified polymorphism rs5888 was a normal variant in diabetic dyslipidmia Pakistani subjects. The expression of SR-B1 receptor gene was down-regulated at transcriptional level which may indicate the disturbance in reverse cholesterol transport and resulted in decreased HDL levels.

Keywords: *Dyslipidemia, HDL, rs5888, SR-B1, type 2 diabetes mellitus*

How to cite this article: Batool T, Majeed A. Genetic mutational and expression analysis of scavenger receptor class B1 *(SR-B1)* gene in type 2 diabetic dyslipidemic patients. HMDJ 2021; 01(01): 3-7

INTRODUCTION

Diabetes mellitus (DM) is spreading as an epidemic and WHO estimated that currently around 422 million people are diabetic[1] worldwide. Diabetes mellitus leads to the formation of potentially harmful products including "acetylated and glycated LDL, advanced glycation end products, reactive oxygen species as well as chemokines and cytokines"[2]. Plasma high-density lipoprotein plays a role in the determination of risk for cardiovascular diseases through selective uptake of cholesterol ester and maintains the cholesterol homoeostasis in human body. Environmental and genetic factors contribute to the change of HDL-C levels.

Correspondence to: Dr. Tayyaba Batool, Deptt of Biochemistry Quaid -e-Azam Medical Collage, Bahawalpur, Pakistan.
Email: drtayyababatool@yahoo.com

Conflict of interest: None

Financial Disclosure: Funded by National University of Sciences & Technology (NUST).

Received: 30-06-2021
Accepted: 15-08-2021

HDL-C mediates reverse cholesterol uptake (RCT) through transmembrane protein "scavenger receptor SR-B1". Scavenger receptor class I B type (SR-BI) is highly expressed in steroidogenic, intestinal, and hepatic cells. SR-BI has high binding affinity with HDL and regulates the selective HDL cholesterol efflux[3,4]. SR-BI protein is encoded by *SR-B1/SCARB1* gene which is located on chromosome 12 [5]. Expression of SR-B1 in cholesterol uptake was well studied in mice where overexpression of *SCARB1* gene protected against atherosclerosis[6]. Genetic variations in *SCARB1* and *ABCA1* gene have been directly correlated with HDL-C levels[7-9]. Studies have identified association between genetic variants in *SCARB1* gene, body mass index, lipid levels and lipoprotein particle[10-12]. SR-B1 is demonstrated as a key regulator of circulating HDL levels and genetic variations in *SCARB1* gene lead to disturbance in hepatic cholesterol uptake[13-15].

Pakistan is ranked 7th in the world with 7.1million people (7.6%) affected by diabetes. The statistics may get rise to 13.8 million people with diabetes in 2030[16]. Dyslipidemia is a prevailing complication in diabetic patients in Pakistan[17,18,19]. Abnormalities in concentration of plasma lipid and lipoproteins

are commonly occurring in type 2 diabetes mellitus and known as diabetic dyslipidemia[20, 21].

The present study has investigated the cause of dyslipidemia in type 2 diabetic patients at molecular level by targeting the HDL receptor SR-B1. The traditional medicine has been converted into personalized medicine, globally, and it is of utmost need to understand molecular genetics of diabetic dyslipidemia and build genetic pool of our population. The objective of this study was to perform genetic mutational and expression analysis of SR-B1 gene in type 2 diabetic dyslipidemia patients.

MATERIAL AND METHODS

The study was designed in accordance with Declaration of Helsinki (revised version 2013) and approved by the institutional ethical review committee. Written informed consent was obtained from enrolled subjects and divided into three groups. Twenty diagnosed type 2 diabetes patients with dyslipidemia were included in a group I, twenty type 2 diabetes patients without dyslipidemia in group II and twenty healthy individuals in group III. Diagnosed patients of type 2 diabetes mellitus with dyslipidemia were randomly selected as per WHO criteria with the consultation of statistician. The subject age was between 29-70 years. Type 2 diabetes patients and healthy individuals were included in other two groups. Type 2 diabetic patients with hypertension, renal dysfunctions, cancer, chronic liver diseases, cardiovascular diseases and on lipid lowering drugs were excluded. Blood in a fasting state was collected and serum separated. High density lipoprotein, total cholesterol, triglycerides were measured by the enzymatic colorimetric kit method on Selectra E Auto-analyzer. Friedewald's formula was applied to calculate LDL-C[22]. BMI and fasting blood sugar was also investigated.

DNA Sequencing of *SR-B1* gene

Nuclear DNA from blood samples was isolated as described by Sambrook and Russell, 2001. Primers specific to the exon-8 of *SR-B1* gene were designed on Primer3 software. The previous reports associated genetic mutations and polymorphism in exon -8 with muscular dystrophy, premature coronary artery disease, myocardial infarction and serum lipid profile[23,24,25,26]. The gene was amplified through polymerase chain reaction (PCR) followed by cycle 1 at 95°C for 6 min, cycle-2 at 93°C for 35sec, 62°C for 35sec, 72°C for 35sec for 35 times and cycle-3 at 72°C for 8min. DNA sequencing was performed on CEQ8000 genetic Analyzer (Beckman Coulter) using *SR-B1* gene specific primers. BioEdit Sequence Alignment Editor ver 7.0.9.0 was used for mutational analysis and comparison of genetic data.

SR-B1 gene expression

Total RNA extracted from the blood using PureLink RNA Mini Kit (Ambion, Life technologies TM.). cDNA synthesis of the samples and endogenous control was carried out by using RevertAid first strand cDNA synthesis kit (Thermoscientific). cDNA based primers were designed on Primer3 software containing forward primers 5'AGTCCTCGCTGGAGTTCTAC3' and reverse primer 5'CCACAGGCTCAATCTTCC3'. SR-B1 gene expression was analysed on Cepheid Smart cycler II using SYBER® GreenERTM qPCR superMix Universal kit. The conditions were 95°C for 10 min, 40 cycles of 93 °C for 30 secs, 48.5 °C for 35 sec and 72 °C for 1 min. The efficiency of assay was determined by serial dilution of equal quantity of cDNA from each sample by plotting curve slope. The mean Ct (cycle threshold) value was calculated for all samples of three groups. Relative quantification of SR-B1 transcript was calculated by the ΔΔCt method[27]. A housekeeping gene β-actin was used to normalize the qPCR data.

Statistical Analysis

Continuous variables and relative abudance of *SR-B1* gene were analyzed by one way ANOVA followed by Posthoc tukey test and exppressed as Mean±SD. Data was considered statistical significance with $p \leq 0.05$.

RESULTS

Demographic and Clinical data

The patients with diabetes and dyslipidemia showed significant deranged HDL and TG levels compared to patients with diabetes only (Figure 1). HDL-C levels were markedly decreased in group I as compared to group II. Four patients of this group were presented with normal HDL-C but their TG and LDL levels were found increased. In group I, HDL-C was markedly decrease in 16 (80%) patients and normal in 4 patients. TG levels were raised in 11(55%) patients, normal in 8 (45%) and decreased in 1 (5%) patients. Cholesterol was

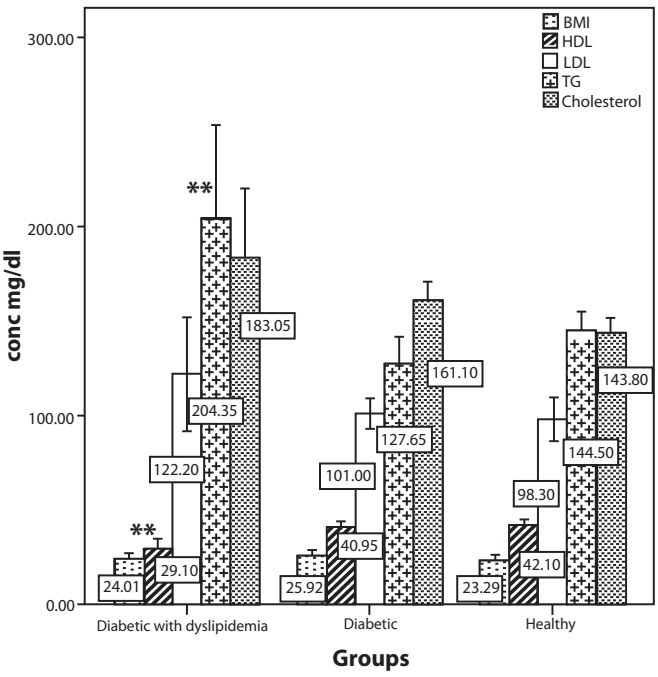


Figure 1: Lipid parameters expressed in mean ±SD.p<0.001 (highly significant).**

observed normal in 11 (55%) patients, increased in 8 (40%) and decreased in 1(5%) patient. LDL levels found normal in 12 (60%) patients, increased in 5(25%) patients and 2 (10%) with decreased levels. Eight subjects were obese. Cholesterol to HDL ratio determined the heart disease risk of these patients. Total 18 out of 20 patients were found at high risk to develop CVD. Different TG levels within the group were detected ranged lowest to the highest value. Group II and III subjects showed normal lipid profile. However, obesity was present in these groups. Therefore, lipid profiles of three groups drawn the conclusion that dyslipidemia in group I was due to diabetes not obesity. The significant difference was ($p<0.05$) observed in HDL-C and TG levels in all three groups.

DNA Sequencing of *SR-B1* gene

Figure 2 shows result of RNA, DNA and PCR. We have screened samples of group I, II and group III for the presence of any genetic mutation in exon-8 of *SR-B1* gene. We did not find genetic mutation in studied exon in disease groups. However, single nucleotide polymorphism rs5888 at position c.1050 (GCC) was detected in 18 patients of group I, 3 patients of group II and 2 control subjects (Figure 3) with major allele "C". This polymorphism was present as CC genotype in all studied subjects.

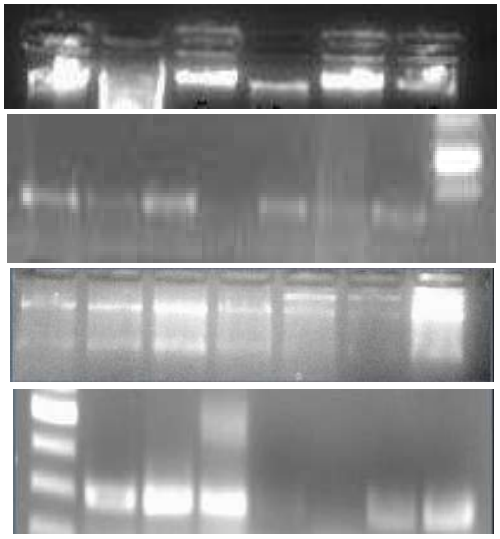


Figure 2a: DNA and Total RNA isolated from leukocyte cells b: PCR of exon-8 of *SR-B1* gene.

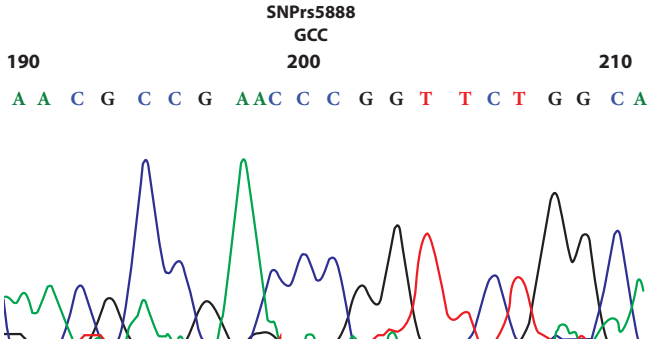


Figure 3: DNA sequencing of *SR-B1* gene. The SNP rs5888 was detected in exon-8 in samples of all groups.

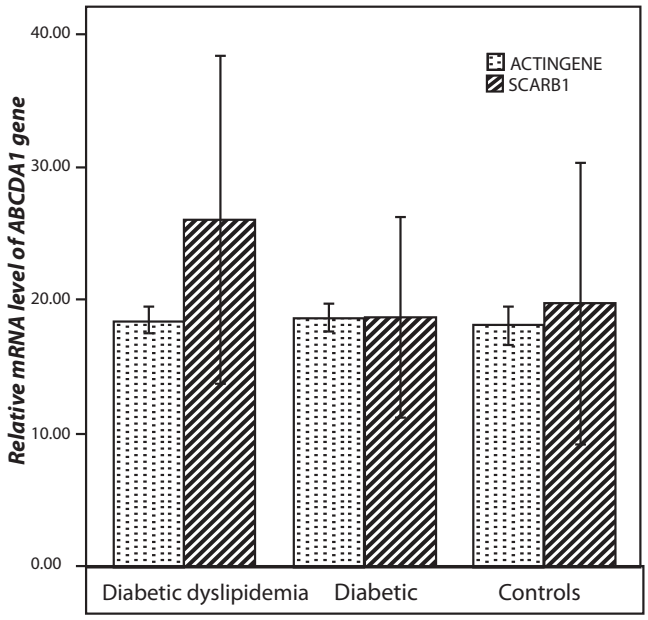


Figure 4. Normalized expression of SR-B1 in human blood cells calculated by 2Δ-ct method. Comparison of CT values showed significant decrease in *SR-B1* gene in diabetic dyslipidemia patients.

***SR-B1* gene expression**

The relative quantification was based on ΔΔCT method. Using this method, target gene expression was compared between diabetic dylipidemic (group I), diabetic (group II) and control (group III) samples (Figure 4). The decrease in SR-B1 gene expression was observed in group I compared to samples of group II & III. There was a clear fold change in gene expression of *SR-B1* gene and mean Ct value also showed significant differences between group I, group II & III. The mean Ct of group I was 26.47±6.21 compared to 18.69±3.76 of group II and 19.78±5.25 of group III. We have found clear association between decrease *SR-B1* gene expression and deranged lipid parameters especially in 3 samples. The Ct value of sample 6 was 34 with HDL level 24mg/dl. The fasting blood sugar level was 305mg/dl and the cholesterol and triglyceride levels were also raised (281 and 201 mg/dl). The Ct value of sample no 17 was 27 with a significant decrease in HDL level (17mg/dl). The triglyceride level was 346mg/dl while the fasting blood sugar was 360mg/dl. Sample no. 33 had the Ct value 26. The HDL level of this sample decreased to 32mg/dl with increased serum triglyceride level 464mg/dl. The fasting blood sugar level was 200mg/dl. The higher Ct value shows the low abundance of the target gene. Here, higher Ct value of target gene was with low copy number and clearly showed the changes in *SR-B1* gene expression. This alteration causes deranged lipid profile. These results clearly suggested the decreased expression of the *SR-B1* gene in diabetes. The control β-actin gene showed the constant expression in all samples. The efficiency of the target gene assay and the control gene assay was calculated by equation E= [10(-1/SLOPE)-1. The calculated efficiency of target and control was equal to 1.2. This shows the accuracy of qPCR. In group 1, there were 10 females and 10 males. The patients of a group I

had poor glycemic control and lowest level of HDL. In group II, out of 20 patients, 12 were females and 8 males.

DISCUSSION

Diabetes leads to several complications and dyslipidemia is one of them. Dyslipidemia is characterized as a deranged lipid parameter. In hyperglycemic dyslipidemia, low HDL-C, apoB and high triglyceride, VLDL has been reported. LDL-C level may be normal, but usually it is high[28]. Dyslipidemia is commonly present in type 2 diabetes. We have observed that diabetic patients had significantly low expression of *SR-B1* gene in circulating leucocytes cells compared to controls. The group I (diabetic dyslipidemia) showed poor glycemic control and lipid profile. The patients of group II (diabetic only) had relatively better glycemic control and their co-morbidities were not as bad as the group I. Although, their lipid profile was within the normal range but we have found most values towards the border line. It shows the effect of diabetes on lipoprotein metabolism which later on causes the dyslipidemia.

The down-regulation of the *SR-B1* gene in group I might be associated with the increase risk of atherosclerosis. Vaisman and colleague has reported protective effect of enhanced expression of *SCARB1* gene against atherogenic dyslipidemia and atherosclerosis[29]. Therefore, cure lies in the correction of lipoprotein metabolism and targeting the genes involved in RCT. We have found a clear difference between glucose level and lipid profile in three groups and results were consistent with our expression analysis. Our results suggest that expression of the *SR-B1* gene was reduced at transcriptional level in diabetic dyslipidemia patients. The low HDL-C and high TG & LDL levels showed that these patients could be prone to atherosclerosis. SR-BI is a multiligand receptor having high affinity with HDL-C particles. Diabetes itself causes change in lipoprotein and elevated TG level may impair the beneficial effects of SR-B1. We have seen the normal lipid profile in diabetic patients of group II and normal expression of *SR-B1* gene. Therefore, we can clearly demonstrate that decrease HDL-C levels in a group I was due to the decreased expression of the *SR-B1* gene. Single nucleotide polymorphism rs5888 did not associate with dyslipidemia in diabetes as it was found in control as well.

CONCLUSION

The exon-8 of SR-B1 did not contain any genetic mutation and identified polymorphism rs5888 was a normal variant in diabetic dyslipidmia Pakistani subjects. The expression of SR-B1 receptor gene was down-regulated at transcriptional level which may indicate the disturbance in reverse cholesterol transport and resulted in decreased HDL levels.

LIMITATIONS AND RECOMMENDATIONS

Small sample size was due the lack of interest for participation from patients. The identifications of genetic variants in other exons of *SR-B1* gene in our local population is important to understand dyslipidemia for better management. Large scale studies including whole exome sequencing will give better insight.

AUTHORS' CONTRIBUTION

Tayyaba Batool: Experimental work and drafting of the manuscript.
Asifa Majeed: Conceptual framework design, review of the manuscript and approval of the final draft.

REFERENCES

1. WHO. Diabetes country profiles [Internet]. World Health Organization. 2016 [cited June, 2016]. Available from: Available from: http://www.who.int/diabetes/country-profiles/en/#P.
2. Di Marco E, Gray SP, Jandeleit-Dahm K. Diabetes alters activation and repression of pro- and anti-inflammatory signaling pathways in the vasculature. Front Endocrinol (Lausanne). 2013;4:68.
3. Leiva A, Verdejo H, Benitez ML, Martinez A, Busso D, Rigotti A. Mechanisms regulating hepatic SR-BI expression and their impact on HDL metabolism. Atherosclerosis. 2011;217(2):299-307.
4. Rhainds D, Brissette L. The role of scavenger receptor class B type I (SR-BI) in lipid trafficking. defining the rules for lipid traders. The international journal of biochemistry & cell biology. 2004;36(1):39-77.
5. Acton S, Rigotti A, Landschulz KT, Xu S, Hobbs HH, Krieger M. Identification of scavenger receptor SR-BI as a high density lipoprotein receptor. Science. 1996;271(5248):518-20.
6. Kozarsky KF, Donahee MH, Glick JM, Krieger M, Rader DJ. Gene transfer and hepatic overexpression of the HDL receptor SR-BI reduces atherosclerosis in the cholesterol-fed LDL receptor-deficient mouse. Arteriosclerosis, thrombosis, and vascular biology. 2000;20(3):721-7.
7. Chen SN, Cilingiroglu M, Todd J, Lombardi R, Willerson JT, Gotto AM, Jr., et al. Candidate genetic analysis of plasma high-density lipoprotein-cholesterol and severity of coronary atherosclerosis. BMC medical genetics. 2009;10:111.
8. Weissglas-Volkov D, Pajukanta P. Genetic causes of high and low serum HDL-cholesterol. Journal of lipid research. 2010;51(8):2032-57.
9. Wu DF, Yin RX, Hu XJ, Aung LH, Cao XL, Miao L, et al. Association of rs5888 SNP in the *scavenger receptor class B type 1* gene and serum lipid levels. Lipids in health and disease. 2012;11:50.
10. Rodriguez-Esparragon F, Rodriguez-Perez JC, Hernandez-Trujillo Y, Macias-Reyes A, Medina A, Caballero A, et al. Allelic variants of the human scavenger receptor class B type 1 and paraoxonase 1 on coronary heart disease: genotype-phenotype correlations. Arteriosclerosis, thrombosis, and vascular biology. 2005;25(4):854-60.
11. Wu DF, Yin RX, Yan TT, Aung LH, Cao XL, Miao L, et al. The SCARB1 rs5888 SNP and serum lipid levels in the Guangxi Mulao and Han populations. International journal of medical sciences. 2012;9(8):715-24.
12. Ayhan H, Gormus U, Isbir S, Yilmaz SG, Isbir T. *SCARB1* Gene Polymorphisms and HDL Subfractions in Coronary Artery Disease. In Vivo. 2017;31(5):873-6.
13. 13. Zanoni P, Khetarpal SA, Larach DB, Hancock-Cerutti WF, Millar JS, Cuchel M, et al. Rare variant in scavenger receptor BI raises HDL cholesterol and increases risk of coronary heart disease. Science. 2016;351(6278):1166-71.
14. Niemsiri V, Wang X, Pirim D, Radwan ZH, Bunker CH, Barmada MM, et al. Genetic contribution of SCARB1 variants to lipid traits in African Blacks: a candidate gene association study. BMC medical genetics. 2015;16:106.
15. Vickers KC, Rodriguez A. Human scavenger receptor class B type

I variants, lipid traits, and cardiovascular disease. Circulation Cardiovascular genetics. 2014;7(6):735-7.
16. World Health Organization – Diabetes country profiles, 2016 [Internet]. 2016 [cited June, 2018]. Available from: http://www.who.int/diabetes/country-profiles/en/#P.
17. Khurram M, Gul H, Rahman F, Faheem M. Lipid abnormalities in patients with type 2 diabetes. J Rawal Med Coll. 2013;17(2):167-8.
18. Alam M, Khiemani H, Malik A, Aurengzeb M, Pathan M, Imran K. Diabetes mellitus type 2; pattern of dyslipidemias. Professional Med J. 2013;20(3):360-4.
19. Khan M, Latif M, Hussain A. Pattern Of Dyslipidemia And Other Risk Factors For Coronary Artery Disease And Macrovascular Complications In Diabetic Patients. Esculapio J Services Inst Med Sci. 2016;12(4):190-3.
20. Ginsberg HN. Lipoprotein physiology in nondiabetic and diabetic states. Relationship to atherogenesis. Diabetes care. 1991;14(9):839-55.
21. Betteridge DJ. Diabetes, lipoprotein metabolism and atherosclerosis. British medical bulletin. 1989;45(1):285-311.
22. Friedewald WT, Levy RI, Fredrickson DS. Estimation of the concentration of low-density lipoprotein cholesterol in plasma, without use of the preparative ultracentrifuge. Clinical chemistry. 1972;18(6):499-502.
23. Stanislovaitiene D, Lesauskaite V, Zaliuniene D, Smalinskiene A, Gustiene O, Zaliaduonyte-Peksiene D, et al. SCARB1 single nucleotide polymorphism (rs5888) is associated with serum lipid profile and myocardial infarction in an age- and gender-dependent manner. Lipids Health Dis. 2013;12:24.
24. Stanislovaitiene D, Zaliuniene D, Krisciukaitis A, Petrolis R, Smalinskiene A, Lesauskaite V, et al. SCARB1 rs5888 is associated with the risk of age-related macular degeneration susceptibility and an impaired macular area. Ophthalmic Genet. 2017;38(3):233-7.
25. Goodarzynejad H, Boroumand M, Behmanesh M, Ziaee S, Jalali A. The rs5888 single nucleotide polymorphism in scavenger receptor class B type 1 *(SCARB1)* gene and the risk of premature coronary artery disease: a case-control study. Lipids Health Dis. 2016;15:7.
26. Acton S, Osgood D, Donoghue M, Corella D, Pocovi M, Cenarro A, et al. Association of polymorphisms at the *SR-BI* gene locus with plasma lipid levels and body mass index in a white population. Arterioscler Thromb Vasc Biol. 1999;19(7):1734-43.
27. Livak KJ, Schmittgen TD. Analysis of relative gene expression data using real-time quantitative PCR and the 2(-Delta Delta C(T)) Method. Methods. 2001;25(4):402-8.
28. Ginsberg HN. REVIEW: Efficacy and mechanisms of action of statins in the treatment of diabetic dyslipidemia. J Clin Endocrinol Metab. 2006;91(2):383-92.
29. Vaisman BL, Vishnyakova TG, Freeman LA, Amar MJ, Demosky SJ, Liu C, et al. Endothelial Expression of Scavenger Receptor Class B, Type I Protects against Development of Atherosclerosis in Mice. Biomed Res Int. 2015;2015:607120.
30. Goldberg IJ. Clinical review 124: Diabetic dyslipidemia: causes and consequences. J Clin Endocrinol Metab. 2001;86(3):965-71.

ORIGINAL ARTICLE

PROPOSAL OF A FUNCTIONAL MODEL, AND STUDENTS' PERSPECTIVE REGARDING ITS UTILIZATION IN BUILDING THE CONCEPT OF THE TRENDELENBURG TEST

Minaa Ashfaq[1], Asma Hafeez[2], Maleeha Zafar[3], Maryam Ashfaq[4]

[1]POF Hospital, Wah
[2,3,4]Department of Anatomy, HITEC-IMS Taxila

ABSTRACT

Objective: To propose a functional model from indigenous resources, and assess its effectiveness for explaining the difficult concept of Superior gluteal nerve injury and positive Trendelenburg test.

Study Design: Quasi Experimental Study

Place and Duration of Study: Department of Anatomy HITEC -Institute of Medical Sciences Taxila. Duration was 1 week.

Material and Methods: Hundred students of first year MBBS class were selected by purposive sampling technique, who were previously taught the concept, using conventional teaching methods, now learnt it again using the model. Feedback was taken from them via an online questionnaire. Google forms were used for collection of data and its analysis.

Results: Out of the 95 submitted responses, 13 (13.7%) students said that they did not understand the concept previously and now they understand it very well, while 78 (82.1%) students said that they understood the concept previously but now they understand it better. A total of 37 students (38.9%) said that it was very easy, and 41 students (43.2%) said that it was easy for them to understand the concept. Furthermore, 72 (94.7%) students said that they think more of such models should be made.

Conclusion: The model proved quite effective in explaining the difficult concept of Trendelenburg test, and construction of functional anatomical models from indigenous resources should be encouraged.

Key words: *Model, Skeleton, Superior gluteal nerve, Trendelenburg test*

How to cite this article: Ashfaq M, Hafeez A, Zafar M, Ashfaq M. Proposal of a Functional Model, and Students' Perspective Regarding its Utilization in Building the Concept. HMDJ 2021; 01(01): 8-13

INTRODUCTION

Conceptualizing anatomy is of paramount importance for effective clinical practice; hence, Anatomy must be taught and learnt within a clinically relevant context with the help of interactive and engaging learning activities[1].As the reformed medical curricula are being introduced, the hours originally allocated to Anatomy teaching are reduced, calling for innovative approaches for an enjoyable and fruitful experience of teaching and learning Anatomy for students in the emerging context[2]. While learning Anatomy, the three-dimensional visualization of structures is of importance for concepts of structures as well as functions[3]. The Positive Trendelenburg test is one such concept and is used by medical practitioners internationally[4]. It demonstrates how an inability of the abductors of thigh at hip joint to perform their function on one side, leads to a drop in the pelvis and limb lengthening of the other side[5].

Correspondence to: Dr. Minaa Ashfaq, POF Hospital, Wah
Email: minaaashfaq@gmail.com

Conflict of interest: None
Financial Disclosure: Nil

Received: 25-07-2021
Accepted:08-08-2021

The superior gluteal nerve innervates the gluteus medius and gluteus minimus muscle. These muscles abduct the thigh at hip joint, thus decrease the angle between thigh and trunk. During walking, one foot is fixed to the ground and the other is lifted. When the gluteus medius and minimus of the supported side contract, they reduce the angle between thigh and trunk by tilting the trunk towards the supported side, and as a result lifting the pelvis of the unsupported side up. This creates a small gap between the foot and ground on the unsupported side and helps in clearing the foot off the ground without dragging. The Superior gluteal nerve is vulnerable to injury by a wrongly placed intragluteal injection resulting in paralysis of the gluteus medius and minimus. As a result, the pelvis of opposite side will drop when the person lifts that foot off the ground[6]. This is called Positive Trendelenburg sign. Person showing it might develop certain compensatory gaits in order to clear the foot off ground, collectively known as Trendelenburg gait and include the gluteal gait, the steppage gait and the swing- out gait [7].

The concept explains how injury to muscles of one side of the thigh (abductors of thigh), leads to a drop in the pelvis, and limb lengthening of the opposite (healthy) side [8]. The complexity and seemingly contradictory nature of the concept makes it challenging for students to imagine. There is no mention in published literature regarding use of a functional model for explaining it. Hence, a need for exploring that possibility was felt.

The active learning is defined as "anything that involves students in doing things and thinking about the things they are doing"[9] while Felder and Brent defined it as "anything course-related that all students in a class session are called upon to do other than simply watching, listening and taking notes"[10]. The anatomy is not only about structure; its clinical and functional aspects are also important[1].The functional models can be used for this purpose and explaining difficult concepts like Trendelenburg sign, but there are little to few functional models available in Anatomy museums.

Indigenous resources can be used to make simple and cost-effective functional models to facilitate the students in understanding difficult concepts and their application in clinical context. the understanding of students. Some already available models can also be modified to create effective functioning models. A functional model to demonstrate the concept of "Injury to the superior gluteal nerve" was fashioned by modification of a dis-articulated skeleton, using indigenous resources with the objective to explore students' perceptions regarding its utilization in building the concept of the Trendelenburg test.

MATERIAL AND METHODS

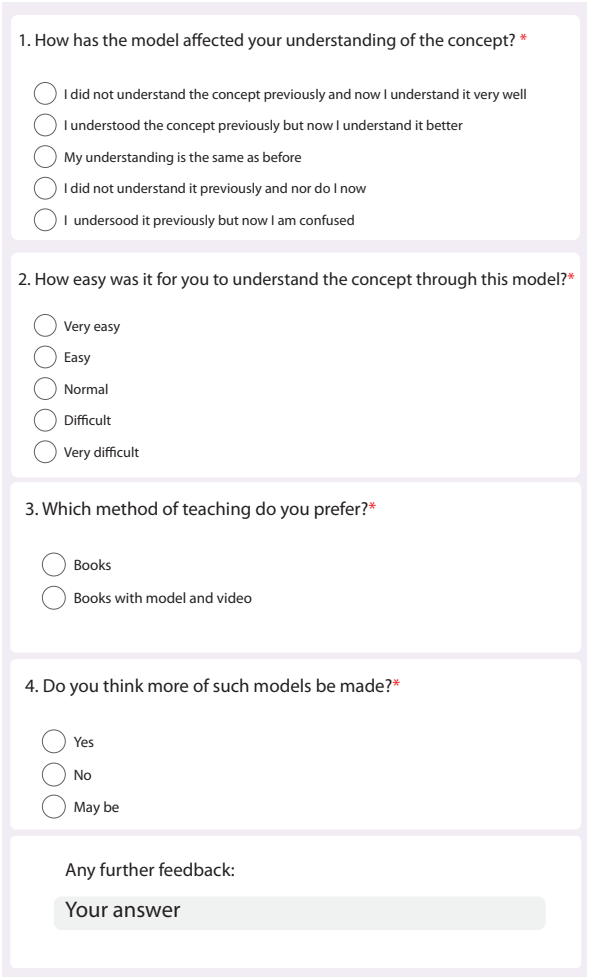
It was a one week long quasi-experimental study, conducted at HITEC-Institute of Medical Sciences Anatomy Department after the approval of the institutional ethics committee. The purposive sampling technique was employed to select the participants.

A functional model explaining the concept of Trendelenburg test was fashioned from the indigenous resources. One hundred first year MBBS students of HITEC-IMS, that were taught the concept of Trendelenburg test already by the conventional lecture were engaged for the study after informed consent. Considering the online teaching due to COVID pandemic, a video was recorded showing the concept with the help of the functional model and a synchronous narration explaining the concept. The video was uploaded on the YouTube, and the student were provided the link https://youtu.be/zyyFOHX25Mo, where they accessed the video and tried to learn / clarify the concept of Trendelenburg test. They were then asked to fill the online feedback proforma (Figure 1), validated by five medical educationists, two of whom were anatomists as well. The feedback proforma assessed the effectiveness of the model in learning the Trendelenburg test in comparison to the conventional lecturing. Google forms were used for collection of data and its analysis. A total of 95 students participated and gave their feedback.

MAKING OF THE MODEL

This model has been fashioned by using artificial bones of lower part of body and cheap, locally acquired material.

The bones used included lower two lumber vertebrae, sacrum, right and left hip bones, femora, tibiae, fibulae, and patellae.


1. How has the model affected your understanding of the concept? *

- I did not understand the concept previously and now I understand it very well
- I understood the concept previously but now I understand it better
- My understanding is the same as before
- I did not understand it previously and nor do I now
- I undersood it previously but now I am confused

2. How easy was it for you to understand the concept through this model?*

- Very easy
- Easy
- Normal
- Difficult
- Very difficult

3. Which method of teaching do you prefer?*

- Books
- Books with model and video

4. Do you think more of such models be made?*

- Yes
- No
- May be

Any further feedback:

Your answer

Figure 1: The Feedback proforma.

Figure 2: The complete model hanging from the stand.

The bones were articulated together by the help of wires while allowing reasonable movement at movable joints (Figure 2).

The foot bones were not used in process. Instead, an artificial foot was created by using paper Mache and was articulated with the lower end of tibia and fibula by a thin metallic rod passing through and through the lower end of tibia and fibula, allowing dorsi and plantar flexion (Figure 3).

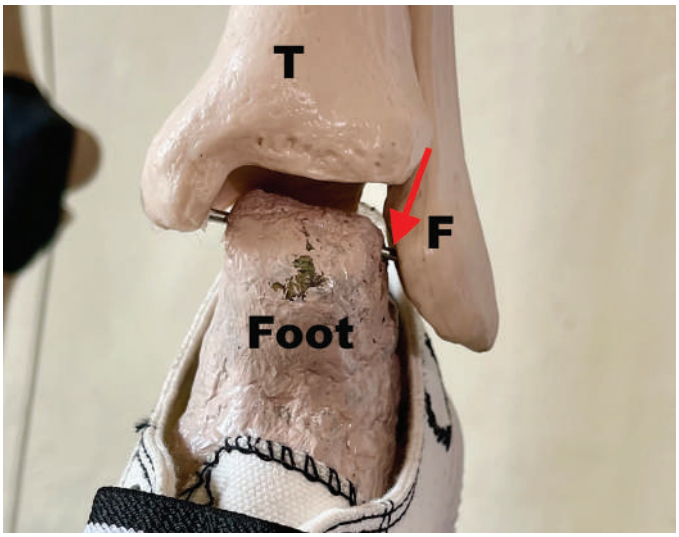


Figure 3: Showing the artificial articulation between lower ends of tibia (T), fibula (F) and artificial foot with the help of metallic rod indicated by red arrow.

For creating the knee joint, a metallic rod was passed horizontally through both condyles of lower end of femur, and the upper end of tibia was hung at this rod with the help of wires (Figure 4).

The knee joint was further stabilized by the help of rubber strips fixed both medially and laterally. The rubber strips used were cut from a tore type tube which can be acquired from basic tyre sellers. This stabilizing of the knee joints is an important step in ensuring the functionality of the model by giving it an upright position; essential for the demonstration of the Trendelenburg test (Figure 4). The patella was hung from the front of lower end of femur.

The gleno-femoral joint was fixed through a strong flexible wire passing through the head of the femur, and the acetabulum while allowing abduction and rotation of thigh at this joint.

The sacroiliac, interpubic, superior and inferior tibiofibular joints were fixed by wires.

Lower two lumbar vertebrae were articulated together and to the sacrum through a string passing through their centre, which was later used to hang the model (Figure 5). The model was hung from this string at a height which allowed the soles of shoes to touch the ground.

After the essential step of articulation of the skeleton was done, the muscles were cut from the same rubber tube used

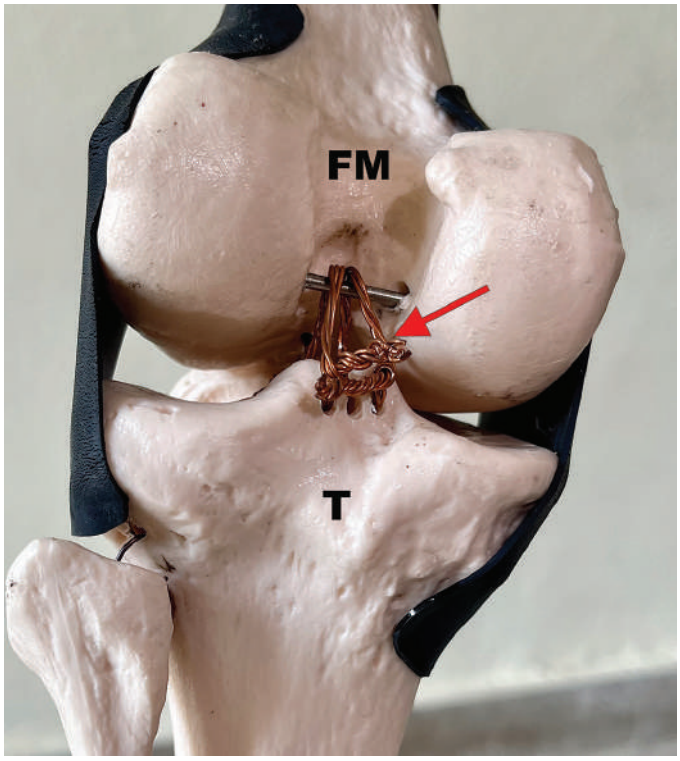


Figure 4: The posterior view of the knee joint. The upper end of tibia (T) can be seen hanging from lower end of femur (Fm) with the help of wires (Red arrow) The rubber straps holding the bones in place on both medial and lateral sides are also apparent.

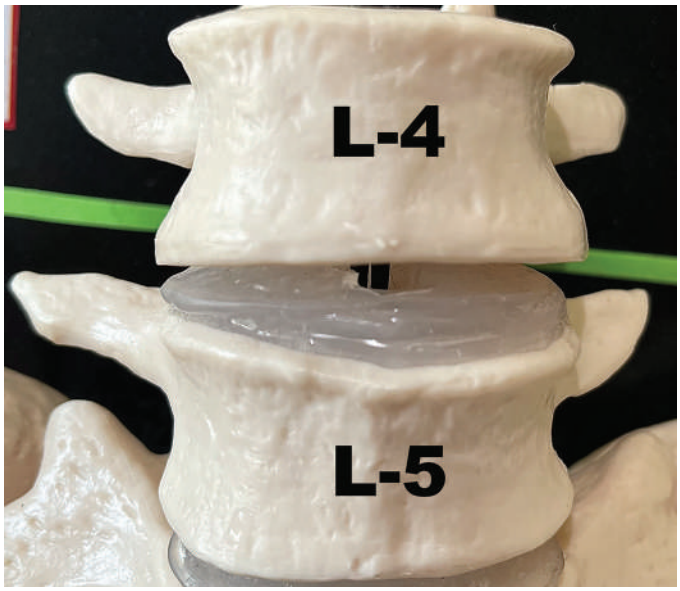


Figure 5: The articulation of lower two lumbar vertebrae (L-4 and L-5) by the string which was used to hang the model (red arrow).

previously, painted and attached with a strong adhesive glue at their origins on the hip bone. At the insertion strong snap buttons were used. One part of the button was attached on the muscle directly while the other part that is to be attached on the femur was attached to a strong cloth. The cloth along with the button was glued onto the femur at the respective insertion

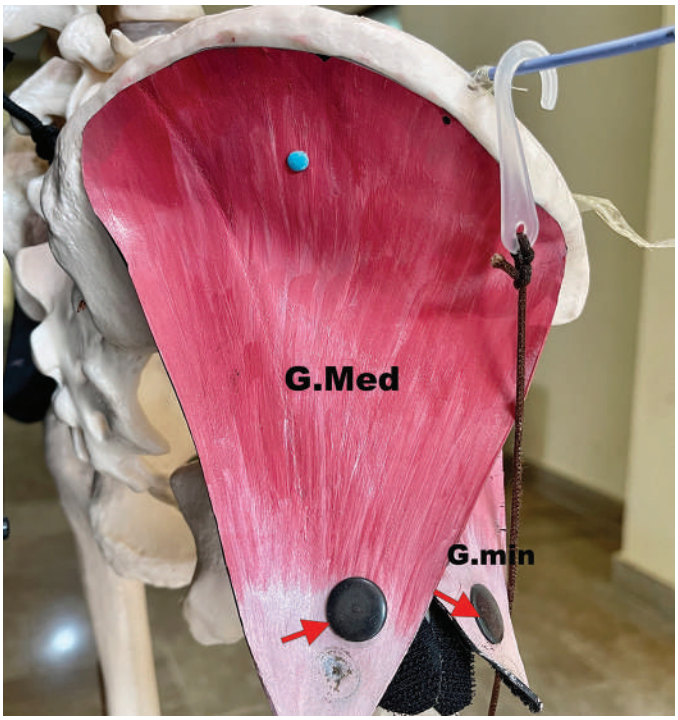


Figure 6: The gluteus medius (G.Med) and minimus (G.min) fashioned from rubber sheets are fixed at insertion by bottons (red arrows) which can be unclasped to depict paralysis of muscles.

points. When installing the buttons, it was kept in mind that there should be some tension in the muscle when the button is closed. Opening the button represented muscle/nerve injury (Figure 6).

A thin straight metallic rod was positioned and set on top of the pelvis to make the 'pelvis tilt' visually easier to detect (Figure 7).

Strings were attached to back of the shoes and passed through a loop attached to the back of mid femur. Hooks were attached

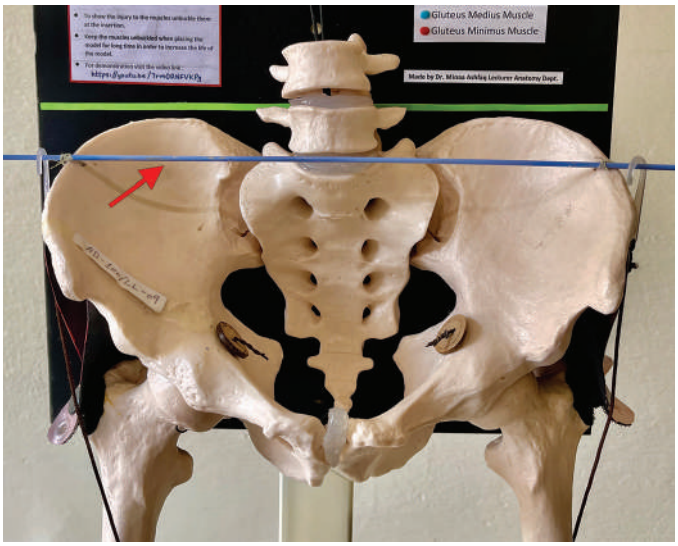


Figure 7: The red arrow indicates the metallic bar placed on pelvis to facilitate visualization of pelvis tilt.

Figure 8: The string (red arrow) attached to the shoe is passed through a loop on back of mid femur and is used to flex the knee and lift the foot off the ground.

to the end of the string for fixing in another loop at the back of the shoe, to keep the knee flexed when needed, in order to lift the foot off the ground (Figure 8).

A custom-built stand was made for the model according to its height. A support was provided at the back of the pelvis so that the pelvis does not rotate antro-posteriorly. Additionally, free space was ensured behind the legs so that there is space for the knees to flex (Figure 2).

The total expenditure on the model excluding the labour, the stand and the skeleton bones was under PKR 1000/-. The cost of the stand was PKR 4000/-.

Working of the model:

1. When the muscle fabric on both sides is buttoned or buckled, the model is at its default state. This is the structure of the skeleton when the muscle is healthy and undamaged. The pelvis remains straight as shown by the rod on top of it. This "undamaged muscle structure" is presented to the students before the beginning of the demonstration as the "controlled or reference environment".
2. To demonstrate injury to the muscles, one side of the pelvis

is unbuckled. A slight tilting of the pelvis is observed after this step. This is due to the change in tension between the two sides as the muscle on the other side is now more stretched.

3. At this point, it is to be observed that this slight tilt to the opposite side is not very significant as long as the feet are placed on the ground, i.e., the skeleton is standing. This tilt is even less significant in real patients because the weight of the torso on the pelvis balances out some of the imbalance. This weight can be demonstrated on the model by placing both palms on the top of the pelvis on each side and pushing down.
4. Now, with one side of the muscles unbuckled (representative of injury), the foot of the same side is lifted off the ground. The pelvis remains straight.
5. Then, the foot of the opposite side of the injury is lifted. This leads to a significant drop of the pelvis on the unsupported side.
6. Keeping this foot lifted, functional limb lengthening and compensatory gaits can also be demonstrated.

RESULTS

A total of 95 students saw the demonstration of model in the video uploaded on the youtube and gave the feedback. Out of which 61(64.2%) were female and 34 (35.8%) were male.

The question-1 inquired about the effectivity of model in understanding the concept in comparison to their previous understanding. Out of 95, 13 (13.7%) students said they did not understand the concept previously but now very well. According to 78 (82.1%) students, they understood the concept previously but now they understand it better. However, 4 (4.2%) students did not find any change in their understanding after watching the video. None of the students said that they did not

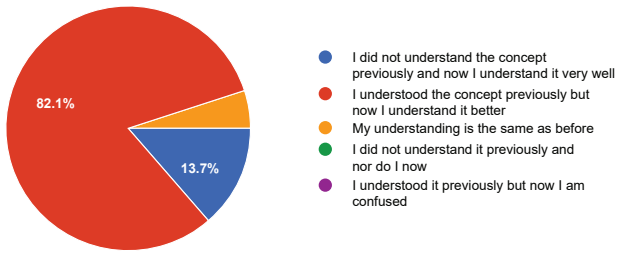


Figure 9: Pie chart depicting how the model has affected the students understanding of the concept.

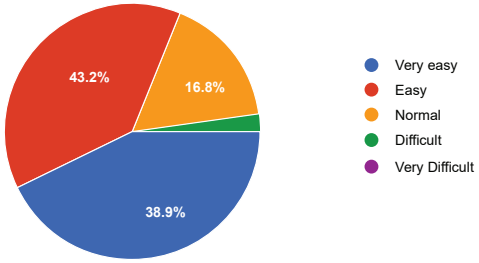


Figure 10: Pie chart showing students responses about how easy it was to understand the concept with model.

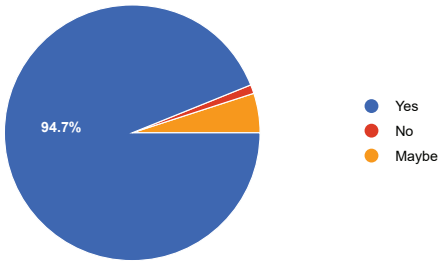


Figure 11: Pie chart showing students responses about need to make more of such models.

understand it previously and nor do now. Similarly, none of the students said that they understood it previously but now they are confused (Figure 9).

The second question was about the ease the model offered for understanding the concept. Out of 95, 37 students (38.9%) found it very easy, 41 students (43.2%) easy, while 16 student (16.8%) remained neutral. However, 1 student (1.1%) found it difficult, while no one opined it to be very difficult (Figure 10).

All students agreed that it was better to understand the concept with assistance of model and video along with the book, than from book alone.

On being asked about their opinion regarding more of such models to be made, out of 95, 76 students responded to this question. 72 (94.7%) students said 'yes', 1 (1.3%) student said 'no', 3 (3.9%) students said 'may be' (Figure 11).

DISCUSSION

The purpose behind the making of this model was to facilitate the learning of the students attempting to understand the aforementioned concept. Popular discourse in pedagogy points towards the higher efficacy of practice and demonstration-based learning[11]. It has been long signified by research that student retention is significantly higher when they are learning concepts through practical hands-on laboratory exercises as compared to lectures[12]. The same is endorsed by the fact that the majority of students in our study reported positive effectivity of the model in clearing the difficult concept of Trendelenburg test.

Our study also highlights the ease reported by majority of students in understanding the concept with the help of model. This is in accordance with the reported fact that the topics which are usually considered "difficult" or "tricky" by students can often be explained more effectively through models, demonstrations, and simulations. Student comprehension and retention is shown to be at the level of 0.75 ± 0.25 with hands-on teaching methods as compared to traditional interactive lectures which were at 0.46 ± 0.37 [13]. Moreover, the studio learning – where students get to learn concepts through hands-on practical experiences instead of lectures – is increasingly entering the modern discourse as the 'ideal' method of teaching, it cannot be implemented universally

without significant policy and budgetary reconstruction at the governmental level. However, as the model presented in this study aims to show, it can be implemented in a cost-effective way for targeted concepts[14]. This can be done by institutions and teachers wishing to enhance their students' conceptual understanding.

Most of the students engaged in this study felt the need for making of more functional models as an innovative method for learning Anatomy and difficult concepts therein. This needs for the such innovation in learning methods has become more important in the recent years due to globalization[15]. Globalization has significantly increased the competition modern medical students are up against. This increased global competition puts the students who have fewer resources at their disposal at a disadvantage. A good ratio of the medical colleges based in developing countries do not have the tangible and intangible resources to create studio-based learning environments for their students.

Research has shown that student performance increases significantly in both theoretical and demonstration assessments if their learning techniques involve a higher degree of hands-on activities[16].

CONCLUSION AND RECOMMENDATIONS

Some targeted difficult concepts in Anatomy and other fields of medicine can be explained effectively using specially designed functioning models. Locally available models can be modified into functioning models, and similarly functioning models can be made from scratch using locally available cost-effective resources. Moreover it is recommended that in the case of difficult concepts, further different teaching approaches should be tried and tested.

AUTHORS' CONTRIBUTION

Minaa Ashfaq: Conceived, model making, data analysis, manuscript writing.
Asma Hafeez: Conceived, final approval of manuscript and accountable for integrity of study.
Mariam Ashfaq: Model making, manuscript writing.
Maleeha zafar: Manuscript editing, bibliography, proof reading.

REFERENCES

1. B Parate S, A. Bhusari P, S Anturlikar V. Use of interactive teaching – Learning approaches in anatomy. IP Indian J Anat Surg Head, Neck Brain. 2019;5(3):76–9.
2. Azer SA, Eizenberg N. Do we need dissection in an integrated problem-based learning medical course? Perceptions of first- and second-year students. Surg Radiol Anat. 2007;29(2):173–80.
3. Berney S, Bétrancourt M, Molinari G, Hoyek N. How spatial abilities and dynamic visualizations interplay when learning functional anatomy with 3D anatomical models. Anat Sci Educ. 2015;8(5):452–62.
4. Bailey R, Selfe J, Richards J. The role of the Trendelenburg Test in the examination of gait. 2009;14(3):190–8.
5. Kendall K, Schmidt C, Ferber R. the Relationship Between Hip Abductor Muscle Strength and Magnitude of Pelvic Drop Following a 3 Week Strengthening Protocol in Non-Specific Low Back Pain Patients. J Sport Rehabil. 2010;19(4):422–35.
6. Caviglia H, Cambiaggi G, Vattani N, Landro ME, Galatro G. Lesion of the hip abductor mechanism. Sicot-J. 2016;2:29.
7. Noury L. Trendelenburg ' s Test and Trendelenburg ' s Gait. 1895;1–8.
8. Cassidy L, Bandela S, Wooten C, Jennifer C, Tubbs RS, Loukas M. Friedrich trendelenburg: Historical background and significant medical contributions. Clin Anat. 2014;27(6):815–20.
9. Bonwell C, Eison J. Active Learning: Creating Excitement in the Classroom. 1991 ASHE-ERIC Higher Education Reports. 1991.
10. Felder BRM, Brent R. Active Learning: An Introduction. 2009;(August).
11. Mathews JM. Using a studio-based pedagogy to engage students in the design of mobile-based media. English Teach. 2010;9(1):87–102.
12. Glasson GE. The effects of hands-on and teacher demonstration laboratory methods on science achievement in relation to reasoning ability and prior knowledge. J Res Sci Teach. 1989;26(2):121–31.
13. 13. Kapici HO, Akcay H, de Jong T. Using Hands-On and Virtual Laboratories Alone or Together-Which Works Better for Acquiring Knowledge and Skills? J Sci Educ Technol. 2019;28(3):231–50.
14. Tsaparlis G. Learning at the Macro Level: The Role of Practical Work. 2009;109–36.
15. Roadrangka V, Yeany RH. A study of the relationship among type and quality of implementation of science teaching strategy, student formal reasoning ability, and student engagement. J Res Sci Teach. 1985;22(8):743–59.
16. Deese WC, Ramsey LL, Walczyk J, Eddy D. Using Demonstration Assessments to Improve Learning. J Chem Educ. 2000;77(11):1511–6.

ORIGINAL ARTICLE

IS HISTOPATHOLOGICAL EXAMINATION OF EVERY SURGICALLY RESECTED GALLBLADDER FOR SYMPTOMATIC GALLSTONES REALLY NECESSARY? A REVIEW OF 644 PATIENTS IN ISLAMABAD, PAKISTAN

Muhammad Saad[1], Usman Ali[2], Urooj Aamir[2], Omair Ali Khan[2], Muhammad Asad Khan[2], Faiza Kazi[3]

[1]Shaikh Zayed Hospital, Lahore
[2]Fauji Foundation Hospital, Rawalpindi
[3]Pathology Department, Foundation University Medical College, Islamabad

ABSTRACT

Background: Cholecystectomy done for symptomatic gallstones, is the most common elective surgical procedure. Histological examination of every gallbladder specimen is often questioned since the incidence of these conditions is very low and varies from country to country.

Objective: To ascertain the necessity of gallbladder pathological examination based on frequency of malignant and premalignant gall bladder disease among resected specimens.

Study Design: Cross Sectional study.

Place and Duration of Study: Department of Pathology, Fauji Foundation Hospital Rawalpindi. Duration of study was 8 months.

Material and Methods: Data of only those gallbladder specimens was included in the study who had a preoperative diagnosis of gallstones using ultrasonography (USG). Data was computed on Statistical Package for Social Sciences (SPSS Version 21). Data was analyzed using software and interpreted in the form of frequencies and percentages.

Results: A total of six hundred and forty-four samples were analyzed. Most specimens received belonged to patients of 41-60 years age group. There was predominance of specimens from female subjects (96.3%). Most common pathological diagnosis was chronic cholecystitis 79.2%.One case of gallbladder adenocarcinoma was identified. Sample identified was of an elderly woman (75 years). Specimen had gross increase in wall thickness, ulceration and exophytic growth. pT2 was the tumor stage.

Conclusion: The frequency of incidental gallbladder carcinoma is very low among our population. It was only seen in one old woman. Diagnosis of gall bladder carcinoma is rare. Carcinoma occurs with gross features suggestive of malignancy. Old age patient's sample should always be checked. We do not prefer routine histological examination of every specimen and therefore, advocate a selective approach in pathology referrals from surgeons.

Key words: *cholecystectomy; gallbladder; gallstones; pathological examination.*

How to cite this article: Saad M, Ali U, Aamir U, Khan OA, Khan MA, Kazi F. Is histopathological examination of every surgically resected gallbladder for symptomatic gallstones really necessary? A review of 644 patients in Islamabad, Pakistan. HMDJ 2021; 01(01): 14-17

INTRODUCTION

Incidence of gall stones is on the rise due to sedentary life style and obesity epidemic[1]. The incidence varies among different parts of the world. It is lowest in Black African (less than 5%) and highest in American Indian (64-73%)[2]. In India incidence is around 10-22% while 11% in Pakistan[2,3]. Gallstones can present in the form of complications like acute or chronic cholecystitis, pancreatitis, biliary tract infections, mucocele etc[4]. Risk factors for gall stones include, increasing age, female gender, pregnancy, obesity, ethnic background, family history. Apart from these, there are numerous modifiable risk factors which include rapid weight loss, drugs like somtatostatin analogues, oral contraceptive pills, biliary tract infections, cirrhosis, metabolic syndrome etc[2,5]. Treatment options include laparoscopic or open cholecystectomy. Natural Orifice Transluminal Endoscopic Surgery (NOTES) and robotic surgery are among the newer techniques of cholecystectomy[6,7]. Bile salts treatment can be used in cholesterol stones but not in pigment bile stones[5]. After resection of gallbladder, pathological examination is warranted to detect any carcinoma in situ or carcinoma gall bladder. Large gall stones are a risk factor for developing carcinoma gall bladder. Incidence of carcinoma gallbladder in Pakistan is 11/100,000 while in India it is 22/100,000. Moreover, prognosis of advanced carcinoma gallbladder is poor with surgery as the only option of cure[8].

The approach of surgeons for pathology referral of resected gallbladder specimens for symptomatic gallstones is not guided

Correspondence to: Dr. Muhammad Saad, Shaikh Zayed Hospital, Lahore.

Email: saadsaadnadeem@gmail.com

Conflict of interest: None
Financial Disclosure: Nil

Received: 28-09-2021
Accepted: 18-10-2021

by local data/ guidelines. Some surgeons selectively refer samples, referring only those specimens where either history or gross features are suggestive of malignancy[9]. Others send all specimens for histology examination. In Pakistan, healthcare facilities are poor. Patients bear the cost of healthcare themselves. Furthermore, an unnecessary referral of gallbladder specimen might put extra burden on limited resources. Various studies have reported gall bladder carcinoma only in macroscopically suspicious specimens and recommended a selective approach for histology examination[10,12]. Thus, we have designed this study to find the patterns of pathological lesions in gallbladder specimens resected for symptomatic gall stones and define local policy that whether routine pathological examination of carcinoma gallbladder is warranted or not. Currently the policy of the institute is to send all gallbladder specimens for histological examination.

MATERIAL AND METHODS

A case series study was conducted in 2016 in the department of Histopathology, Foundation University Medical College, Islamabad from Jan till Oct 2016. Ethical approval was taken from the institute's ethical and review board (No. 215/FF/FUMC/ERC). All consecutive samples received in the laboratory with clinical diagnosis of symptomatic gallstones were included. All the specimens were stored in 10% formalin and were sent for histopathological examination. Hematoxylin and Eosin staining was done. Poorly fixed specimens, referred cases or pre-operative diagnosis of cancer cases were not included in the study. Slides were reviewed and diagnosed by at least one fellow pathologist of the department. The data was collected by the investigators with the help of Self-Administered Proforma sheet. Data was put in Statistical Package for Social Sciences Version 21. Data analysis was done. Descriptive statistics were assessed on variables.

RESULTS

The study sample consisted of 644 patients. The age of the patients was divided into 5 groups. 389 (60.4 %) patients were between the ages of 41-60 years, 126 (19.6%) patients were between the ages of 61-80 years whereas 107 (16.6%) were between 21-40 years and 14 (2.2%) were less than 20 years old. These findings are given in table 1.

Out of 644, 620 (96.3%) of the study participants were females and 24 (3.7%) were males. Male to female ratio was 1:26 showing a female preponderence. The findings are shown in figure 1.

Table 1: Age group of the participants:

Age Group	Distribution Percentage
1. Less than 20 years	2.17%
2. 21-40 years	16.61%
3. 41-60 years	60.4%
4. 61-80 years	19.57%
5. More than 80 years	1.24%

It was found out that the majority of the participants had dyspepsia (44.72%), pain in hypochondrium 239 (37.1%) and

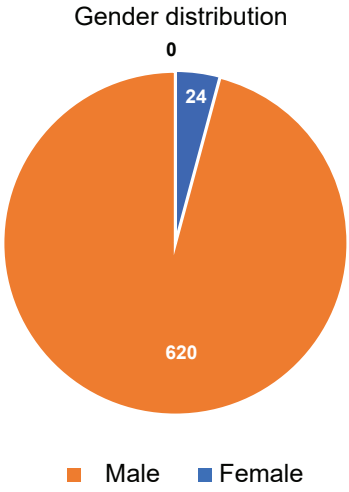


Figure 1: Gender distribution of the participants.

Table 2: Frequency and percentage of main presenting complaints of patients:

	Presenting complaint	n (%)
1	Dyspepsia	288 (44.72%)
2	Pain in right hypochondrium	239 (37.11%)
3	Pain abdomen and vomiting	89 (13.8%)
4	Abdominal discomfort	6 (0.93%)
5	Fever	6 (0.93%)
6	Others	16 (2.48%)
	Total	644 (100%)

pain along with vomiting 89 (13.8%) as presenting complaint. These findings are given in table 2.

Different patterns of histopathological lesions were found in the reports, chronic cholecystitis being the most common accounting for 515 (79.96%) of all the cases. Acute cholecystitis was found in 80 (12.42%) patients, chronic cholecystitis with cholesterosis were in 26 (4.0%) and xanthogranulomatous cholecystitis in 26 (4%) patients. There was just one case of adenocarcinoma in our sample. These findings are given in table 3.

When the received gallbladders were opened carefully, gallstones were present in 592 (91.9%) of the patients whereas no gallstones were found in 52 (8.1%) of the patients.

Gross focal lesions were noted down in 11 (1.7%) patients. Most of the gross focal lesions were found in adenocarcinoma (1), xanthogranulomatous cholecystitis (2) and follicular cholecystitis (1).

DISCUSSION

Our study cohort comprised of a large sample. The importance of routine examination of every gallbladder specimen was

Table 3. Histology of the resected specimen as mentioned in report:

	Histopathological Diagnosis	**n (%)**
1	Chronic cholecystitis	515 (79.96%)
2	Acute on chronic cholecystitis	80 (12.42%)
3	Xanthogranulomatous cholecystitis	26 (4%)
4	Empyema	9 (1.4%)
5	Follicular cholecystitis	4 (0.6%)
6	Chronic cholecystitis with cholesterosis	2 (0.4%)
7	Adenocarcinoma gallbladder	1 (0.2%)
8	Atrophic gallbladder	1 (0.2%)
9	Acute suppurative cholecystitis	1 (0.2%)
10	Gangrenous cholecystitis	1 (0.2%)
11	Focal low-grade dysplasia	1 (0.2%)
12	Adenomatous hyperplasia	1 (0.2%)
13	Chronic cholecystitis with adenomyoma	1 (0.2%)
14	Acute on chronic cholecystitis with empyema	1 (0.2%)
	Total	644 (100%)

evaluated for the detection of gallbladder carcinoma. Previously conducted study in Jamshoro Pakistan included only 220 patients[9]. Moreover, the catchment area of affiliated hospital is large with patients referred from Northern areas, Khyber Pakhtunkhaw province and northern Punjab. Hence, the cohort comprised of various ethnicities of Pakistan. There was female predominance in study sample for all age groups. Most samples were from women of 41-60 years age group. This was followed by samples from women of 61-80 years of age. The male to female ratio was 1: 26. This is more than 1:7 reported by Siddiqui et al[9]. It is believed that female sex hormones and pregnancy causes an increased incidence of gall stones among women especially after post-menopause, the gap between men and women decreases[2]. However, in our sample the gap remained high among both genders. Though gallbladder diseases are more common in females but one of the reasons for female predominance is institutional policy which basically caters for families of retired army personnel. We observed twenty cases of gallstones among less than 20 years age group.

The incidence of incidental gallbladder carcinoma in cholecystectomy samples is around 1%[13]. In our sample size it was 0.2% which is much less than that reported. The one case identified as gallbladder carcinoma had gross ulceration, increased gallbladder wall thickness and exophytic growth. The sample belonged to an elderly woman i.e. 75 years old who underwent cholecystectomy for symptomatic gallstones. Only in this sample, incidental gallbladder carcinoma was identified. Pathological staging of tumor was pT2 Nx Mx. It is believed that simple cholecystectomy offers radical cure in all T1a cases while in T1b stage extended cholecystectomy may be warranted[14]. Hence, diagnosis of T1a stage cancer which may exist without gross lesions does not change clinical decisions. T1b stage is the one where neoplastic cells have invaded muscularis propria. In cases with stage T2 or more there is a role of post-operative adjuvant chemotherapy[14],therefore, a selective approach is needed over routine examination. A similar research showed that macroscopic abnormalities and increased wall thickness were seen among gallbladder carcinoma cases, justifying a selective approach to reduce cost as well as human workload[15]. The enormous pressure lies on the pathology department including the excessive use of resources and time. However, the results are only applicable to the population under study or in our clinical setting atleast. More researches should be performed to clear the views about adopting this new selective approach.

CONCLUSION

Based on results from this study we conclude a very low prevalence of incidental gallbladder carcinoma i.e. 0.2% which is much less than reported elsewhere. Time and resources can be spent more efficiently on better things. Literature suggests that carcinoma without any gross lesions are usually T1a tumors which are cured by simple cholecystectomy. Moreover, specimen of females with old age should be sent for histopathological examination. Hence, a selective approach towards sending gallbladder specimens is justified and an evidenced based approach.

RECOMMENDATIONS

More researches should be performed to reach a conclusive policy. Specimens of old age should never be discarded without proper examination as carcinoma tends to target old age. There

is a need to decide the age limit and those lying in these limits should only be subjected to histopathology, this can only be achieved by thorough research.

AUTHORS' CONTRIBUTION

Muhammad Saad: Manuscript writing.
Usman Ali: Manuscript writing.
Urooj Aamir: Result interpretation.
Omair Ali Khan: Data collection.
Muhammad Asad Khan: Data collection, interpretation and methodology.
Faiza Kazi: Data collection.

REFERENCES

1. Cruz-Monserrate Z, Conwell DL, Krishna SG. The Impact of Obesity on Gallstone Disease, Acute Pancreatitis, and Pancreatic Cancer. Gastroenterol Clin North Am. 2016 ; 45:625-637.
2. Stinton LM, Shaffer EA. Epidemiology of Gallbladder Disease: Cholelithiasis and Cancer. Gut Liver. 2012; 6: 172–187. Published online 2012 Apr 17.
3. Bilal M, Haseeb A, Saad M, Ahsan M, Raza M, Ahmed A,Shahnawaz W, Ahmed B,Motiani V. The Prevalence and Risk Factors of Gallstone among Adults in Karachi, South Pakistan: A Population-Based Study. Global Journal of Health Science. 2017; 9: 106-114.
4. Browning JD, Horton JD.Gallstone disease and its complications. SeminGastrointest Dis. 2003; 14:165-77.
5. Njeze GE. Gallstones. Niger J Surg. 2013; 19: 49–55.
6. Ayloo S, Nabajit Choudhury N. Single-Site Robotic Cholecystectomy. JSLS. 2014;18: e2014.00266.
7. Dhillon KS, Awasthi D, Dhillon AS. Natural orifice transluminal endoscopic surgery (hybrid) cholecystectomy: The Dhillon technique. J Minim Access Surg. 2017; 13:176–181.
8. HundalR, Shaffer EA. Gallbladder cancer: epidemiology and outcome. Clin Epidemiol. 2014; 6: 99–109.Published online 2014 Mar 7. doi: 10.2147/CLEP.S37357.
9. Siddiqui FG, Memon AA, Abro AH, Sasoli NA, Ahmad L. Routine histopathology of gallbladder after elective cholecystectomy for gallstones: waste of resources or a justified act? BMC Surg. 2013; 13: 26.
10. Darmas B, Mahmud S, Abbas A, Baker AL. Is there Any Justification for the Routine Histological Examination of Straightforward Cholecystectomy Specimens? Ann R Coll Surg Engl. 2007; 89: 238–241.
11. De Zoysa MI, De Silva SK, Illeperuma A.Is routine histological examination of gall bladder specimens justifiable? Ceylon Med J. 2010; 55:13-6.
12. Deng YL, Xiong XZ, Zhou Y, Shrestha A1, Li FY, Cheng NS.Selective histology of cholecystectomy specimens--is it justified?J Surg Res. 2015; 193:196-201.
13. Ahn Y, Cheon-Soo Park, Hwang S, Hyuk-Jai Jang, Kun-Moo Choi, Sung-Gyu Lee. Incidental gallbladder cancer after routine cholecystectomy: when should we suspect it preoperatively and what are predictors of patient survival? Ann Surg Treat Res. 2016; 90: 131–138.
14. Lee SE, Kim KS, Kim WB, Kim IG, Nah YW, Ryu DH, Park JS, Yoon MH, Cho JY, Hong TH, Hwang DW. Practical guidelines for the surgical treatment of gallbladder cancer. Journal of Korean medical science. 2014; 29: 1333-40.
15. Talreja V, Ali A, Khawaja R, Rani K, Samnani SS, and Farid FN. Surgically Resected Gall Bladder: Is Histopathology Needed for All? Surgery Research and Practice. 2016; Article ID 9319147; 4 pages, 2016. doi:10.1155/2016/9319147.

ORIGINAL ARTICLE

TENS FOR COMPLEX PEDIATRIC LONG BONE FRACTURES

Kashif K Qureshi[1], Iram Iqbal[2], Khalid Z Aslam[3], Ahmed Jasra[4], Sohail Akber[5], Inam-ul-Haq[6]

[1]Department of Orthopedics, HITEC-IMS, Taxila
[2]Department of Radiology, HBS Medical & Dental College, Islamabad
[3,4]Department of Anesthesiology, HBS Medical & Dental College, Islamabad
[5]Department of Neurosurgery, HITEC-IMS, Taxila
[6]Department of Anesthesiology, HITEC-IMS, Taxila

ABSTRACT

Objective: Displaced fractures of the tibia, femur and forearm in the pediatric population can usually be reduced to an acceptable position by closed methods but the realization that malalignment leads to a less than normal or compromised functional result has led to a trend of intervention to avoid these complications. The lower morbidity associated with elastic intramedullary nails has been more acceptable to the orthopedic and trauma surgeons. This study assesses the results of the use of elastic nails for unacceptable position in pediatric long bone fractures.

Study Design: Descriptive, Case Series.

Place and Duration of Study: HBS Medical and Dental College, Islamabad and HITEC Institute of Medical Sciences, Taxila. January 2016 to March 2018.

Material and Methods: Twenty patients between the ages of 3-14 years were offered intervention by Titanium Elastic Nailing System (TENS) due to the unacceptable position of their fractures. The patients were then followed up three months after removal of their implant after union.

Results: There were 12 males and 8 females in this study. Thirty five percent of the patients were between the ages of 3 and 5 years while the rest (65%) were five to fourteen years of age. There was one case of loss of reduction and another in which there was superficial infection. Two patients complained of skin irritation from the implant.

Conclusion: Elastic nailing in complicated and malaligned long bone fractures in children is a reliable option for the orthopedic and trauma surgeon with very little morbidity and leads to satisfactory functional outcome, early union and permits easy implant removal.

Keywords: *TENS, ESIN, Pediatric fractures, Femur shaft fractures, Tibia fractures, Forearm fractures, Maluniting*

How to cite this article: Qureshi KK, Iqbal I, Aslam KZ, Jasra A , Akber S, Haq IU. Tens for complex pediatric long bone fractures. HMDJ 2021; 01(01):18-21

INTRODUCTION

Long bone fractures in the pediatric population are quite common[1,2]. In the earlier years the trauma is due to fall at home either by neglect or the child trying to discover the world. However, during school going years the increased activity level of the young children predisposes them to long bone fractures. A few decades ago treating them by close reduction and subsequently putting them in cast was the treatment of choice and any displacement and/or angulation occurring at the time of reduction or subsequently was accepted as it was believed that it would remodel. Secondary displacement and malalignment are common after close reduction and casting[3].Over the years it became obvious that not all displacement or angulation corrects as the child grows up and functional compromise is a rule in malunited fractures.

Surgical intervention by close reduction and internal fixation Close Reduction and Internal Fixation (CRIF) or Open Reduction and Internal Fixation (ORIF) by elastic nails has led to better healing times, lower morbidity and earlier return to pre-injury activity status[4,5,6]. Some common indications for surgery include failure of reduction, failure to maintain reduction in unstable fractures and open fractures[7].

When comparing ORIF with plates and screws to intramedullary fixation it becomes obvious that ORIF is associated with larger scars, more tissue dissection, a higher incidence of infection and difficult implant removal. Intramedullary devices such as K wires and Rush pins are rigid, difficult to bend at metaphysis and difficult to manipulate. Elastic nails solve all these problems by being bent at the tip, being elastic and easy to manipulate and provide three point fixation within the canal. They are also easy to remove once union has occurred[8.] There is added advantage of preservation of the growth plate as these nails are inserted proximal or distal to the growth plates[9.]

Correspondence to: Prof. Dr. Kashif K Qureshi, Department of Orthopedics, HITEC-IMS Taxila, Pakistan,

Email: khurshidkashif11@gmail.com

Conflict of interest: None
Financial Disclosure: Nil

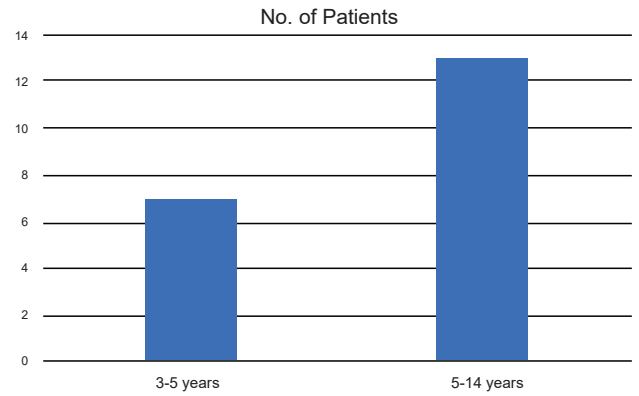
Received: 01-07-2021
Accepted: 29-07-2021

MATERIAL AND METHODS

Sampling Technique: Non-probability, consecutive sampling.

Inclusion Criteria:
Age: 3-14 years
Gender: Both males and females
Fractures: Diagnosed cases of displaced tibial shaft, femoral shaft, radius and ulna shaft fractures

Exclusion Criteria: Fractures at the end of the bones and intra articular fractures of long bones were excluded



Graph 1: Age Distribution of Patients.

Table 1: Method of achieving reduction and fixation.

ORIF	5
CRIF	15

Figure 1: A maluniting fracture of the both bones of the forearm.

Table 2: Distribution of fractures according to bones involved.

Tibia	7
Femur	8
Radius ulna	5

Figure 2: The same fracture after close reduction and fixation with ESIN.

RESULTS

Out of 20 children in the study group 12 were males. A great majority of them belonged to the more physically active 5-14 years age group. There was only one case of loss of reduction after TENS subsequently while the other two complications were skin irritation and superficial infection in the same patient. There were no cases of deep infection, implant failure or difficulty in removing the implant after union had occurred. Open reduction was required in cases where either the callus had started to form or in early few cases of the forearm where control of radius by closed means was difficult as compared to ulna.

DISCUSSION

Close reduction of long bone fractures has been the gold standard of treatment in children for ages. The cost was low and the results were generally acceptable. Union rates of more than 90% and full functional recovery have been reported by different authors[10]. At times, however, there is loss of reduction after manipulation or malrotation which warrants surgical intervention[11].

TENS for long bone fractures was introduced in late 70s and has recently seen marked acceptance by the orthopedic and trauma

surgeons. The main reasons for this increased popularity is due to simple technique, low morbidity and excellent results. The original technique has seen few modifications since its inception which confirms its authenticity[12]. Entering the canal from the maximum diameter seems to be the ideal solution. Avoidance of the growth plate is also a crucial step. Bending the nails beyond their elastic limit to conform to the shape of the fractured bone with the maximum bow at the fracture site ensures stable fixation.

The results of TENS use in tibia fractures were compared with external fixator by Kubiak et al in 2005 and they reported 7 bony complications in the fixator group as compared to only one in the TENS group. Similarly, the union time was much shorter in the TENS group as compared to the external fixator group (7 weeks versus 18 weeks)[13]. The results have been varying regarding union but the overall impression is that there is earlier union after using the TENS. This is probably explained by keeping the fracture hematoma intact. Gordon JE and workers achieved union in 18 weeks while others reported union of tibia fractures occurring in 21.5 weeks [14].

Sankar et al in their series of 19 children reported skin irritation at the nail entry site as their only complication. There were no cases of leg length discrepancy or diaphyseal arrest as the result of treatment by TENS[15]. In our study we saw that skin irritation was the most frequent complaint (2 patients) and was present in the earlier operated cases. As the experience with nail grew that complication was avoided. There was no case of leg length discrepancy in our series. O'Brien in his study reported union in 9 weeks with no case of leg length discrepancy or malunion[16].

It was seen that none of the patients had refracture of the shaft of radius, ulna, femur or tibia once healing had occurred and the implant was removed within a year of performing the procedure. This is also confirmed by the study done by Liu P et al who reported that he had full range of motion with only two patients who had less than 1cm of shortening which was without any problem and there was no case of refracture[17].

Excellent results were achieved in study performed by Ahmed EKF et al in 75% of patients while there were 25% good results. There were no cases of poor results[18]. Most series have reported very few complications associated with the use of flexible intramedullary nailing and have preferred this technique for fixation of pediatric forearm fractures[19-25]. Some latest research in closed fixation of tibia fractures in children even by locked plates is very promising as to lower complication rates and more acceptable alignment[26].

We found gratifying results when the procedure was performed in the upper limb. There were no cases of neurovascular injury, little need to protect the limb after surgery of both bones of the forearm and earlier return to preinjury level of use of the involved limb. Smith and Fernandeza in their studies comparing plating to intramedullary flexible nail found that there are advantages of cosmesis, easy removal of implants after union has occurred and little chance of neurovascular injury[27,28].

Reduction and percutaneous fixation of both bone fractures of the forearm can be difficult at times due to the muscle mass and difficulty in reducing the radius. For that occasionally a mini incision has to be given to remove the intervening muscle and help passage of the elastic nails. This has been reported by Stanley and Wilkins et al. who had to reduce their first six fractures out of 50 through limited open approach[29].

Removal of elastic nails is usually done after about six months. The removal is usually without difficulty and there is little evidence of refracture after removal in the literature. Slongo et al also did not have a single case of refracture after removal of elastic nails in their study[30]. In our study of twenty patients operated for different long bones fracture we did not have a single case of refracture after removal. This is definitely an advantage when compared with plating where protected weight bearing has to be considered after plate removal from the femur and/or the tibia.

Lee, Sang-Hee in his study have, however, highlighted the complication of leg length discrepance which they found out was more related to age at which the injury took place[31].

In another study by Kapil from Nepal, TENS was reported as safe, reliable and easy to perform procedure with low complication rate. The complications, they also noted, are easily avoidable and/or manageable[32].

The most frequent problem encountered in different studies has been entry site skin irritation which the surgeons usually learn to avoid by cutting the ends deep into the tissues. This has been also observed by Ligier et al who had 13 cases of skin irritation or inflammation out of 123 cases (10.5%)[33]. We had two cases of skin irritation by prominent implant (10%) which goes well with the documented rate in other studies.

AUTHORS' CONTRIBUTION

Kashif Khurshid Qureshi: Conception and design, Acquisition of data, Analysis and interpretation of data, Drafting and revision.
Iram Iqbal: Design, Analysis.
Khalid Z Aslam: Critical Revision.
Ahmed Jasra: Analysis and interpretation of data.
Sohail Akber: Analysis and interpretation of data.
Inam-ul-Haq: Drafting the article.

REFERENCES

1. Economedes DM, Abzug JM, Paryavi E, Herman MJ. Outcomes using titanium elastic nails for open and closed pediatric tibia fractures. Orthopedics. 2014 Jul;37(7):e619-24.
2. Mäyränpää MK, Mäkitie O, Kallio PE. Decreasing incidence and changing pattern of childhood fractures: a population-based study. J Bone Miner Res. 2010 Dec;25(12):2752-9.
3. Srivastava AK, Mehlman CT, Wall EJ. Elastic stable intramedullary nailing of tibial shaft fractures in children. J Pediatr Orthop. 2008;28:152–8.
4. Sheikh SI, Khan A, Iqbal J. Enders nail for diaphyseal long bone lower limb fractures in children J Rawal Med Coll 2012;16(1):25-7.
5. Rodríguez-Merchán EC. Pediatric fractures of fore arm. Clin Orthop

Relat Res 2005; 432: 65-672.
6. Adamczyk MJ, Riley PM. Delayed union and non-union following closed treatment of diaphyseal Pediatric Forearm Fractures. J Pediatr Orthop 2005; 25(1): 51-55.
7. Daruwalla JS. A study of radioulnar movements following fractures of the forearm in children. Clin Orthop Relat Res 1979; 139: 114- 120.
8. Schemitsch EH, Jones D, Henley MB, Tencer AF. A Comparison of Mal reduction after Plate Fixation and Intramedullary Nail Fixation of Forearm Fractures. J Orthop Trauma 1995; 9(1): 8-16.
9. Jeong Heo M.D., Chang-Wug Oh M.D., Ph.D, Kyeong_Hyeon Park M.D. et al. Elastic nailing of tibia shaft fractures in young children up to 10 years of age. Injury; 47:4: April 2016, 832-836
10. El-Adl G, Mostafa MF, Khalil MA. Titanium elastic nail fixation for paediatric femoral and tibial fractures. Acta Orthop Belg 2009; 75:512–520.
11. Sankar WN, Jones KJ, David Horn B. Titanium elastic nails for pediatric tibial shaft fractures. J Child Orthop 2007;1:281–286
12. Shital N. Parikh, MD; Viral V. Jain, MD; Jaime Denning, MD; Junichi Tamai, MD; Charles T. Mehlman, DO, MPH; James J. McCarthy, et al. Complications of Elastic Stable Intramedullary Nailing in Pediatric Fracture Management. J Bone Joint Surg Am 2012; 94(24):e184.
13. Kubiak EN, Egol KA, Scher D. Operative treatment of tibial fractures in children: are elastic stable intramedullary nails an improvement over external fixation? J Bone Joint Surg [Am] 2005; 87-A:1761-8.
14. Anjum R, Raina P, Singh S, Hackla S, Malhotra S. Fixation of Paediatric tibial fractures with TENS; a prospective study. Intl J Adv Res. 2015;3(5):251-54.
15. 15. Sankar WN, Jones KJ, David Horn B. Titanium elastic nails for pediatric tibial shaft fractures. J Child Orthop. 2007;1:281–286.
16. O'Brien T, Weisman DS, Ronchetti P, et al: Flexible titanium elastic nailing for the treatment of the unstable pediatric tibial fracture. J Pediatr Ortop 2004;24:601–609.
17. Liu P, Wei Z, Wei Y X. Treatment of children" s shaft fracture of tibia and fibula with TENS fixation. OJPed 2011;1:9-11.
18. Ahmed EKF, Zakaria B, Hadhood M, Shaheen A. Management of diaphysealtibial fracture in pediatric by elastic stable intramedullary nails. Menoufia Med J. 2014;27:401-406.
19. Amit Y, Salai M, Chechik A, Blankstein A, Horoszowski H. Closing Intramedullary Nailing for the Treatment of Diaphyseal Forearm Fractures in adolescence: A Preliminary Report. J Pediatr Orthop. 1985; 5(2): 143-146.
20. Cullen MC, Roy DR, Giza E, Crawford AH. Complications of Intramedullary Fixation of Pediatric Forearm Fractures. J Pediatr Orthop. 1998; 18(1): 14-21.
21. Lascombes P, Haumont T, Journeau P. Use and Abuse of Flexible Intramedullary Nailing in Children and Adolescents. J Pediatr Orthop. 2006; 26(6): 827-834.
22. Garg NK, Ballal MS, Malek IA, Webster RA, Bruce CE. Use of elastic stable intramedullary nailing for treating unstable forearm fractures in children. J Trauma. 2008; 65(1): 109-115.
23. Shoemaker SD, Comstock CP, Mubarak SJ, Wenger DR, Chambers HG. Intramedullary Kirschner wire fixation of open or unstable forearm fractures in children. J Pediatr Orthop. 1999; 19(3): 329-337.
24. Flynn JM, Jones KJ, Garner MR, Goebel J. Eleven years experience in operative management of pediatric forearm fracture. J Pediatr Orthop. 2010; 30(4): 313-319.
25. Richter D, Ostermann PA, Ekkernkamp A, Muhr G, Hahn MP. Elastic intramedullary nailing: a minimally invasive concept in the treatment of unstable forearm fractures in children. J Pediatr Orthop. 1998; 18(4): 457-61.
26. Radhakrishna, Veerappa N, Madhuri, Vrisha. Management of pediatric open tibia fractures with supracutaneous locked plates. Journal of Pediatric Orthopaedics B. 2018; 27 (1): 13-16.
27. Smith VA, Goodman HJ, Strongwater A, Smith B. Treatment of Pediatric Both bone forearm fractures: a comparison of operative techniques. J Pediatr Orthop. 2005; 25(3): 309-313.
28. F.F. Fernandeza, M. Egenolfa, C. Carstenb, F. Holza, S. Schneider, et al. Unstable diaphyseal fracture of Both Bones of the forearm in children. Plate fixation Vs Intramedullary nailing. Injury. 2005; 36 (10): 1210- 1216.
29. Wilkins KE. Operative management of children's fractures: is it a sign of impetuousness or do the children really benefit? J Pediatr Orthop. 1998; 18(1): 1-3.
30. Slongo TF. Complications and failures of the TENS technique. Injury. 2005; 36: S1-A78-85.
31. Lee, Sang-Hee; Hong, Jae-Young; Bae, Ji-Hoon; Park, Jong Woong; Park, Jung-Ho. Factors related to leg length discrepancy after flexible intramedullary nail fixation in pediatric lower-extremity fractures. Journal of Pediatric Orthopaedics B. 2015; 24(3): 246-250.
32. Kapil Mani KC, Parimal Acharya, Arun Sigdel. Titanium Elastic Nailing System (TENS) for Tibia Fractures in Children: Functional Outcomes and Complications. J Nepal Med Assoc. 2016; 55(204): 55-60.
33. Ligier JN, Metaizeau JP, Prévot J, Lascombes P. Elastic stable intramedullary nailing of femoral shaft fracture in children. J Bone Joint Surg. 1988; 70(1): 74-7.24.

ORIGINAL ARTICLE

EFFECTS OF EPLEY'S MANEUVER AND VESTIBULO-OCULAR REFLEX STIMULATION EXERCISES ON VERTIGO PATIENTS

Kanwal Zafar, Furqan Ahmed Siddiqui, Sanna Pervaiz, Wardah Ajaz Qazi, Ruqia Begum, Nida, Qurat-ul-ain
Foundation University Institute of Rehabilitation Studies (FUIRS), Foundation University Islamabad

ABSTRACT

Objective: To determine the effects of Epley's maneuver and Vestibulo-ocular Reflex stimulation exercises on Vertigo patients.

Study Design: Randomized Control Trial (RCT).

Place and Duration of Study: The study duration was 06 months, from August 2016 to February 2017, at Rehab & Research Centre, Pakistan Railway General Hospital Rawalpindi.

Material and Methods: A Randomized Control Trial was conducted on 50 Benign Paroxysmal Positional Vertigo (BPPV) patient who were recruited through purposive sampling technique. Random assignment was done through coin toss method into two groups. Vestibular exercise group VE (n=25) and Control group/Traditional Treatment TT (n=25). Baseline assessment and after 2weeks assessment was conducted. Motion Sensitivity Quotient (MSQ) scale and Dizziness Handicap Inventory (DHI) scale were used for data collection. Data was analyzed on SPSS-20 version.

Results: 50 patients were recruited having mean age of 43.42 ±19.93yrs, with 94.0% patients having positive nystagmus. Prior to treatment, P-value of MSQ was 5.622 and for DHI 0.320. After 2 weeks of intervention significant improvement was recorded in MSQ and DHI with p value <0.001.

Conclusion: It is concluded from this study that Epley's maneuver and Vestibulo-ocular Reflex stimulation exercises reduce Nystagmus, dizziness and vertigo and improve quality of life. At least 2weeks of treatment is required for better outcome.

Keywords: *Balance, Dizziness, Nystagmus, Quality of life, Vertigo*

How to cite this article: Zafar K, Siddiqui FA, Pervaiz S, Qazi WA, Begum R, Nida, Qurat-ul-ain. Effects of Epley's Maneuver and Vestibulo-ocular Reflex stimulation exercises on Vertigo patients. HMDJ 2021; 01(01): 22-26

INTRODUCTION

The human vestibular system is a sensory equilibrium system that manages and controls the humane sense of balance and movement [1]. Peripheral vestibular organs translate the angular, translational and head tilt motions relative to the gravity. The semicircular canals and otolith organs provide continuous input to the brain about rotational and translational head movements. This information from vestibular organs like Semicircular canals and otolith including their pathways maintains the gaze and posture via Vestibulo-Ocular reflex and Vestibulo-Spinal reflex[2]. Signs and symptoms of the vestibular dysfunction are vertigo, nystagmus, visual inability on head movement, blurring or double vision,spinning sensations or dizziness, tinnitus, asymmetrical posturing in sitting or standing and disequilibrium[3].

The membranous labyrinth of each ear consists of three semicircular canals. Anterior semicircular canal (ASC), Posterior semicircular canal (PSC) and Horizontal semicircular canals (HSC) and they are at right angel of each other[4]. Fluid is filled into bony semicircular canals, loose connective tissues float with contained endolymph. Rotatory conditions are different in three canals, that is how diagnosis of involved canal is done by maintaining different head positions. Three canals are at right angle with each other, so the rotatory movement in any axis can be detected by any of the canal and then it will pass through the nerves [5].

Benign paroxysmal positional vertigo is a disorder of the inner ear[6]. BPPV is the most common peripheral vertigo and the posterior or lateral semicircular canals are usually affected. BPPV is characterized by brief attacks of rotary vertigo associated with positional nystagmus which are elicited by specific head positions or change in head position relative to gravity. The pathophysiology of BPPV is canalolithiasis comprising of free floating otoconial debris adherent to cupula[7].

Prevalence of BPPV is more common in women and elder population. There is an association between osteoporosis and BBPV. Theoretically a disturbance in calcium metabolism as occurring in osteoporosis and osteopenia increases calcium resorption which generates free calcium in endolymph and reduces its capacity to dissolve the dislodged otoconia[8]. BPPV is mainly of idiopathic cause, but there are many factors which contribute in the occurrence of BPPV in all kind of patients. In middle aged women hormonal factor can be the cause of BPPV,

Correspondence to: Dr. Kanwal Zafar . Foundation University Institute of Rehabilitation Studies FUIRS, Foundation University Islamabad

Email: kanwal.zafar@fui.edu.pk

Conflict of interest: None
Financial Disclosure: Nil

Received: 28-09-2021
Accepted: 20-10-2021

Decreased bone mineral density both in males and females leads to BPPV. Prevalence of BPPV is high in patients with osteopenia and osteoporosis. After menopause there are more chances to develop BPPV because of the disturbed calcium metabolism. In diabetic and Hypertensive patients BPPV is more commonly occurring problem. Gold standard test for the diagnosis of BPPV is Dix-Halpike maneuver which is performed by asking the patient to move from long sitting to supine position and turn head to 45 degree to left or right, wait for 1 minute and observe the nystagmus and vertigo[9]. Vestibular rehabilitation has been always a neglected part of rehabilitation; Evidence has shown that vestibular rehabilitation can be effective in improving symptoms related to many vestibular disorders. Individuals with complaints of dizziness, with comorbidities including hypertension and diabetes, may benefit from a screening and treatment for BPPV.

MATERIAL AND METHODS

A Randomized controlled trial study was conducted at rehab &research center for 6months in Pakistan railway general hospital.50 patients were approached and randomly allocated through coin toss method equally in two groups. OpenEpi was used to calculate sample size. Vestibular exercise group (n=25) and traditional treatment group (n=25). Non probability sampling technique was used to collect the data.

Both genders, Adult Population (above 20yrs) and BPPV (benign paroxysmal positional vertigo) patients diagnosed by Neurologist were included. Patients with any Co-morbidity, Infection, tumor, severe hearing deficit, having any genetic disease and all vestibular disorders other than BPPV were excluded.

Data was collected using Motion sensitivity quotient, Dix-Halpike maneuver, Visual vertigo analogue scale for dizziness and Dizziness Handicap Inventory. Traditional treatment group was given traditional treatment for vertigo including Dix-Halpike maneuver for diagnosis, then medication for treatment of vertigo. VE (vestibular exercises group) was given Vestibular exercises treatment using Dix-Halpike maneuver for diagnosis, Eply's maneuver and VOR stimulation exercises. Treatment was provided for 2-3 days per week for up to 2 weeks. Duration of study was 6 months, from August 2016 to January 2017.

TREATMENT PROTOCOLS

The assessment was conducted at baseline and after 2weeks of intervention. Both groups were diagnosed using Dix-Halpike maneuver then were assessed for the outcome measure using both treatment techniques In the vestibular exercise group, patients were given exercises for 2 days per week, 45 minute of session for 2 weeks (Table 1).

RESULTS

The study results showed that total patients were 50 among them 44.0% (n=22) were male and 56.0% (n=28) were female, Out of all participants 48.0% (n=12) males and 52.0% (n=13) females were in Structured Vestibular rehabilitation (SVR) group. Whereas Traditional Treatment (TT) containing 40.0% (n=10) males and 60.0% (n=15) females. Percentage of patients having diabetes 38.0% (n=19) and hypertension 50.0% (n=25). Nystagmus was positive in 94.0% (n=47) patients and Dix-Halpike test was positive in 100% patients both in control and experimental groups (Table 2).

Mean age of the population 43.42 ± 19.93years with SVR patients having 43.40 ± 20.16 years and TT patients having age of 43.44 ± 20.11years.

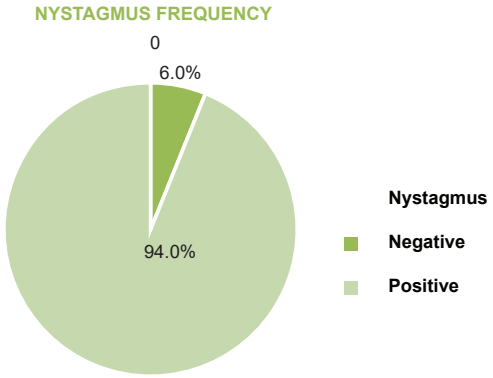


Figure 1: Nystagmus Frequency.

Nystagmus was positive in 94.0% patients and negative in 6.0% participants were not having nystagmus (Figure 1).

Data was non-skewed; Mann Whitney U test indicates that there is a no significant difference at baseline. Motion sensitivity Quotient scale for VE with Mean ± SD 73.35 ± 24.95 at baseline and after 2 weeks mean ± SD is 7.37 ± 6.35. TT baseline Mean ± SD was 70.20 ± 24.95 and after 2 weeks mean ± SD 70.20 ± 32.28, Z-value was 0.408 at baseline and 5.622 after 2weeks. P-value was 5.622 at baseline and after 2 weeks P-value is 0.000 which is less than 0.05. Results indicate that there is a significance difference in both groups (Table 3).

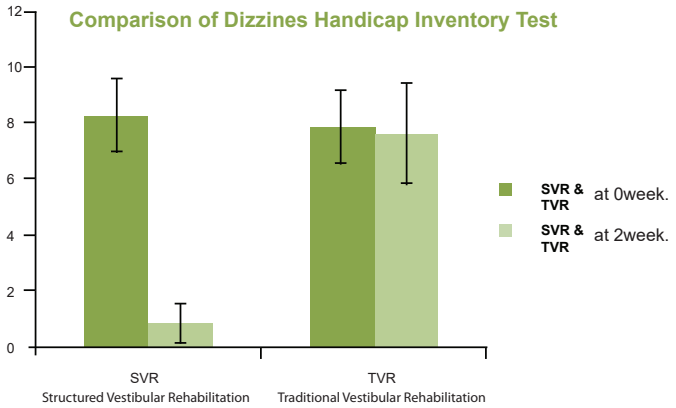


Figure 2: Comparison of Dizziness Handicap Inventory Test.

The above bar chart shows the difference in mean values of Dizziness handicap inventory test in both groups at baseline and after vestibular rehabilitation of 2 weeks (Figure 2).

Table 1: Treatment Protocol for Both Groups.

Days	Traditional treatment for BBPV Group (A)	Vestibular Exercises for BPPV Group (B)
1st day	Dix-Halpike maneuver Medications	Dix-Halpike maneuver Epley's maneuver
4th day		VOR stimulation Exercises
7th day	Dix-Halpike maneuver, Medications	Epley's maneuver
10th day		VOR stimulation Exercises
14th Day	Re-evaluation	Re-evaluation

Table 2: Demographics Distribution.

Variables		F	Total %	Vestibular exercise Group(VE)	Treatment Group(TT)
Gender	Male	22	44.0%	48%(n=12)	40%(n=10)
	Female	28	56%	52%(n=13)	60%(n=15)
DM	+ive	19	38%	36%(n=9)	40%(n=10)
	-ive	31	62%	64%(n=16)	60%(n=15)
HTN	+ive	25	50%	52%(n=13)	48%(12)
	-ive	25	50%	48%(n=13)	52%(13)
Nystagmus	+ive	47	94%	96%(n=24)	92%(n=23)
	-ive	3	6%	4%(n=1)	8(n=2)
Dix-Halpike maneuver	Yes	100	100%	100%(n=50)	100%(n=50)
	No	0	0%	0.0%(n-=0)	0.0%(n=0)

Table 3: Mann-Whitney U test for Motion Sensitivity Quotient Scale.

S\NO	Variables	Vestibular exercise Group(VE) Mean±SD	Treatment Group(TT) Mean±SD	Z Value	P value
1	MSQ at 0 week	73.35 ± 24.95	70.20 ± 24.95	0.408	5.622
2	MSQ at 2 weeks	7.37 ± 6.35	70.20 ± 32.28	5.622	0.000

DISCUSSION

As study suggests, the vestibular rehabilitation resulted to be very effective in minimizing the symptoms of Nystagmus and vertigo in BPPV patients and improving their quality of life. Recently, vestibular rehabilitation has become a well-known treatment option for the BPPV patients. Literature has proven the vestibular rehabilitation as effective in improving the symptoms. SL Whitney conducted a study and demonstrated the effectiveness of vestibular rehabilitation in minimizing medication need and reducing the vertigo symptoms in early stage peripheral vestibular disorder disease [10].

A systemic review was performed by Courtney D.Hal in 2016 in which they found the evidence that supervised vestibular rehabilitation once a week for 2-3 weeks is affective for acute and sub-acute cases of vertigo, and in chronic bilateral vestibular problems it should be one session per week for 4-5 weeks[11].

A study was conducted by Wahlgren, Amy PT et all in which they provide repositioning maneuvers and education for patients with BPPV and after 3 sessions over 4 weeks of care patients demonstrated complete abolishment of their symptoms both objectively and subjectively [12]. Strong evidence provided by Male A et all in 2019 in which they found that 90% cases have evidence based physical rehabilitation for the management of BPPV[13]. In July 2009 Another study was conducted by Athanasios Katsarkas, he concluded that bilateral Benign Paroxysmal Positional Vertigo is most occurring in Post-traumatic patients and that is mainly of Posterior semi-circular canals, it can be treated with structured vestibular rehabilitation and habituation exercises [14].

Hillier S1 conducted an RCT where they performed movement based rehabilitation versus physical maneuvers for BPVV. The results of their studies showed significant improvement in symptoms after physical repositioning maneuvers for short term but for long term effects combination of two is more effective than single maneuver($p=0.001$)[15].The results of the present study also showed significant improvement in vestibular symptoms after vestibular rehabilitation($p<0.05$).

A controlled modified research "Vestibular rehabilitation of BPPV patients" was carried out by Akito Fujino. He compared the effects of Vestibular rehabilitation with medication and results statistically confirmed that there was marked improvement in symptoms of BPPV after VR in comparison with just medication. Therefore, Vestibular rehabilitation could be considered as first line management option for BPPV patients, whether it is acute or chronic condition[16]. An RCT on Physical therapy for the vertigo and dizziness in the primary care was conducted by L Yardley and S Beech. They compared the effects of VR and medical care in vertigo patients. Randomly, patients were assigned into treatment group and control groups, Treatment protocol was continued for 6 weeks and the treatment group presented with drastic improvement in all measurements, whereas the control group did not show any significant improvement.

The study of Vincent A van Vugt et all reported that exercises are more affective to treat BPVV as compared to drugs[17].

Encapsulated study proven that Vestibular rehabilitation is very basic, less expensive and beneficial treatment method for vertigo and BPPV patient[18].

Moreover, there are certain limitations of this study. As sample size of the study was not very adequate and It was not convenient to examine huge number of patients because of the limited time constraint. Extension of time for this study can lead to huge data set, therefore more accurate and reliable findings of the study can be obtained. As observed from the literature review that causes of BPPV are idiopathic, so which population can be prone to vertigo is completely idiopathic.

CONCLUSION

It is concluded from this study that Epley's maneuver and Vestibulo-ocular Reflex stimulation exercises reduces Nystagmus, vertigo and dizziness. It helps to improve the quality of life and a better functional performance in return minimizes the fear of fall, as it is proven by improved score on Dizziness handicap inventory scale.

AUTHORS' CONTRIBUTION

Kanwal Zafar: Principal Investigator.
Furqan Ahmed Saddiqui: Drafting.
Sana Pervaiz: Write-up.
Wardah Ajaz Qazi: Data Analysis.
Ruqiya Begum: Discussion Writing.
Nida: Review of the Manuscript.
Qurat-ul-ain: Final review of the Manuscript.

REFRENCES

1. Asadi H, Mohamed S, Lim CP, Nahavandi S, Nalivaiko E. Semicircular canal modeling in human perception. Reviews in the neurosciences. 2017;28(5):537-49.
2. Maitland CG. Vestibular Dysfunction. Parkinson's Disease and Nonmotor Dysfunction: Springer; 2013. p. 365-76.
3. Khandare S, Gonsalves N, Palekar DT, Rathi DM, Desai R, Deshmukh M. Efficacy of two different vestibular rehabilitation approaches for dizziness in vestibular dysfunction in hearing impaired children". International Journal of Current Research in Life Sciences. 2018;7(05):1985-8.
4. Iversen MM, Rabbitt RD. Wave mechanics of the vestibular semicircular canals. Biophysical journal. 2017;113(5):1133-49.
5. Kipping JA. Functional neuroanatomy of cerebello-cerebral systems 2015.
6. Bhattacharyya N, Gubbels SP, Schwartz SR, Edlow JA, El-Kashlan H, Fife T, et al. Clinical practice guideline: benign paroxysmal positional vertigo (update). Otolaryngology–Head and Neck Surgery. 2017;156(3_suppl):S1-S47.
7. Imai T, Takeda N, Ikezono T, Shigeno K, Asai M, Watanabe Y, et al. Classification, diagnostic criteria and management of benign paroxysmal positional vertigo. Auris Nasus Larynx. 2017;44(1):1-6.
8. Bruintjes TD, van der Zaag-Loonen HJ, Eggelmeijer F, van Leeuwen RB. The prevalence of benign paroxysmal positional vertigo in patients with osteoporosis. European Archives of Oto-Rhino-Laryngology. 2018;275(12):3083-6.

9. Ciodaro F, Mannella VK, Nicita RA, Cammaroto G, Bruno R, Galletti B, et al. Therapeutic efficacy of the Galletti–Contrino manoeuvre for benign paroxysmal positional vertigo of vertical semicircular canals in overweight subjects. European Archives of Oto-Rhino-Laryngology. 2018;275(10):2449-55.
10. Whitney SL, Alghadir AH, Anwer S. Recent evidence about the effectiveness of vestibular rehabilitation. Current treatment options in neurology. 2016;18(3):13.
11. Hall CD, Herdman SJ, Whitney SL, Cass SP, Clendaniel RA, Fife TD, et al. Vestibular rehabilitation for peripheral vestibular hypofunction: an evidence-based clinical practice guideline: from the American physical therapy association neurology section. Journal of Neurologic Physical Therapy. 2016;40(2):124.
12. Wahlgren A, Palombaro K. Evidence-based physical therapy for BPPV using the International Classification of Functioning, Disability and Health model: a case report. Journal of Geriatric Physical Therapy. 2012;35(4):200-5.
13. Male A, Ramdharry G, Grant R, Davies R, Beith I. A survey of current management of Benign Paroxysmal Positional Vertigo (BPPV) by physiotherapists' interested in vestibular rehabilitation in the UK. Physiotherapy. 2019;105(3):307-14.
14. Katsarkas A. Benign paroxysmal positional vertigo (BPPV): idiopathic versus post-traumatic. Acta oto-laryngologica. 1999;119(7):745-9.
15. Hillier S, Mcdonnell M. Is vestibular rehabilitation effective in improving dizziness and function after unilateral peripheral vestibular hypofunction? An abridged version of a Cochrane Review. European journal of physical and rehabilitation medicine. 2016;52(4):541-56.
16. Fujino A, Tokumasu K, Yosio S, Naganuma H, Yoneda S, Nakamura K. Vestibular training for benign paroxysmal positional vertigo: its efficacy in comparison with antivertigo drugs. Archives of otolaryngology–head & neck surgery. 1994;120(5):497-504.
17. Van Vugt VA, Van Der Horst HE, Payne RA, Maarsingh OR. Chronic vertigo: treat with exercise, not drugs. bmj. 2017;358:j3727.
18. Wiesmeier IK, Dalin D, Wehrle A, Granacher U, Muehlbauer T, Dietterle J, et al. Balance training enhances vestibular function and reduces overactive proprioceptive feedback in elderly. Frontiers in aging neuroscience. 2017;9:273.

ORIGINAL ARTICLE

INSIGHT INTO THE EXPERIENCES OF HEALTHCARE PROFESSIONALS WHO RECOVERED FROM COVID-19 IN HITEC-IMS

Hamza Saeed[1], Hamza Naveed[2], Naila Abrar[3], Munir Ahmad[4], Sajida Farid[5], Saima Umair[6]

[1,2,3,4,5]Department of Pharmacology, HITEC-IMS, Taxila
[6] Department of Community Medicine, HITEC-IMS, Taxila

ABSTRACT

Objective: The current study aims to collect the experiences of healthcare professionals who recovered from COVID-19.

Study Design: We did a qualitative study using an empirical phenomenological approach.

Place and Duration of Study: The study was conducted at HITEC-IMS, Taxila from March to July 2021.

Material and Methods: 15 healthcare professionals were recruited in total, out of which 7 were physicians working in HIT Hospital and 8 were academicians who were working in various departments of HITEC-IMS. Participants were recruited using non-probability techniques of purposive and snowball sampling. We used a self-developed and validated semi-structured interview guide to collect their lived experiences after recovering from COVID-19. Interviews were transcribed verbatim then thematic analysis was done during which themes/codes were generated.

Results: A total of twelve themes emerged from data analysis. The majority of participants were of the view that lab workers should be properly trained on sample collection. They also agreed that there is a need to address the major issue of anxiety and depression during the isolation period. All of the healthcare professionals concurred in being treated well by co-workers. Participants also saw vaccination as a positive step towards the prevention of infection and the majority of our respondents were highly satisfied with the role of the government of Pakistan during this pandemic.

Conclusion: Lab workers should be trained to perform the task and work effectively in a state emergency as they lacked skill for effective and painless sample collection. Counseling sessions should be organized to deal with anxiety, stress and more campaigns and social awareness work should be done on strategies to prevent the further spread of infection during this pandemic. Comprehensive support should be provided by the government for the well-being of healthcare workers.

Keywords: *COVID-19, healthcare professionals, pandemic, lived experience, and WHO.*

How to cite this article: Saeed H, Naveed H, Abrar N, Ahmad M, Farid S, Umair S. Insight into the experiences of Healthcare Professionals who recovered from COVID-19 in HITEC-IMS. HMDJ 2021; 01(01): 27-32

INTRODUCTION

Coronavirus disease 2019 (COVID-19) is a global pandemic that brought the world to a total halt. As per the latest statistics of (WHO) dated Jan 18,2021 93,805,612 confirmed cases have been reported globally whereas 2,026,093 deaths have been reported worldwide[1].

On Dec 31, 2019, the first few cases of an unknown viral disease were reported in Wuhan China to the world health organization (WHO). Later the pathogen was identified as Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)[2]. Coronaviruses are a large family of viruses that are known to cause illnesses ranging from the common cold to more severe diseases such as Pneumonia and the Middle East Respiratory Syndrome (MERS). The first-ever case of SARS-CoV-2 was reported in China in 2002 which transmitted from civet cats to humans and Middle East Respiratory Syndrome corona virus (MERS-CoV) from camels to humans in Saudi Arabia in 2012[3]. It is a hypothesis that this virus grows and replicates in animals such as bats, pangolins, and civet cats kept in close proximities such as meat markets or breeding pens without causing symptoms in them [4].

Currently, the United States of America (USA) has the highest cumulative total number of cases 23,884,299 [5]. In Pakistan first patient-reported on Feb, 26, 2020.

As of latest reports Jan,19 2021 confirmed cases 523,011, active cases 35,485, deaths 11,055. Highest number of cases were reported in Sindh 236,530, followed by Punjab 150,316, KPK 63,825, Federal 40,177, Baluchistan 18,622, AJK 8,654 and Gilgit Baltistan 4,887 [6].

Healthcare professionals are the first line of defense against

Correspondence to: Hamza Saeed, Deptt of Pharmacology, HITEC-IMS, Taxila

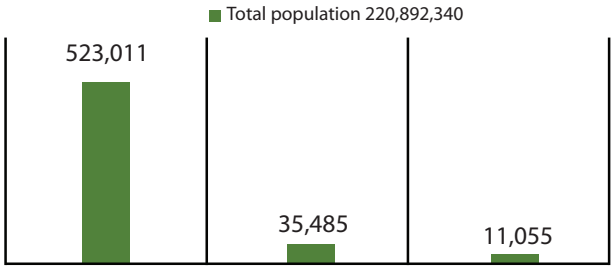
Email: hamzasaeed1469@gmail.com

Conflict of interest: None
Financial Disclosure: Nil

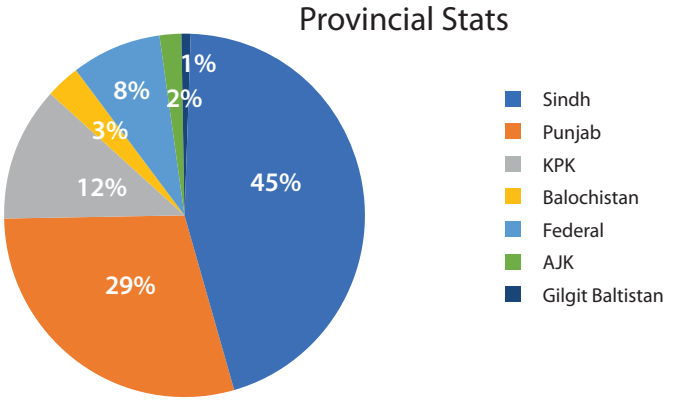
Received: 15-08-2021
Accepted: 20-09-2021

this pandemic. COVID-19 poses a serious risk to healthcare professionals as they are constantly exposed to infected individuals. Due to lack of knowledge and constant mutation in the viral RNA, there is a prominent hindrance in diagnosis, treatment, and infection control practices.

According to a study conducted between March 24 and April 23, 2020 in the United Kingdom (UK) and USA, healthcare workers has at least a threefold increased risk of reporting positive for COVID-19 infection [7].



During this period, WHO commenced many online training programs and training sessions to provide healthcare professionals with appropriate knowledge and guidance on how to deal with this infection and its spread [8].Currently there is no information regarding the experiences of healthcare professionals during COVID-19 in Pakistan.



To date there is no study done on gathering experiences of healthcare professionals, therefore; the current study aims to collect experiences of healthcare professionals who recovered from COVID-19. What were their beliefs before and after the infection?

MATERIAL AND METHODS

Study design and participants

Our research team did a qualitative study. We recruited physicians and faculty members from HITEC-IMS using the non-probability purposive and snowball sampling technique. The participants were interviewed from June 1 to June 15, 2021, using a self-developed and validated semi-structured interview guide to collect their lived experiences after recovering from COVID-19. The interview guide was validated by three senior topic experts.

We interviewed 15 healthcare professionals; the sample size was determined by theoretical saturation point which was reached till the 13th interview, two participants were additionally interviewed to confirm saturation, so no further interviews were conducted.

Inclusion criteria

- Respondents who are now negative for COVID-19.
- Respondents can be of any age.

Exclusion criteria

- Respondents who never got tested for COVID-19 whether symptomatic or asymptomatic.
- Respondents who are still positive for COVID-19.

Data Collection Procedure

- Approval for data collection from the Institutional Review Board (IRB) of HITEC-IMS was taken.
- Confidentiality was maintained by using numbers instead of names for e.g. physician P1 and for faculty F1.
- Interviews were done according to the inclusive and exclusive criteria.
- Informed consent both verbal as well as written was taken from the participants.
- The authors took interviews and audio recorded them with the permission of respondents.
- Participants were asked questions from a self-developed and validated semi-structured interview guide to collect their lived experiences after recovering from COVID-19.
- Experiences were recorded in the interview guide, transcribed and thematic analysis was done during which codes and themes were generated.
- To increase the rigor of research, a member-checking procedure was performed after interview transcription.
- Team members also rechecked the answers to increase the rigor of the research process.

All the interviews were transcribed within 24 hours of taking the respective interview. A group of at least two researchers was present at the site of the interview. One researcher was taking notes and the other was asking interview questions, meanwhile, a recorder (mobile device) was placed on the table with the permission of the respondent to audio record the whole interview. The interviews were then transcribed verbatim.

DATA ANALYSIS

The interviews were analyzed using (NVIVO 11) software which is a widely used software for qualitative research. A separate file was made including all questions of each interview. The interview responses were read by all authors to remove any oddity. The answer to each question was configured into a sequence.

Finally, a consensus was reached among all the researchers to include the responses. Codes and themes were generated from the responses of participants.

Table 1: Demographic characteristics of participants.

Participants	Age	Gender	Qualification	Marital Status	Current Designation	Experience in Years
Physician 1	35	Male	BDS	Married	Medical Officer	8
Physician 2	38	Male	BDS	Married	Senior Registrar	12
Physician 3	60	Male	MBBS	Married	Professor	20
Physician 4	37	Male	BDS	Married	Assistant Professor	10
Physician 5	34	Male	BDS	Single	Registrar	8
Physician 6	47	Female	MBBS	Married	Professor	17
Physician 7	45	Female	MBBS	Married	Associate Professor	13
Faculty 1	27	Female	MBBS	Married	Lecturer	2
Faculty 2	63	Male	MBBS	Married	Professor	22
Faculty 3	29	Female	BDS	Married	Lecturer	5
Faculty 4	28	Female	MBBS	Married	Lecturer	2
Faculty 5	42	Female	MBBS	Married	Professor	16
Faculty 6	32	Female	MBBS	Married	Lecturer	5
Faculty 7	29	Female	MBBS	Married	Senior Lecturer	5
Faculty 8	31	Male	MBBS	Married	Senior Lecturer	5

RESULTS

Our sample consisted of 15 respondents of which seven were physicians and eight were academicians working in HITEC-IMS. The interviews were conducted from June 1 to June 15, 2021. Saturation was achieved after the 13th interview and two further additional interviews were conducted to confirm the saturation. Interviews lasted for about 15-30 minutes.

Themes were developed from codes after the coding process. Themes and their codes were generated through NVIVO 11 software. Figure 1 shows the responses of participants towards questions that were asked using the interview guide. Themes were generated from the responses of participants and were defined. There was a total of 10 questions with 2 questions having a part (a) and (b), so the total responses were for 12 questions.

We recruited 15 healthcare workers in total out of which 7 were physicians and working in HIT Hospital and 8 were academicians which are working as faculty in various departments of HITEC-IMS.

The 1st theme was "Experience with the collection of samples". The majority of the participants were unsatisfied with it, while only a small percentage was satisfied and only 1 participant had mixed feelings (Figure 1).

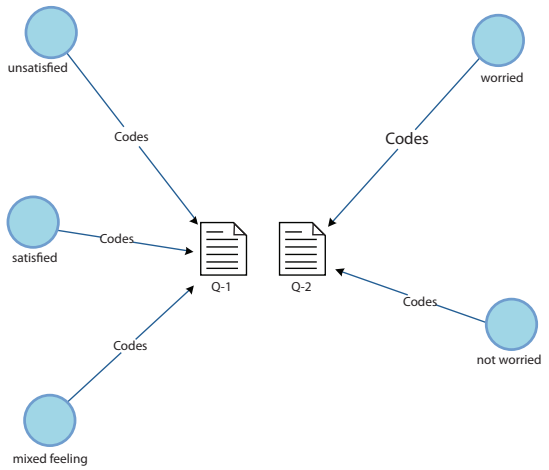


Figure 1: Theme 1

Figure 2: Theme 2

2nd theme was 'feelings about passing the infection to the family". Almost all of the participants were worried and had anxiety that they might pass the infection to their loved ones and it had a psychological toll on them (Figure 2).

3rd theme was 'can you recall/relate how you contacted this virus". Most participants were of the view that they contacted this virus from gatherings like weddings, college functions, students in class. Some respondents could not remember exactly how they caught this virus (Figure 3).

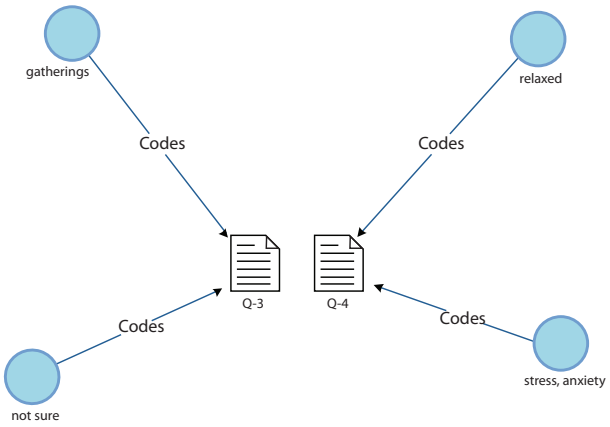


Figure 3: Theme 3

Figure 4: Theme 4

4th theme was "Anxiety or stress during isolation period". Almost 9 participants stated that they had no anxiety or stress during the self-isolation period. 6 of the participants had minor symptoms of anxiety or depression. Fortunately, none of the respondents had any major anxiety or depression problem (Figure 4).

5th theme was "what symptoms did you have due to COVID-19". The participants had mixed symptoms which included (fever, myalgia, loss of taste and smell, cough, shortness of breath, gastrointestinal symptoms, sleep disturbance, conjunctivitis, cardiac symptoms, headache). The majority of the participants had fever and body aches. There was also a portion of respondents who suffered from loss of taste and smell and there were two participants who still don't have their taste or smell restored. Surprisingly only 4 participants had the problem of cough (Figure 5a).

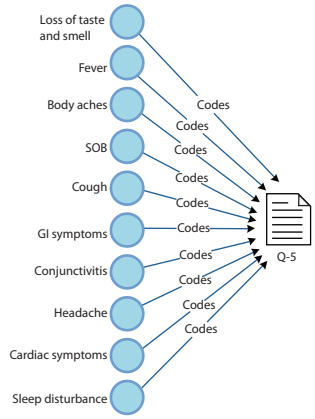


Figure 5: Theme 5

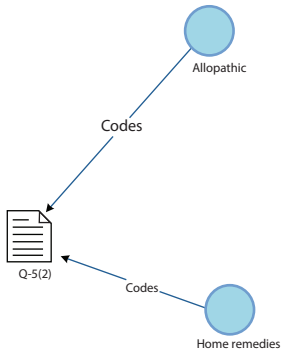


Figure 5: Subtheme 5

5th subtheme was "What treatment plan did you follow". Almost all of the participants used allopathic drugs for the symptoms as they themself were in the healthcare field, so they refrained from homeopathic treatments (Figure 5b).

6th theme was "feeling after testing negative". Most of the participants felt relaxed and happy to recover from this infection and some showed mixed feelings about their health now, as half of them still complained about dyspnea and lethargy which they didn't experience before, and it's having a negative effect on them as they will recover from this with time (Figure 6).

7th theme was "how satisfied are you with your health (immunity) now". There was a very mixed response to this theme, almost half of the participants were still having problems in carrying out their daily duty they felt lethargic and felt extra load or heaviness on their body (Figure 2).

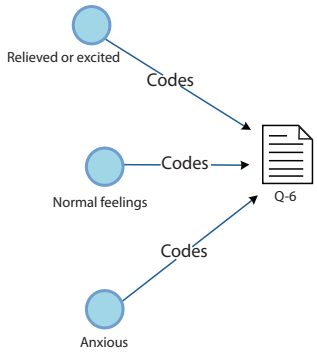


Figure 6: Theme 6

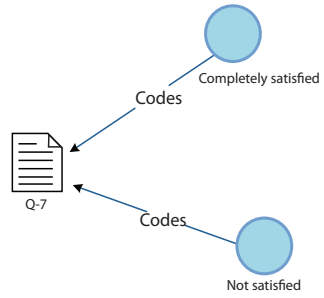


Figure 7: Theme 7

8th theme was "attitude of coworkers while participants were COVID-19 positive". All of the participants were happy and very thankful to their coworkers as they supported them both morally and physically by sharing their workload. Some were offered to stay at home and have rest even after the end of the isolation period (Figure 8).

The 9th theme was "how do you access the role of the vaccine in dealing with the Covid-19 pandemic". Almost all of the participants had some idea about the vaccine that it is a necessity in this time to prevent further transmission of this infection and to limit the number of casualties and the only way to eradicate this pandemic is by vaccination (Figure 9).

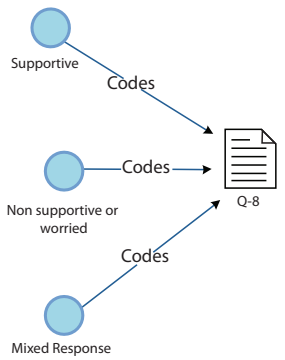


Figure 8: Theme 8

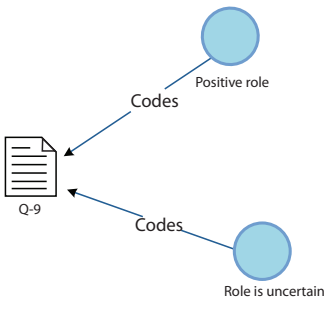


Figure 9: Theme 9

10th theme was "What measures can be helpful in preventing the spread of infection". Most of them were of the view that wearing the mask, maintaining social distance, avoiding public gatherings, use of sanitizers, and frequent hand washing was necessary to prevent further spread. Two participants also said that educational institutes should not be re-opened as this was the main cause of the spread of infection, also gatherings like weddings should be banned until and unless the positivity rate drops below 3% (Figure 10).

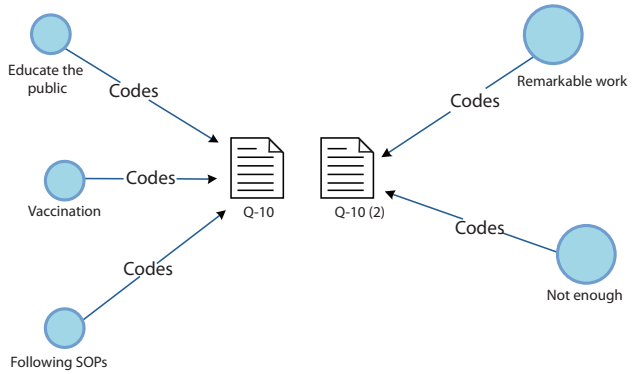


Figure 10: Theme 10a **Figure 10b: Subtheme 10**

10th subtheme was the "role of the government of Pakistan to prevent the spread of infection". As far as the role of government is concerned they said that the government of Pakistan played a positive role in this situation as being a third world country the government still managed to keep the death toll to a minimum, provided free vaccines to its citizens, started a campaign to raise awareness about COVID-19 (Figure 10b). In short, the role played by the government in this ordeal is commendable and should be highlighted.

DISCUSSION

COVID-19 has completely changed the whole situation of the world. Pakistan, being a third-world country is at serious risk, timely control of this virus is of prime importance.

Our study illustrated that there was a major problem of anxiety and depression among healthcare professionals during the quarantine period. The pandemic had a significant effect on mental health, job security, workload, and the quality of care provided [9].

In the study, it was observed that all the co-workers played a positive role and treated healthcare professionals very well during the COVID-19 crisis. Workers showed great spirit and zeal to serve their nation but the intensive work drained healthcare workers physically and emotionally [10].

European countries reported extensive depression and anxiety due to the situation. The level of severity was influenced by age, gender, occupation specialization, workload, and proximity to COVID patients [11].

Our study also concluded that the testing procedure of polymerase chain reaction-reverse transcription (PCR-RT) caused pain and irritation which created distress among the healthcare professionals. A study conducted in the UK concluded that many loopholes were present in the UK health system during this pandemic as lack of personal protective equipment (PPE), training, and tests created anxiety and distress among the workforces [12]. Positive aspects reported were solidarity, support, and being valued by society [13].

Home healthcare professionals of different ethnic groups felt neglected, at higher risk of infection due to lack of PPE, lack of supplies and training from their agencies, and relied on other agencies for support and supplies [14]. They experienced challenges that exacerbated the inequities they face as a marginalized workforce [15].

The mass vaccination program of the government of Pakistan was seen as a remarkable role [16]. Healthcare professionals before this felt they were at risk of infection and showed a moderate level of anxiety due to non-availability of vaccine, no specific treatment, high rate of transmission, and lack of knowledge [17,18].

Healthcare professionals showed negative emotions, fatigue, discomfort, and helplessness due to work, fear, anxiety, and concern for patients and family members but they also found growth under pressure, gratefulness, teamwork, and self-reflection [19].

CONCLUSION

The issue with PCR-RT testing in Pakistan is that people are afraid of the pain or irritation at the site of infection so, there is a need of providing technical training to all the sample collectors across the country. This will reduce the fear of getting tested in the mass population.

In addition, there is the problem of proper isolation as most of the population lack a private space or room and most of them have shared space in Pakistan. The government needs to be more active in sorting out this problem.

Moreover, the problem of anxiety and depression also arises among people due to long stays at home during a pandemic. Healthcare professionals are the front-line force in fighting this pandemic, we found them to be very resilient and highly motivated in dealing with their patients. They were supported well by their colleagues. There was a sense of acknowledgment for them and when they were positive for COVID-19, their junior staff facilitated them in every capacity.

The role of vaccine is a positive one and everyone should be encouraged to go for it as it will reduce chances of getting this infection. The public needs to be educated more on the need to follow standard operating procedures (SOPs) especially like wearing of the mask should be made mandatory and violations should be fined.

The role of the government of Pakistan should be appreciated

because despite financial constraints it took timely decisions and implemented actions to stop the spread of infection.

The Government of Pakistan needs to formulate strict policies and implement them in institutes like colleges, universities, and schools. There is a need to keep the balance of going about a normal life routine along with following SOPs.

AUTHORS' CONTRIBUTION

Hamza Saeed: Topic selection, devising and write up of methodology, results and conclusion, Presenting synopsis to IRB and final submission of article for approval.
Hamza Naveed: Introduction write up, transcribing verbatim of interviews.
Munir Ahmad: Supervisor, overall supervision of research work.
Naila Abrar: Final review of research work results and discussion.
Sajida Farid: Overall scrutiny of the entire write up in research especially in introduction and abstract.
Saima Umair: Assisting 1st author in data collection.

REFERENCES

1. Retrieved Jan18, 2021, from, http://covid19.who.in-t/?adgroupsurvey={adgroupsurvey}&gclid=Cj0KCQi-A3smABhCjARIsAKtrg6LidOkN_OELTy4Ex9cJsOxkND8nbRoj7bofzR59cwrn2XHRXPnQi0kaAufjEALw_weB
2. Huang, C., Wang, Y., Li, X., Ren, L. & Zhao, J. 2020. Clinical features of patients infected with 2019 novel Coronavirus in Wuhan, China the Lancet, 395, 497-506.
3. Retrieved Jan 19,2021, from, http://www.emro.who.int/health-topics/corona-virus/questions-and-answers.html
4. Mishra, A., Joshi, R., Jha, S., Raj, A., Prakash, A. & Medhi, B. 2020. Human animal interface of SARS-CoV2 transmission Veterinary research communication 44, 119-130.
5. Retrieved Jan 19,2021 from, https://covid.gov.pk/
6. Retrieved Jan 20,2021 from, https://covid.gov.pk/stats/pakistan
7. Alusbaic, S., Temsah, M. H., Eyadhy, A. A. Gosadi, I. 2019. Middle East respiratory syndrome coronavirus epidemic impact on healthcare workers risk perceptions, work, and personal lines. Journal of infections in developing countries 13, 920-926.
8. Sun, N., Wei, L., Shi, S. & Jiao, D. 2020. A qualitative study on the psychological experience of care givers of Covid-19 patient's American journal of infection control 48, 592-598.
9. Creswell, J. W. (1998). Qualitative inquiry and research design: Choosing among five traditions. Thousand Oaks, CA: Sage Publications.
10. Nguyen, L. H., Drew, D. A., & Graham, M. S. (2020). Risk of COVID-19 among front line health care workers and the general community. The Lancet Public Health, 5(9), 475-483.
11. Retrieved April 2,2021 from https://www.who.int/emergencies/diseases/novel-coronavirus-2019/training/online-training
12. Halcomb, E., Mclnnes, S., Williams, A., Ashlay, C. & James, S. 2020. The experiences of primary healthcare nurses during the Covid-19 pandemic in Australia Journal of nursing scholarship, 52, 553-563.
13. Liu, Q., Luo, D., E, J., Haase, Guo, Q., Wang, X. Q. & Yang, J. 2020. The experiences of health care providers during the Covid-19 crisis in china: A qualitative study The Lancet global health 8, 790-798.
14. Bholken, J., Schomig, F., Lemke, M. R. & Riedel, S. G. 2020. Covid-19 pandemic: Stress experiences of healthcare workers Psychiatrische praxis 47, 190-197.
15. Vindrola, C., Andrews, L., Dowrick, A., Djellouli, N., Fillmore, H. & Gonzalez, E. B. 2020. Perceptions and experiences of healthcare workers during the Covid-19 pandemic in the UK BMJ open
16. Sterling, M. R., Tseng, E. & Poon, A. 2020. Experiences of home healthcare workers in New York City during coronavirus disease 2019 pandemic JAMA internal medicine 180, 1453-1459.
17. Kaijin, X., Hongliu, C. A. I., & Yihong, S. H. E. N. (2020). Management of COVID-19: the Zhejiang experience. Journal of Zhejiang University, 49(2), 147–157. https://doi.org/http://www.zjujournals.com/med/EN/10.3785/j.issn.1008-9292.2020.02.02
18. Peng, F., Tu, L., Yang, Y., & Hu, Q. (2020). Management and Treatment of COVID-19: The Chinese Experience. Canadian Journal of Cardiology, 36(6), 915–930. https://doi.org/https://www.sciencedirect.com/science/article/abs/pii/S0828282X20303950.
19. Senni, M. (2020). COVID-19 experience in Bergamo, Italy. European Heart Journal, 41(19), 1783–1784. https://doi.org/https://academic.oup.com/eurheartj/article/41/19/1783/5816894?login=true.

REVIEW ARTICLE

MANAGEMENT OF ORAL, DENTAL AND MAXILLOFACIAL TRAUMA IN THE EMERGENCY ROOM

Irfan Shah

Department of Oral and Maxillofacial Surgery, Dental College HITEC-IMS, Taxila, Pakistan

ABSTRACT

Trauma is a global epidemic. Road traffic accidents, falls, interpersonal violence, sports related and industrial accidents all could and do lead to oral and maxillofacial injuries. If not managed properly, oral and maxillofacial trauma could lead to airway compromise, profuse bleeding, loss of function, disfigurement and death. The purpose of this narrative review article is to highlight the significance of timely management of oral and maxillofacial trauma patients in the emergency room. While the definitive treatment is responsibility of trained maxillofacial surgeons, most of the life and function saving steps could already be taken by the emergency room personnel well before arrival of the specialist surgeons.

Key Words: *Maxillofacial, Dentoalveolar, Trauma*

How to cite this article: Shah I. Management of Oral, Dental and Maxillofacial Trauma in the Emergency Room. HMDJ 2021; 01(01): 33-35

INTRODUCTION

Oral, dental, maxillofacial and the head and neck region are among the most commonly injured parts of human body. Road traffic accidents, falls, interpersonal violence, sports related and industrial accidents all could and do lead to oral and maxillofacial injuries[1,2,3]. The extent of such trauma ranges from minor dentoalveolar injuries to extensive disruption of the soft and hard tissue architecture of the facio-maxillary region. If not identified and managed properly, these later injuries could cause facial disfigurement (scars and facial deformity), loss of function (mouth opening, deglutition, olfaction, and vision) and prove life threatening due to airway compromise and/ or excessive bleeding.

While the final diagnosis and definitive management of all these injuries is the responsibility of qualified and trained oral and maxillofacial surgeons, quick identification and administration of life, vision and function saving measures must start well before the availability of such specialists. It is therefore mandatory that the emergency room personnel are well versed with the signs and symptoms as well as emergency management of the trauma patients with maxillofacial injuries.

There are countless published scientific articles on definitive management of maxillofacial trauma but only few give guidelines for the emergency room personnel on how to initially manage these patients.

Correspondence to: Prof. Dr. Irfan Shah, Principal, Dental College HITEC- IMS, Taxila Cantt.

Email: drshah121@hotmail.com

Conflict of interest: None

Financial Disclosure: Nil

Received: 27-07-2021

Accepted: 16-08-2021

The purpose of this narrative review article is to give broad guidelines to the emergency room personnel on how to initially manage patients with oral, dental, and maxillofacial injuries.

Basic Principles of Maxillofacial Trauma Management

Diagnosis of most dental, oral, and maxillofacial injuries require detailed history and clinical examination followed by radiological investigations. CT scan is the diagnostic modality of choice for most patients with maxillofacial trauma. In patients requiring CT scan for head injury and having signs of maxillofacial trauma, the exposure should be extended downwards to include the entire maxillofacial region. This will preclude the need for repeat visits to the radiology department for additional exposures later.

Emergency management of all oral, dental, and maxillofacial trauma patients starts with the well-established ATLS principles of ABCDE [4,5,6]. Using this systematic approach to assess the patient, helps in identification of life-threatening injuries and simultaneously addressing them. Maintenance of airway patency along with protection of the cervical spine, breathing, circulation with hemorrhage control and prevention of disability (neurological, ophthalmological) should take precedence over management of the oral, dental, and maxillofacial injuries. Similarly, the frightening appearance of some maxillofacial injuries must not distract the emergency room personnel from rest of the body of the trauma patient. The entire body of the patient must be examined (exposure) to identify and manage other equally or even more significant injuries.

Airway (with cervical spine) management:

Owing to their direct proximity, trauma to the oral and dental structures predisposes the patient to airway compromises in several ways. Broken teeth or dentures may physically obstruct

the upper airway. Similarly, oral, and nasal bleeding in an unconscious patient in supine position will gravitate towards the oropharynx and obstruct the airway. Bilateral fractures in the para symphysial region of mandible may allow the central fragment to displace posteriorly[7,8]. Patient's own tongue in such cases falls back and obstructs the airway. A posteriorly displaced maxillary fracture similarly allows the soft palate to fall back leading to airway compromise.

Prevention of airway compromise in most of these patients is easy and require simple techniques[9]. Supine position should be avoided in patients with oral and nasal bleeding. Putting the patient on his or her left or right lateral side would allow any continued bleeding to flow out rather than accumulating in the oropharynx and obstructing the airway. Cervical spine injury must always be suspected in patients with faciomaxillary injuries and care must be taken to avoid further trauma while positioning or repositioning the patient[10,11]. Clearing the oral cavity and oropharynx with fingers and /or suctioning will help in removing foreign bodies, broken teeth, dentures, and blood clots. A thick surgical silk suture passed deep through the middle of the tongue is a good and easy way to pull it anteriorly and prevent it from falling back and obstructing airway. Similarly, posteriorly displaced fractured mandibular fragments could be pulled back anteriorly and retained there with simple interdental wiring.

Simple maneuvers like chin lift and jaw thrust and simple devices like nasal and oral airways are extremely helpful in maintaining airway patency. If these simple techniques and maneuvers are not sufficient to maintain airway, expert help must be immediately sought for intubation, cricothyrotomy or tracheostomy. Most oral and maxillofacial surgeons can perform all these procedures. Otherwise, an anesthetist must be called immediately to perform oro-tracheal or naso-tracheal intubation or an ENT surgeon to perform cricothyrotomy or tracheostomy thus securing a definitive airway.

Bleeding and circulation

The entire body of the patient must be carefully examined to identify concealed or revealed hemorrhage. Similarly signs and symptoms of excessive blood loss must be looked for, IV access established, and fluid therapy started to restore circulating volume to prevent or manage hypovolemic shock.

The maxillofacial region is richly vascular and both the soft tissue lacerations as well as osseous fractures may lead to profuse bleeding[12]. Tongue lacerations or lacerations involving the facial vessels could lead to intra and extra oral bleeding, respectively. Similarly, displaced, and mobile fractures in the mandibular angle or body region may lacerate the inferior alveolar vessels and lead to profuse intra oral bleeding. Unstable Maxillary fractures may similarly lead to excessive blood loss manifested by anterior and/or posterior nasal bleeding.

The basic principles of achieving hemostasis elsewhere in the body are equally applicable to controlling blood loss in the maxillofacial region[13,14]. Identification of the source of bleeding, direct pressure application, application of hemostatic clamps to a bleeding vessel and suturing the lacerations all could prove helpful in securing hemostasis originating from soft tissues.

In mandibular fractures with bleeding originating from the inferior alveolar canal, direct pressure application is mostly impossible. Fragment mobility prevents effective clot formation and hence continued bleeding. A single stainless-steel wire passed around the teeth on either side of the fracture line and tightened to prevent fragment mobility is the easiest way of arresting bleeding in the emergency room. Definitive reduction and fixation or immobilization will be performed later by the maxillofacial surgeon after the patient is hemodynamically stabilized.

Similarly, for maxillary fractures, nasal bleeding could be managed with anterior and/ or posterior nasal packing. While anterior nasal packing is a simple procedure, posterior nasal packing needs knowledge and skills. It consists of passing a Folly's catheter from the anterior nares into the nasopharynx, inflating the balloon and then pulling it anteriorly to exert pressure on the intranasal bleeding point. Combined with anterior nasal packing, posterior packing is an effective way to control hemorrhage associated with midface fractures.

Dento-alveolar and Maxillofacial Injuries

Once airway of the patient with maxillofacial trauma is protected, his/her breathing and circulation restored and the patient is hemodynamically and neurologically stable, attention should be paid to the oral, dental, and maxillofacial injuries that need urgent treatment. Ideally by this time a medical / dental colleague with expertise in maxillofacial trauma management should be available and they will perform detailed clinical and radiological assessment of the patient. In the absence of such expertise the casualty medical officer on duty should perform oral and maxillofacial examination and perform simple procedures that could save vision and prevent loss of function and cosmesis. This will include examination of the oral and maxillofacial region and, depending upon training and experience, preliminary reduction of bony fragments, replantation of avulsed teeth, and initial re-approximation and suturing of soft tissue lacerations.

Orbital fractures are common in maxillofacial trauma patients. While some patients with midface fractures need no ophthalmology consultation[15], others need detailed assessment and management by an ophthalmologist. Vision threatening injuries (e.g., retrobulbar hematoma) must be identified early and managed urgently without waiting for ophthalmologist. Lateral canthotomy and inferior Cantholysis are simple surgical procedures to reduce intra ocular pressure and thus prevent vision loss. All maxillofacial surgeons are trained and can perform these procedures. Same should be the case with most trauma center surgeons.

Avulsed, displaced and luxated teeth need urgent attention as

well[16]. Avulsed teeth need immediate replantation. The tooth socket is gently irrigated with saline to remove foreign bodies and blood clot. The tooth is similarly gently irrigated and replanted into the socket. Avoiding touching the root part of the tooth increases the chances of its survival. All replanted and luxated teeth require splinting with dental wiring for stabilization. This part could again be performed better by an expert oral and maxillofacial surgeon.

CONCLUSION

While oral and maxillofacial surgeons are best trained to manage dental, oral and maxillofacial injuries, the emergency room personnel could avoid morbidity and mortality by administering basic life and function saving treatment. Simple maneuvers to establish and secure airway, arrest hemorrhage, and restore circulation prove lifesaving. Similarly, identifying sight threatening orbital injuries, temporarily reducing and immobilizing jaw bones and replanting and stabilizing avulsed and luxated teeth could prove helpful in reducing pain, loss of function and prevent disfigurement.

REFERENCES

1. Shaikh IM, Rajput F, Khatoon S, Usman G. Etiology and incidence of maxillofacial skeletal injuries at tertiary care hospital, Larkana, Pakistan. Pak Oral & Dent Jour. 2014;34(2:239-42)
2. Khan SU, Khan M, Khan AA, Murtaza B, Maqsood A, Ibrahim W, Ahmed W. Etiology and pattern of maxillofacial injuries in the Armed Forces of Pakistan. J Coll Physicians Surg Pak. 2007;17(2):94-7.
3. Hamid MM, Jabir A, Fathi A, Mohieeldin A, hamid AA. Pattern and etiology of maxillofacial trauma among Sudanese population. J Head Neck Physicians Surg 2020; 8:87-90.
4. Deliverska EG, Stefanov LP. Maxillofacial trauma management in polytraumatized patients – the use of Advanced Trauma Life Support (ATLS) principles. J of IMAB. 2013; 19(2):282-285.
5. Perry M, Morris C. Advanced trauma life support (ATLS) and facial trauma: can one size fit all? Part 2: ATLS, maxillofacial injuries and airway management dilemmas. Int J Oral Maxillofac Surg. 2008;37(4):309-20.
6. Perry M, O'Hare J, Porter G. Advanced Trauma Life Support (ATLS) and facial trauma: can one size fit all? Part 3: Hypovolaemia and facial injuries in the multiply injured patient. Int J Oral Maxillofac Surg. 2008;37(5):405-14.
7. Ehrenfeld M, Prein J. Symphyseal and Para symphyseal fractures. In: Ehrenfeld M, Manson PN, Prein J, eds. Principles of Internal Fixation of the Craniomaxillofacial Skeleton - Trauma and Orthognathic Surgery, 1st ed. New York: Thieme; 2012:137-146.
8. Kurogi AS, Oliveira e Cruz GA, Closs Ono MC, Maluf J´unior I, Gus IO, Freitas RS, et al. Bilateral para symphysis fracture obstructs the airway? ACM Arq Catarin Med. 2012; 41:24-26.
9. Barak M, Bahouth H, Leiser Y, Abu El-Naaj I. Airway management of the patient with maxillofacial trauma: review of the literature and suggested clinical approach. Biomed Res Int. 2015; 2015:724032.
10. Hutchison I, Lawlor M, Skinner D, "ABC of major trauma. Major maxillofacial injuries," BMJ 1990.;. 301:595–599
11. Jose A, Nagori SA, Agarwal B, Bhutia O, Roychoudhury A. Management of maxillofacial trauma in emergency: An update of challenges and controversies. J Emerg Trauma Shock. 2016;9(2):73-80
12. Cogbill TH, Cothren CC, Ahearn MK, Cullinane DC, Kaups KL, Scalea TM, Maggio L, Brasel KJ, Harrison PB, Patel NY, Moore EE, Jurkovich GJ, Ross SE. Management of maxillofacial injuries with severe oronasal hemorrhage: a multicenter perspective. J Trauma. 2008 5(5):994-9
13. Akolkar AR, Kulkarni DG, Gangwani KD, Shetty L, Channe SP, Sarve PH. Bleeding control measures during oral and maxillofacial surgical procedures: A systematic review. J Dent Res Rev 2017; 4:79-89.
14. Ardekian L, Samet N, Shoshani Y, Taicher S. Life-threatening bleeding following maxillofacial trauma. J Craniomaxillofac Surg. 1993 Dec;21(8):336-8
15. Rockafellow A, Busby E, WuDunn D, Grover S, Salman S Evidence-Based Protocol for Ophthalmology Consult for Orbital Fractures. J Oral Maxfac Surg 2021, 79(7):1507-1513.
16. Skapetis T, Curtis K. Emergency management of dental trauma. Australas Emerg Nurs J; 2010: 13, 30-34

CASE REPORT

SEBACEOUS HORN: A CASE REPORT

Farhan Ahmed Eitezaz[1], Eitezaz Ahmed Bashir[2], Anila Rehman[3], Riaz Anwar Bashir[4], Arsalan Siraj[5], Muhammad Asghar[6]

[1]Microsurgical Clinical Fellow- Nottingham University Hospital Trust, UK

[2] Prof of Surgery- Jinnah Memorial Hospital Rawalpindi

[3] Al- Shifa Eye Trust Hospital Rawalpindi

[4,5] Department of Surgery HITEC-IMS, Taxila, Pakistan

[6] Department of Urology HITEC-IMS Taxila

ABSTRACT

Sebaceous horn is a relatively rare lesion consisting of a protruding, conical, dense, hyperkeratotic nodule which resembles the horn of an animal. Cutaneous horns most frequently occur in sun-exposed parts and are typically found in the face and the scalp, but may also occur on the hands, eyelids, nose, chest, neck, shoulder and penis. Their occurrence on covered areas is uncommon. We report a 61-year-old female patient presenting with cutaneous horn over her suprapubic area which is a rather unusual site for this lesion. There's a rare but definite risk of underlying malignant pathology in cutaneous horn. Standard treatment involves local excision, but the presence of malignancy mandates a partial penectomy.

Conclusion: Surgical Excision with clear wide margins in mandatory for the management of lesions presenting as Sebaceous horn.

Keywords: *Cornu cutaneum, Sebaceous Horn*

How to cite: Eitezaz FA, Bashir EA, Rehman A, Bashir RA, Siraj A, Asghar M. Sebaceous Horn: A case report. HMDJ 2021; 01(01): 36-37

INTRODUCTION

A cutaneous horn is a clinical description referring to protruding compressed cornified material indicating a skin reaction pattern to a variety of cutaneous pathologies [1]. Cutaneous horns most frequently occur in sun-exposed parts and are typically found on the face and scalp, but may also occur on the hands, penis, eyelids, nose, chest, neck and shoulder [2].

They are thought to result from underlying benign, premalignant or malignant pathology, in 61.1%, 23.2% and 15.7% of cases respectively [3]. Tenderness at the base of the lesion and lesions of larger size favour malignancy [4]. Excisional biopsy with a clear margin is the treatment of choice. This paper reports a case of cutaneous horn in an infrequent location.

CASE REPORT

A 61-year-old female reported to the outpatient department with 6 months history of a conical, hard and yellowish lesion over her suprapubic region (Figure 1 & 2). The swelling had its origin as a small, rounded nodule which progressively enlarged to the presenting size. Patient did not bother about the lesion at first, but over the next few months patient developed a dull ache in the lesion which radiated to the inguinal region and was also associated with itching. A detailed history and clinical examination were consistent with a large protruding horny swelling in the suprapubic region with a nodular base, but no induration or regional lymphadenopathy. There were no comorbid medical conditions. The sebaceous horn was excised with a clear margin and the wound was closed primarily. Histopathological findings were consistent with benign keratosis, ruling out a malignant etiology.

DISCUSSION

Cutaneous horn is a clinical denomination which describes a highly keratotic, conical and circumscribed lesion, white or yellowish in color, that varies from a few millimeters to many centimeters and that can hide either benign or malign lesions[5]. It usually involves areas of the body exposed to sunlight in patients 50 years or older. Cutaneous horns are classified into four varieties: (1) Sebaceous horns arise from sebaceous cysts and arise most commonly on the scalp, (2) Wart horns closely resemble sebaceous horns and are usually found on the penis, (3) Cicatrix horns are rare and grow from the post burn lesions. A laminated horny outgrowth may form from the healing post burn ulcer, (4) Nail horns most commonly from big toenail

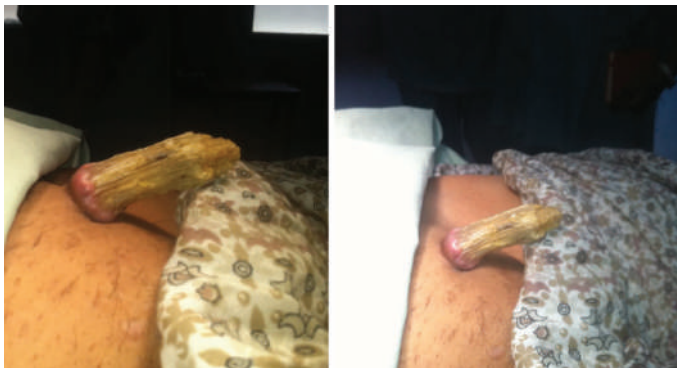


Figure 1 & 2: Conical lesion over the suprapubic region.

Correspondence to: Dr. Farhan Ahmed Eitezaz, Deptt of Plastic Surgery, HITEC-IMS, Taxila, Pakistan.

Email: farhan.eitezaz@hitec-ims.edu.pk

Conflict of interest: None

Financial Disclosure: Nil

Received: 06-06-2021

Accepted: 02-08-2021

in unattended patients [6]. The cutaneous horn usually occurs over sun exposed areas, particularly the face, scalp, pinna, nose, forearm, and dorsal aspect of hand [7]. They sometimes can develop in non-sun exposed areas as in our case. On examination these sebaceous or cutaneous horns are yellowish in colour and hard with linear ridges alone along the long axis of the horn which tapers and becomes conical at its distal end. The base of the horn may show redness and tenderness of the surrounding skin. It is also important to assess the lymph nodes draining the area in which the lesion is present. Pain, basal tenderness and large size, are features suggestive of malignancy. The longer the time to develop the disease and the bigger its base, the higher the risk of the lesions being premalignant or malignant [8]. The mass of the cutaneous horn usually shows compact, diffuse hyperkeratosis with parakeratosis. It is important to identify pre-malignant actinic (or arsenical) keratosis, malignant squamous cell carcinoma and sometimes keratoacanthoma. The lesion should be excised with margins and sent for histopathology to rule out malignancy. If the lesion is malignant then it should be excised with clear margins and metastatic evaluation should be carried out.

CONCLUSION

Sebaceous horns appear benign but a high risk of underlying malignancy should be suspected. The lesion should be excised with clear margins and specimen should be evaluated by a histopathologist to rule out malignancy of the horn base.

CONSENT

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

AUTHORS' CONTRIBUTION

Farhan Eitezaz: Write up of the manuscript ,final drafting and editing.
Eitezaz Ahmed Bashir: Idea for case report , concepulisation , senior operating author and proof reading of manuscript .
Anila Rehman: literature search and statistics.
Riaz Anwar Basir: proof reading of manuscript , editing.
Arsalan Siraj: final edit and proof reading.
Muhammad Asghar: guidance and proof reading.

REFERENCES

1. Bondeson J. Everard Home, John Hunter and cutaneous horns: a historical review. Am J Dermatopathol. 2001;23:362–9.Am J Dermatopathol. 2001;23:362–9.
2. Saraf S. Sebaceous horn: An interesting case. Indian J Dermatol [serial online] 2007 [cited 2014 Aug 4];52:59-60
3. Yu RCH, Pryce DW, Macfarlane AW, Stewart TW. A histopathological study of 643 cutaneous horns. Br J Dermatol. 1991, 124:449-452
4. Tauro LF, Martins JJS, John SK, Keinear KP. Cornu cutaneum at an unusual site. Indian J Plast Surg. 2006;39:76-8
5. Mantese SAO, Diogo PM, Rocha A, Berbert ALCV, Ferreira AKM, Ferreira TC. Corno cutâneo: estudo histopatológico retrospectivo de 222 casos. An Bras Dermatol. 2010;85(2):157-63.
6. Ingram NP. Cutaneous horns: a review and case history. Annals of the Royal College of Surgeons of England I978; 6o: 128-129.
7. Copcu E, Sivrioglu N, Culhaci N. Cutaneous horns: are these lesions as innocent as they seems to be? World J Oncol 2004; 2: 18.
8. Castillo D, Zerpa O, Loyo N, López C, Oliver M. Histopatologia del cuerno cutaneo: estudio retrospectivo de 77 casos. Derm Venez. 2002;40:65-9.

CASE REPORT

DENTAL MANAGEMENT OF SUBMANDIBULAR SPACE INFECTION IN A PATIENT WITH GLUCOSE-6-PHOSPHATE DEHYDROGENASE DEFICIENCY

Muhammad Jamal[1], Shumaila Basit[2], Laiba Saher[3], Khalid Mahmood Siddiqi[4]

[1] Oral and Maxillofacial Surgery, Islamabad Medical and Dental College Islamabad
[2] Oral Medicine Department, Islamabad Medical and Dental College, Bhara Kahu, Islamabad
[3]Oral and Maxillofacial Surgery department, Islamabad Medical and Dental College, Bhara Kahu, Islamabad
[4]Oral and Maxillofacial Surgery, Islamabad Medical and Dental College Islamabad

ABSTRACT

Glucose-6-phosphate dehydrogenase deficiency, genetic disorder that effects RBC's proceeding to hemolytic anemia usually on exposure to certain foods, medications or even infections. This article is reporting a dental treatment of a 7-year-old male patient with G6PD deficiency presenting to oral and maxillofacial department with left submandibular space infection, secondary to irreversible pulpitis in left mandibular deciduous first molar. It started from irreversible pulpitis in deciduous first molar. Patient presented with a painful swelling and erythema. Extraction was done under local anesthesia and swelling subsided later on. Proper protocol has been proposed in consultation with hematologist for the dental management of G6PD deficiency patient.

Keywords: *Acute haemolytic anaemia, Dental Management, Favism, G6PD deficiency, Red blood cells*

How to cite: Jamal M, Basit S, Saher L, Siddiqi KM. Dental Management of submandibular space infection in a patient with Glucose-6-Phosphate Dehydrogenase Deficiency. HMDJ 2021; 01(01): 38-40

INTRODUCTION

Glucose-6-phosphate dehydrogenase (G6PD) is an important enzyme that plays a prime role in sustaining the levels of antioxidants in the body systems. It acts as a shield to RBCs as it helps RBCs in combating premature destruction. It promotes easy conversion of glucose into ribose 5 phosphate. In case of deficiency, there is disturbance in production of free radicals (reactive oxidative species) that cause excessive oxidative stress that can lead to acute hemolytic crisis[1].This form of stress can be increased by invasive surgical procedures or medicines causing damage to the tissues. Therefore, extreme caution is advised in drug selection for medical and dental management in patients with G6PD deficiency. This enzymatic deficiency is more common in males. Here, we are reporting a case of a 7-year-old male patient with G6PD deficiency that underwent dental treatment under local anesthesia.

CASE REPORT

A 7-year-old male patient reported to oral and maxillofacial surgery department in Islamabad Dental Hospital with a painful swelling on left side of face for last five days. Swelling started five days ago and gradually increased in size to involve the left submandibular region (Figure-2). The swelling was associated with pain that was severe, intermittent and increased specially at night. The pain was not relieved after taking analgesics. He had a severe episode of pain one month back in lower left deciduous molar (#74) for which they reported to operative department and was diagnosed as irreversible pulpitis (Figure 1,2). The offending tooth underwent pulpectomy to remove the inflamed pulpal tissue. As a result, patient's pain was relieved and tooth remained asymptomatic for one-month post treatment. Scaling was also done one month back for the removal of calculus present on lingual surface of mandibular incisors.

The patient reported again to the hospital with the complaint of pain since last five days along with a diffuse swelling. Patient looked fatigued. Facial asymmetry was present as a result of diffuse swelling on left side of face involving left submandibular and buccal space. Figure-1 shows pre-operative intraoral and extra-oral radiographs showing marked swelling and facial asymmetry. The swelling was tender on palpation along with increased temperature and measuring approximately 2x2 cm in greater dimensions. There was limited mouth opening of 24mm. Intraorally tooth #74 had a filling and was tender to percussion. There was a swelling adjacent to 74 in buccal vestibule which was tender to percussion. Radio graphically tooth # 74 was carious with a filling placed and a periapical radiolucency around the mesial root. The patient was sent to operative department to reassess tooth # 74. Extraction was advised for tooth#74. Patient was sent to hematologist for consultation. Hematologist cautioned about the use of local anesthetics, antibiotics and analgesics. A list of drugs was given to us by the

Correspondence to: Muhammad Jamal, Associate Professor, Oral and Maxillofacial Surgery, Islamabad Medical and Dental College Islamabad.

Email: jamal_kcd@hotmail.com

Conflict of interest: None
Financial Disclosure: Nil

Received: 15-06-2021
Accepted: 25-07-2021

hematologist. Patient's guardians were briefed about the sign and symptoms of acute hemolytic crisis and advised to report to hospital in case if there is an emergency. The patient was thoroughly accessed; extraction was planned and performed under local anesthesia following aseptic technique using 1.8ml of 2% lignocaine with adrenaline (1:200,000). Pus and blood drained from the socket. The socket was washed with saline, squeezed with gauze and pack was placed. Patient was kept under observation for 30 minutes. After 30 minutes the socket was examined, there was no active bleed and the patient was sent home with intraoral pack and post extraction instructions were given. He was medicated keeping in mind list of drugs that were contraindicated and re-called on third post-op day. On follow up visit, there was no bleeding, no pain and the swelling was markedly reduced. (Figure-3,4) and he was referred to operative department for the treatment of #84.

Figure 1: Pre-operative intraoral photograph showing inflammation of mucosa of offending tooth.

Figure 2: Pre-operative extra oral photograph showing facial asymmetry due to swelling.

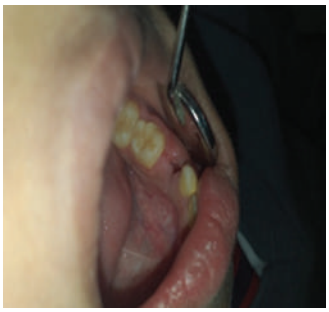


Figure 3: Intraoral photograph showing adequate healing after extraction of offending tooth.

Figure4: Extraoral photograph showing resolution facial symmetry after adequate healing.

DISCUSSION

Dr. Ernest Beutler first identified G6PD in 1953[2]. This enzymatic disorder affects around 400,00000 people worldwide. Inherited mutations in genetic encoding and X-linked inheritance are the causative factors of G6PD deficiency that pave way to alterations in protein with certain enzymatic activities.3 When associated with ingestion of fava beans, it is known as favism. Increased fava beans ingestion cause increased reactive oxygen species production[4]. It is widespread in Arabian Peninsula and sub Saharan African region with documented prevalence rates of 39.8% in Saudi Arabia, 30% in Syria, and 29% in Oman[3,5].

WHO categorize G6PD deficiency into five classes depending on the level of enzyme deficiency (Table-1)[6,7]. Acute or chronic hemolytic anemia along with denaturation of hemoglobin, puddling, neonatal jaundice and hyperbilirubinemia are clinical mamifestations of this disease. Most of the patients are clinically asymptomatic and the disease is rarely fatal. Oxidative drugs, infectious diseases and ingestion of fava beans can trigger the hemolysis in children[8].

Table-1: Classes of G6PD Deficiency.

Class	Severity
Class I	Chronic hemolytic anemia, severely deficient
Class II	1-10% residual activity
Class III	10-60% residual activity
Class IV	60-150% normal activity
Class V	150%; increased activity

The most frequently occurring clinical consequence of this enzymatic insufficiency is drug induced acute hemolysis. The list of contraindicated medications has been constantly modified over years[5]. (Table-2). Although it's a rare disease but pediatric dentist should be able to identify the disease and its current systemic manifestations, while making the treatment plan of such patients. Clinicians should also be aware of the fact that this disorder has no distinctive physical, facial, or bucco-dental signs. Detailed clinical and family history is particularly important about this masked metabolic disorder. Some parents may also be not aware of the condition in their children. Performing dental procedure in such patients is difficult because it may lead to oxidative stress aggravating Acute Hemolytic Anemia[7].

Hematologist consultation is foremost to assess the level of deficiency, finding and avoiding the patients trigger factors

Table 2: Drugs to be avoided in G6PD deficiencies and Chemicals to avoid in G6DP deficiency

Furazolidone	Methylene blue
Naphthalene	Nalidixic acid
Niridazole	Isobutyl nitrite
Nitrofurantoin	Phenazopyridine
Sulfectamide	Primaquine
Thiazolesulfone	Trinitrotouline
Toludine blue	Phenylhydeazine
Urate oxidase	Sulfapyridine

Credit note: Earnest Butler, G6PD Deficiency. Blood 1994; 84:3613-36

via proficient history taking and examination is important[9]. For this case, the hematologist warned us about the use of local anesthetic agent, analgesics and antibiotics of choice.

Usually AHA due to G6PD is self-limiting and reverts once the offending agent is withdrawn. "Ali R elyassi proposed following recommendations in their review paper (1) Anyone suspected of G6PD deficiency should be screened; (2) exposure to oxidative stressors in these individuals should be avoided; (3) these patients should be informed of risks along with signs and symptoms of an acute hemolytic crisis; (4) the clinician should be able to identify both laboratory and clinical signs of hemolysis; and finally, (5) if an acute hemolytic crisis is identified, the patient should be admitted for close observation and care" [10].

There are no local guidelines and case reports related to this subject. This case report will be a good addition to the literature. Through such case reports and case series, we can formulate the guidelines for dental management of these patients.

CONCLUSION

Drug induced hemolysis in G6PD deficiency definitely presents many clinical challenges in dental therapeutics. To make the patient aware with this condition and designing evidence based clinical protocol will be beneficial in successful dental management without any untoward reaction.

AUTHORS' CONTRIBUTION

Muhammad Jamal: Design & Conception.
Shumaila Basit: Drafting and Discussion.
Laiba Saher: Literature review.
Khalid Mahmood Siddiqui: Proof reading & Critical Analysis.

REFERENCES

1. Goi T, Shionoya Y, Sunada K, Nalamura K. General Anesthesia in a Glucose-6-Phosphate Dehydrogenase Deficiency Child: A Case Report. Anesth Prog. 2019; 66: 94-6.
2. Gupta H, Arora R, Kamboj M. Periodontal considerations in a patient with glucose-6-phosphate dehydrogenase deficiency with associated pancytopenia: A rare case report. J Indian Soc Periodontol. 2014; 18: 229-31.
3. Singh N, Uppoor A, Rajendran V, Naik G. periodontal disease and hemolysis in glucose-6-phosphate dehydrogenase deficiency: Is there a nexus? J Oral Biosci. 2019; 61: 129-33.
4. Luzzatto L, Arese P. Favism and Glucose-6-Phosphate Dehydrogenase Deficiency. N Engl J Med. 2018 4; 378(1):60-71.
5. Pes GM, Errigo A, Soro S, Longo NP, Dore MP. Glucose-6-phosphate dehydrogenase deficiency reduces susceptibility to cancer of endodermal origin. Acta Oncologica. 2019:1-7.
6. Elyassi AR, Rowshan HH. Perioperative management of the glucose-6-phosphate dehydrogenase deficient patient: a review of literature. Anesth prog. 2009; 56:86-91.
7. Kumar RA, Venkatesh B, Karumaran CS, Rajasekaran MS, Shankar P. Protocol for Dental Management in a Patient with Glucose-6-Phosphate Dehydrogenase Deficiency. J
8. Clinic & Diagnos Res. 2017; 11: 9-11.Hernández-Pérez D, Butrón-Téllez Girón C, Ruiz-Rodríguez S, Garrocho-Rangel A, Pozos-Guillén A. Dental considerations in children with glucose-6-phosphate dehydrogenase deficiency (Favism): A review of the literature and case report. Case reports in dentistry. 2015; 2015:1-4.
9. Heuvel EALVD, Baauw A, Mensink-Dillingh SJ, Bartels M. A rare disorder or not? How a child with jaundice changed a nationwide regimen in the Netherlands. J Community Genet. 2017;8(4):335-339
10. Elyassi AR, Rowshan HH. Perioperative management of the glucose-6-phosphate dehydrogenase deficient patient: a review of literature. Anesth Prog. 2009; 56(3):86-91.

CASE REPORT

TREATMENT OF CLASS III MALOCCLUSION WITH COMBINATION OF DISTRACTION OSTEOGENESIS AND ORTHOGNATHIC SURGERY

Muhammad Mudassar Saleem[1], Ammar Saeed[2], Huma Ijaz[3], Bushra Naeem Khan[4]

[1]Department of Oral and Maxillofacial Surgery, Dental College HITEC-IMS, Taxila Cantt
[2] Oral and Maxillofacial Surgeon, Punjab Dental Hospital, Lahore
[3]Post Graduate Resident, Orthodontics, Punjab Dental Hospital, Lahore
[4]Senior Registrar in the Department of Orthodontics, Shifa College of Dentistry, Islamabad

ABSTRACT

Dentofacial deformities and occlusal discrepancies in adults usually call for the treatment that combines orthodontics and orthognathic surgery to acquire optimal, stable, functional, and esthetic outcome. The basic aim of orthodontics and orthognathic surgery is to address patient's main concern and to establish optimal functional occlusion as well as to achieve good esthetic outcome. To accomplish this, the orthodontist and the surgeon must work in collaboration to diagnose and address the dentofacial deformity. Newer techniques such Distraction osteogenesis (DO) has emerged in the field of maxillofacial surgery.

Keywords: Dentofacial Deformity, Distraction Osteogenesis, Class III malocclusion, Mandibular Prognathism, Cephalometric analysis

How to cite: Saleem MM, Saeed A, Ijaz H, Khan BN. Treatment of class III Malocclusion with combination of Distraction Osteogenesis and Orthognathic Surgery. HMDJ 2021; 01(01): 41-45

INTRODUCTION

Dentofacial deformities and occlusal discrepancies in adults usually call for the treatment that combines orthodontics and orthognathic surgery to acquire optimal, stable, functional, and esthetic outcome. The basic aim of orthodontics and orthognathic surgery is to address patient's main concern and to establish optimal functional occlusion as well as to achieve good esthetic outcome. To accomplish this, the orthodontist and the surgeon must work in collaboration to diagnose and address the dentofacial deformity[1].

Skeletal class III malocclusion can be the result of maxillary retrognathism or mandibular prognathism or the combination of both conditions[2,3]. Role of inheritance in the etiology of class III malocclusion is well known[4]. Due to the complexity of skeletal class III malocclusion cases orthognathic surgery in such cases is essential to provide acceptable facial and occlusal outcomes.

Concepts in craniofacial and maxillofacial surgery have grown rapidly during recent decades. Newer techniques such Distraction osteogenesis (DO) has emerged in the field of maxillofacial surgery because of its utility, simple design, and an advantage of avoiding bone grafts, infection, blood transfusion and intermaxillary fixation for long periods of time[5]. Perks of using distraction osteogenesis is the augmentation of soft tissue along with the bone, this augmented soft tissue reduces the likelihood of relapse thus increasing stability of the results achieved[6].

The initial applications of DO were done with extraoral distractors according to Ilizarov's principles, but these applications carried significant complications such as external scarring, facial nerve damage, inferior alveolar nerve damage, and social problems, to counter these problems intraoral distracters were made available[7-8].

CASE REPORT

A 22-year-old male came to a private clinic in Lahore with the chief complaint of prominent mandible. On clinical examination he had a concave profile with minimal incisal show on smile, acute nasolabial angle, maxillary dental and

Figure 1: Cephalogram (Pre-treatment).

Correspondence to: Muhammad Mudassar Saleem, Department of Oral and Maxillofacial Surgery, Dental Collage HITEC-IMS Taxila.

Email: dr.m.m.saleem@gmail.com

Conflict of interest: None
Financial Disclosure: Nil

Received: 01-07-2021
Accepted: 06-08-2021

Table 1: Pre-treatment Cephalometric Analysis.

Pre-treatment Cephalometric Analysis		
	Norm[9]	**Pretreatment values**
SNA	82± 2	77°
SNB	80± 2	95°
ANB	2± 2	-16°
Witts	2± 2mm	22mm
FMA	25±5	18°
Face height ratio LFH/TAFH	55±5%	69%
UI-SN	108±5	124°
IMPA	95±4	73°
Interincisal angle	128 ±5	139°
Nasolabial	95± 5	54°
E-line		
Upperlip	2± 2mm	-11mm
Lower lip	0±2	-2mm

skeletal midline coincide with facial midlines, mandibular dental midline was 3 mm off towards left. Skeletal mandibular midline was coincident with the chin.

On Intraoral examination he had missing lower left 1st molar and grossly carious upper left lateral incisor. Incisors were in class III relationship with a negative overjet of 8mm and overbite of around 50%. Arch length discrepancy was -1 in upper arch. We were not able to detect any centric relation and centric occlusion discrepancy.

OPG findings were, missing lower left 1st permanent molar, root canal treated lower right 1st permanent molar, and grossly carious upper left lateral incisor. There were 31 permanent teeth with good crown root ratio and bone level. No sign of Temporomandibular joint disorder was found.

Cephelometric analysis revealed skeletal class III relationship with prognathic mandible and retrognatrhiuc maxilla. He was a low angle case with well-established class III compensations of dentition, that is, retroclined lower incisors and proclined upper incisors. Figure: 1 shows Cephalomeric radiograph (pre-treatment), Table: 1 mentions the pre-treatment cephalometric analysis.

TREATMENT GOALS

The goals of the treatment consisted of, treating the grossly carious upper left lateral incisor, correcting the mandibular prognathism, improving the profile and the nasolabial angle, increasing incisal show on smile, achieve stable molar relationship and class 1 canine and incisors, correct upper incisor proclination and lower incisor retroclination, improve overjet and overbite and achieve skeletal class 1 relationship. Replace the missing tooth with dental implant.

SUGGESTED TREATMENT PLANS

Extent of discrepancy wouldn't allow sole orthodontic treatment thus surgical orthodontic treatment was suggested. The amount of maxillomandibular differential call for bimax surgery. Extraction of upper premolars to correct the proclined upper incisors simultaneously correction of lower incisor retroclination followed by maxillary advancement and mandibular setback. Lower left 1st molar will have prosthetic replacement with a dental implant.

Another plan suggested was distraction of maxillary segment to have stable results, space gained via distraction will be used

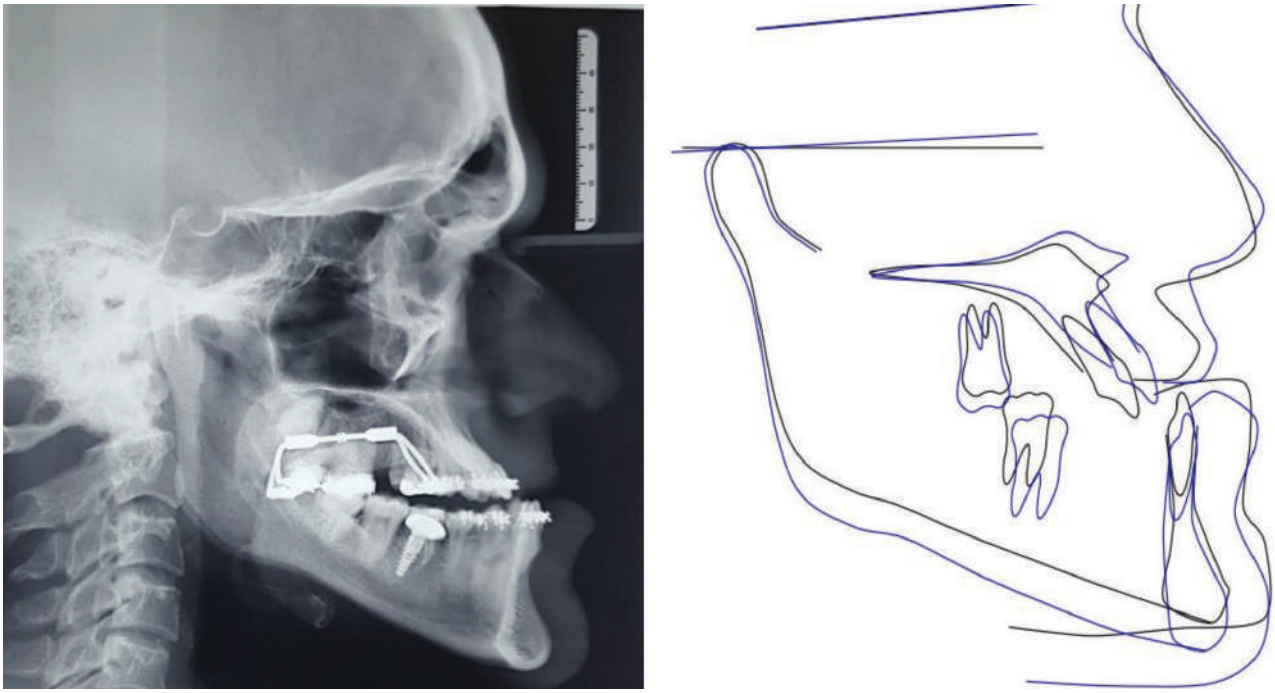


Figure 2: (a) Post distraction Cephalometric Radiograph (b) Superimpositions: pre-treatment (black) post-distraction (blue).

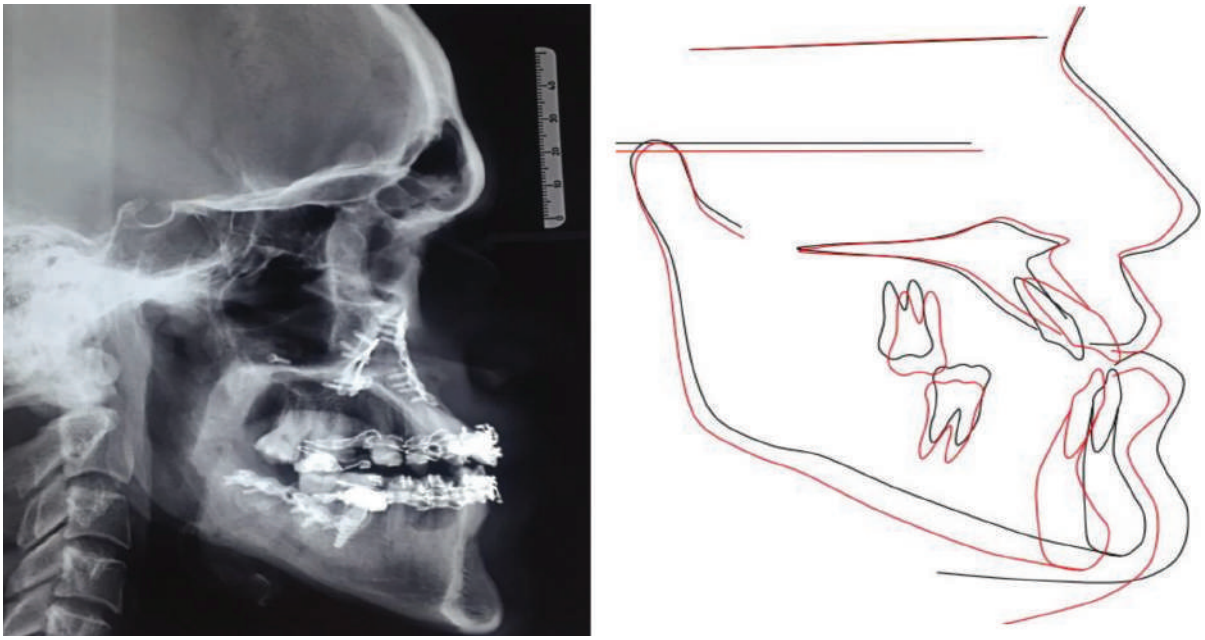
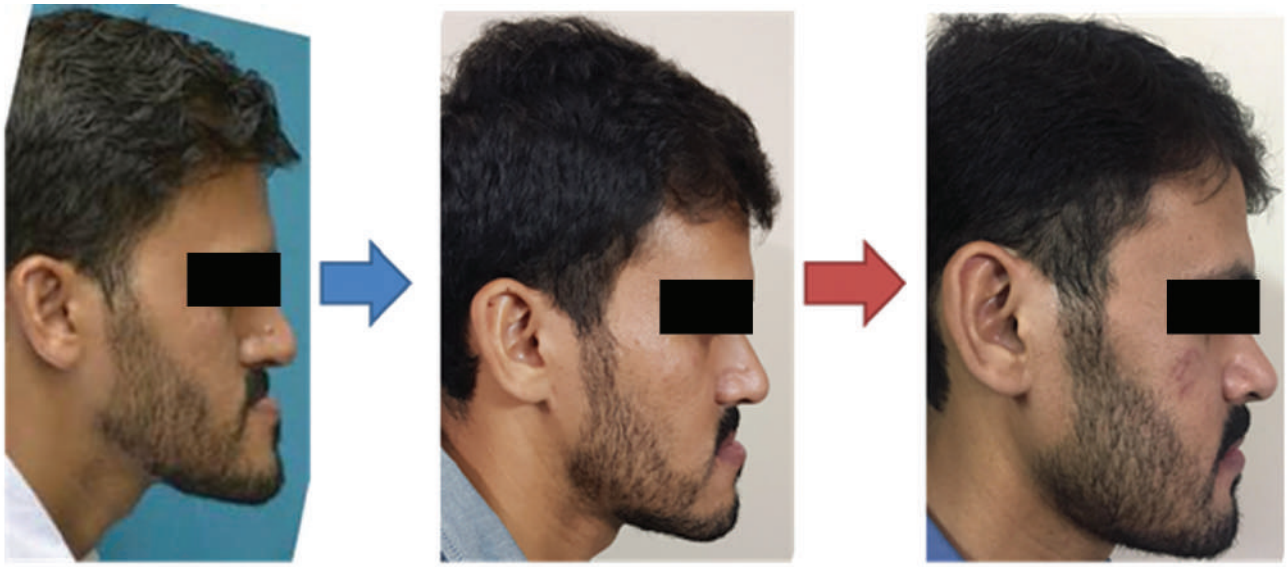


Figure 3: (a) Post-Surgical Cephalometric Radiograph (b)Superimpositions: post distraction (black) and post-surgery (red).

for the correction of inclination of upper incisors followed by mandibular setback. Although maxillary values are not very far from a norm, this plan was suggested because the amount of movement required ideally was 22 mm which cannot be done in single jaw so a major maxillary and mandibular movement was required to achieve acceptable esthetics. Patient opted for this plan.

TREATMENT PROGRESS

Placement of Roth slot 0.022" x 0.025" to begin phase I, starting with 0.014" NiTi arch wires in both arches to begin with the alignment and leveling. Patient was concerned for the missing tooth, lower 1st molar was prosthetically replaced. Treatment continued with the first phase, aligning and leveling, using 0.016" NiTi round arch wires, and subsequently torsion movements were begun to express with 0.016" x 0.022" NiTi, 0.017" x 0.025" NiTi and 0.019" x 0.025" NiTi rectangular ones. 2 month after, 0.019" x 0.025" stainless steel arch wires were used to make space for the cuts in the maxilla for distraction. After leveling and alignment and creation of space surgery to place cuts between upper 1st molars and upper second premolars was performed. Tooth borne distracter i.e. Hyrax appliance placed anteroposteriorly was used as a distractor. Distraction was started 5 days after the surgery and distracter was activated with the rhythm of 0.5mm activation in the morning and 0.5



Pre-treatment **Post-distraction** **Post-surgery**

Figure 4: Face Profile (Pre-treatment, Post-distraction & Post-surgery).

Table 2: Cephalometric Comparison: Pre-treatment, Post-distraction & Post-surgery.

Cephalometric Values				
	Norm[9]	**Pre-treatment values**	**Post-distraction**	**Post-surgery**
SNA	82± 2	77°	81°	84°
SNB	80± 2	95°	95°	85°
ANB	2± 2	-16°	-14°	-1°
Witts	2± 2mm	-22mm	-15mm	-1mm
FMA	25±5	18°	20°	22°
Face height ratio PFH/LFH	55±5%	69%	72%	70%
UI-SN	108±5	124°	122°	120°
IMPA	95±4	73°	79°	84°
Interincisal angle	128 ±5	139°	135°	120°
Nasolabial	95± 5	54°	86°	85°
E-line				
Upperlip	2± 2mm	-11mm	-8mm	-2mm
Lower lip	0±2	-2mm	-2mm	-1mm

mm in the evening for 10 days. After distraction period a consolidation phase was given for 3 months. Post distraction records were obtained (Figure 2), 10 mm of maxillary forward movement was achieved with distraction. Cephelomteric comparison of pre and post distraction can be seen in table # 2. SNA improved, distraction was achieved without disturbing upper incisor inclination instead the incisors retroclined due to creation of space. Point A and ANS moved forward without proclination of upper incisors resulting in the improvement of nasolabial angle.

Space created between upper second premolar and upper 1st molars was used to improve inclinations of upper incisors

Before the completion of presurgical orthodontics, patient requested for the surgery as he was moving out of the country. He was informed about the consequences of premature surgery. So surgical phase II was performed 6 months after distraction. Mandible was moved back asymmetrically, on average 9mm by the help of sagittal split osteotomy and maxilla was advanced 3mm. post-surgical records were obtained, superimpositions

post distraction and post-surgery shown in (Figure 3)

As shown in figure 4, improvement in profile is obvious. Due to the severity of deformity ideal result were very difficult to achieve because of limitations of surgical movements. Patient was de-bonded 2 months after surgery, orthodontic treatment couldn't be completed because he had to leave and insisted on de-bonding.

DISCUSSION

Distraction osteogenesis is a versatile technique that is used in craniofacial anomalies may or may not in conjunction with orthognathic surgery. Distraction Osteogenesis helps in achieving skeletal movements that may otherwise be difficult with conventional techniques, it eliminates the need for bone grafts, and provides predictable healing. Distraction can be combined with conventional orthognathic surgery to achieve optimal results[10,11].

CONCLUSION

Combined approach of Distraction Osteogenesis followed by Orthognathic Surgery in severe skeletal discrepancy is a conducive approach with minimum chances of replace.

AUTHORS' CONTRIBUTION

Muhammad Mudassar Saleem: Write up & Conception.
Ammar Saeed: Data Collection.
Huma Ijaz: Literature Review.
Bushra Naeem Khan: Proof Reading & Critical Analysis.

REFERENCES

1. Engel M. ,Berger M. ,Hoffmann J. et al. Midface correction in patients with crouzon syndrome is le fort iii distraction osteogenesis with a rigid external distraction device the gold standard?. Craniomaxillofac Surg. 2019; 47: 420-430
2. Heggie A.A. ,Kumar R. ,Shand J.M.
   The role of distraction osteogenesis in the management of craniofacial syndromes.Ann Maxillofac Surg. 2013; 3: 4-10
3. M. Miloro, Peterson's Principles of Oral and Maxillofacial Surgery, vol. 2, People's Medical Publishing House, Shelton, Conn, USA, 2nd edition, 2011.
4. Vig KD, Ellis E., 3rd Diagnosis and treatment planning for the surgicalorthodontic patient. Dent Clin North Am. 1990;34:361–84
5. Sinclair PM. Orthodontic considerations in adult surgical orthodontic cases. Dent Clin North Am. 1988;32:509–28.
6. Profit, WR. The development of dentofacial deformity: influence and etiological factors. In: Profit, WR, White, RP, Sarver, DM, eds. Contemporary Treatment of Dentofacial Deformity. St. Louis: CV Mosby; 2003
7. Guerrero, C. A., W. H. Bell, and L. S. Meza. Intraoral distraction osteogenesis maxillary and mandibular lengthening. Atlas Oral Maxillofac SurgClin North Am 1999. 7:111–150.
8. Chin, M. and B. A. Toth. Distraction osteogenesis in maxillofacial surgery using internal devices: review of five cases. J Oral Maxillofac Surg 1996. 54:45–53.
9. Diner, P. A., E. Kollar, H. Martinez, and M. P. Vazquez. Submerged intraoral device for mandibular lengthening. J Craniomaxillofac Surg 1997. 25:116–123.
10. Douglas, L. R., J. B. Douglass, and P. J. Smith. Intraoral mandibular distraction osteogenesis in a patient with severe micrognathia secondary to TMJ ankylosis using a tooth and bone-anchored device (PIT device): a case report. J Oral Maxillofac Surg 2000. 58:1429–1433.
11. Jacobson A, Jacobson R. Radiographic cephalometry. Chicago: Quintessence Pub.; 2006.

CASE REPORT

CORRECTION OF POST TRAUMATIC SADDLE NOSE DEFORMITY: A CASE REPORT

Muhammad Nazir Khan[1], Soha Kiyani, Zahra Saeed, Taha Rehman, Nazish Rasheed
Armed Forces Institute of Dentistry (AFID), Rawalpindi, Pakistan

ABSTRACT
Nasal bone deformities are common and could be caused by many factors such as genetic, traumatic, biological, or iatrogenic. Post traumatic nasal deformities account for major part of nasal abnormalities. A variety of treatment and grafting options are available for correction of nasal deformities. The purpose of this case report is to highlight the importance of proper treatment of Naso-orbito Ethmoidal fractures in first surgery and to advocate use of mandibular symphysis graft for correction of post traumatic saddle nose deformity.
Keywords: *maxillofacial trauma, nasal deformity, saddle nose, rhinoplasty.*
How to cite: Khan MN, Kiyani S, Saeed Z, Rehman T, Rasheed N. Correction of Post traumatic saddle nose deformity. HMDJ 2021; 01(01): 46-48

INTRODUCTION

Nose is the most prominent feature of human face contributing both to aesthetics and function[1]. It is most commonly involved in facial trauma with highest incidence of fracture[2]. Post traumatic nasal deformities contribute to both aesthetic and functional complaints and has the incidence rate of 14 to 50 percent. The factors that determine the nasal deformity include direction, mechanism, and severity of the original trauma[3]. The presenting complaint of a patient is usually a more prominent, deformed, or asymmetric nose, and/ or nasal obstruction. Treatment of nasal deformities is complicated further by the presence of fractured and deformed nasal septal cartilage[4]. Surgical correction of the post traumatic deformity mostly includes bone or cartilage grafting. Mandible symphysis provides an easy donor site for bone grafting, its use for the correction of saddle nose deformity is not commonly reported. The purpose of this case report is to highlight the importance of proper treatment of Naso-orbito Ethmoidal fractures in first surgery and to advocate use of symphysis graft for correction of post traumatic saddle nose deformity.

CASE REPORT

A 37-year-old male patient visited the Oral and maxillofacial Surgery Department of Armed Forces Institute of Dentistry, Rawalpindi – a tertiary care hospital - with the complaint of nasal deformity and compromised esthetics. He was a previously treated case of fracture Le-Fort I, Naso-orbito-ethmoidal (NOE) and zygomaticomaxillary complex fractures that were treated with open reduction and internal fixation.

On presentation to our setup in March 2021 post traumatic saddle nose deformity was appreciated with obstruction of right nasal pathway, flared nostrils, deviation of nasal tip and alar widening along with visible scar. Radiographically two plates, one linear and the other Y shaped could be appreciated in the nasofrontal region.

The clinical and radiographic examination confirmed a malunited NOE fracture.

The treatment plan formulated for correction of nasal deformity was rhinoplasty with bone grafting from the mandible symphysis region under GA. Other options discussed with the patient included:

- Costochondral graft
- Iliac crest
- Calvarial bone

Symphysis was opted for graft due to less chances of morbidity and intraoral incision mark.

After pre anesthesia assessment patient was admitted and prepared for surgery. Under aseptic conditions patient was orally intubated. Existing scar was used to place the incision onto the nasofrontal region. Vestibular incisions were made to approach nasomaxillary buttress and the symphysis.

Plates were removed from nasomaxillary and nasofrontal region. Bone graft from symphysis was harvested, shaped to the nasal dorsum and fixed using miniplate (12 holes x 7 Screws). After achieving hemostasis, the intra and extra oral incisions were closed using Vicryl and Silk sutures. The patient recovered

Correspondence to: Brig. Muhammad Nazir Khan. Deputy Commandant (Clinical & Training), Armed Forces Institute of Dentistry (AFID), Rawalpindi, Pakistan.
Email: nazeerkhan996@gmail.com
Conflict of interest: None
Financial Disclosure: Nil
Received: 28-07-2021
Accepted: 29-08-2021

Figure 1: Pre and post-operative picture .

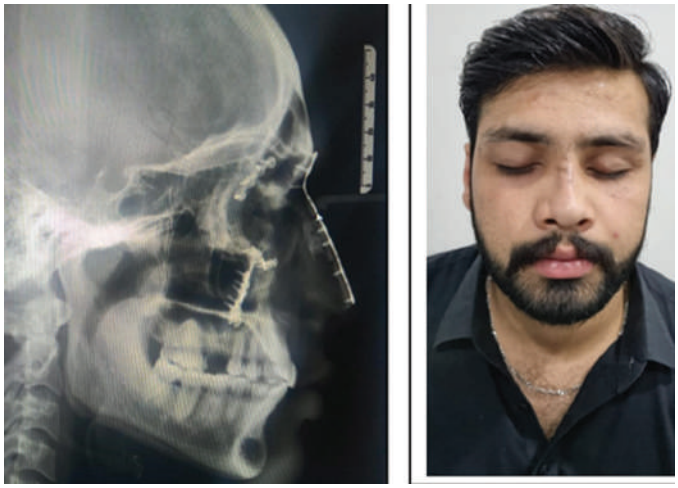


Figure 2: Post-operative clinical & Radiographic Appearance.

and healed uneventfully with satisfactory functional and esthetic results. Figure 1 explains pre and post-operative profile pictures of patient. Figure 2 explains post-operative lateral view (radiograph) and frontal view (photograph) of same patient.

DISCUSSION

Nasal bone is the most commonly affected bone in facial trauma and accidents due to its prominence[5]. The saddle nose is most commonly seen after trauma or infections or as a sequel to NOE fractures. Villella stated that maxillofacial trauma frequently results in depression of the dorsum of nose which can lead to nasal coloboma, damage to lacrimal duct system and nasal obstruction.

As per LIMA, the saddle nose deformity can be anterior or posterior depending on the mode of injury and anatomical location.

Grafting options include autogenous tissue such as

- bone (calvarium, costae, ulnae, symphysis, iliac crest)
- cartilage (costae, septum or combination)
- alloplastic augmentation such as silicon, silastic, polyethylene
- fillers[6]

Autogenous grafts lead to advantage of less chances of graft rejection, infection and inflammation and balances flexibility and rigidity; however, the main disadvantage Is donor site morbidity and prolong operating time[7].

The first calvaria graft was performed by Tessier. It was stated by Thomason et al that calvaria graft has less resorption, however, it is contraindicated in cases of monocortical cranial vault or alopecia[8].

For Class 1 and class 2 nasal deformities with minimum loss of dorsal support columellar retraction concha and septal cartilage grafts are proven to be adequate and effective[9]. The ease with which they can be transplanted and provide sufficient elasticity and support makes them favorable for small defects. The septal cartilage grafts however carry the risk of contour irregularities.

Extensive saddle nose deformities (class III and IV) require more rigid and reliable grafting options such as costal cartilage. It provides more stability and has been material of choice since ages[10].

The iliac crest bone graft provides adequate bone and stability but caries morbidity of donor site and requires longer duration of surgery[11].

The bone of the symphysis for saddle nose deformity is optimum as it provides adequate flexibility and support with minimum donor site morbidity and its ease of harvesting.

CONCLUSION

NOE fractures should be addressed with great care in the primary surgery so as to avoid post traumatic deformities which are difficult to correct. However, if they do occur a variety of graft materials are present for correction of the post traumatic nasal deformity. The author's choice of graft material highlights his experience, patient consideration and amount of bone required for the correction. Bone from the symphysis region can provide excellent strength and flexibility. The ease of access and less post-operative donor site morbidity are additional advantages.

AUTHORS' CONTRIBUTION

Brig. Muhammad Nazir Khan: Conceptualization, write up & proof reading.
Dr. Zahra Saeed: Write up.
Dr. Taha Rehman: Literature review.
Dr. Nazish Rasheed: Literature review.

REFERENCES

1. Rohrich RJ, Adams Jr WP. Nasal fracture management: minimizing secondary nasal deformities. Plast reconstr surg. 2000;106(2):266-73.
2. Karakurt SE, Orhan Z, Karakus MF, Cetin MA, Ikinciogullari A, Dere H. Impact of Nasal Trauma on Olfactory Function. J Coll Physcians Surg Pak 2020; 30(09):912-916.
3. Genther DJ, Papel ID. Posttraumatic Nasal Deformities. In Facial Trauma Surgery 2020; (pp. 395-416).
4. 4. Marcus BC. The Traumatic Nasal Deformity. Facial Plastic Surgery. 2020;36(01):018-23.
5. Mahaseth RK, Gurung U, Thapa N, Pradhan B, Kharel B. Fracture Nasal Bone: Causes, Presentation and Management in a Tertiary Care Center in Nepal. J Inst Med. 2020 30;42(1):21-5.
6. Fattahi T, Salman S. Management of nasal fractures. Atlas Oral Maxillofac Surg Clin North Am. 2019;27(2):93-8.
7. Sawhney R, Chan D, Ducic Y. Principles of Correction: An Overview of Secondary Correction of Posttraumatic Bony Deformities. Atlas of Operative Maxillofacial Trauma Surgery. 2020:93-100.
8. Malhotra M, Varshney S, Joshi P, Gupta S, Malhotra R, Singh V. A Modified technique of rhinoplasty using cortical bone graft to correct saddle nose deformity with loss of septal cartilage. Exp Rhinol Otolaryngol. 2018; 2:101-4
9. Rašić I, Košec A, Pegan A. Semilunar conchal cartilage graft in saddle nose reconstruction. European annals of otorhinolaryngology, head, and neck diseases. 2018;135(5):357-60.
10. Gundeslioglu AO, Yildirim ME, Yarar S, Uyar I, Ismayilzade M. A different stabilization technique of autogenous cartilage grafts in saddle nose deformity: prevention warping and resorption. J Craniofac Surg. 2019;30(3):811-5.
11. Wexler AM, Baker SB. 42 Posttraumatic Facial Restoration—. Aesthetic Surgery of the Facial Skeleton-E-Book. 2021; 10:468.

SHORT COMMUNICATION

ONLINE PRECLINICAL AND CLINICAL TEACHING; CHALLENGES VS OPPORTUNITIES

Aashi Ahmed[1],Sundas Fatima[2]

[1]Department of Community Medicine, HITEC-IMS Taxila
[2]Department of Psychiatry, HITEC-IMS Taxila

The traditional structure of medical education has certainly been disrupted by Covid-19 pandemic. Professional undergraduate medical teaching has drastically shifted to online mode utilizing novel teaching methodologies which need to be adopted much earlier to teach "adult learners"[1]. Prolonged crisis, transition to online teaching and novel ways of student assessment have serious implications on academic performance and psychological well-being of medical students. Although online teaching is convenient, fixable, easily accessible, time efficient and available to a wider population, creation of conducive learning environment is compromised due to social isolation, lack of motivation, absence of physical interaction with the instructor and immediate feedback[2]. Disruption of teaching and training lead to additional stress, anxiety and depression among medical students[3].

Training medical students particularly in preclinical and clinical phase is the biggest challenge due to lack of hands-on training and interaction with patients. In clinical years, face-to-face clinical training is compulsory to develop required competencies to practice medicine. Evaluation of technology-based teaching modalities is necessary for effectiveness and sustainability of its utilization in preclinical and clinical years[4]. For this purpose, students of HITEC-IMS provide feedback after completion of each academic block and necessary modifications are done to improve teaching and training . After receiving borderline satisfactory feedback from 4th year MBBS students in August 2021, reasons of unsatisfaction with online preclinical and clinical teaching were explored along with their psychological wellbeing. Domains having borderline satisfaction levels (45%-55% satisfaction) from feedback proforma were selected for exploration of attributes. An interactive session was planned with students to discuss the possible factors in first stage. On the basis of identified responses, a google form was developed and was distributed among class in stage two. For psychological

Table 1: Factors causing unsatisfaction with online teaching among students.

DOMAIN	REASONS	%
Balance Between Instruction & Practical Objectives	MIT included lectures only	29.2%
	Didactic lectures/No interaction	46.3%
	Skills related learning objectives not covered	24.3%
Stimulation of Interest	Monotonous lectures	31.7%
	Lecture handouts not shared beforehand	31.7%
	Poor network connection on faculty side	21.9%
	No videos/links shared for further reading	14.6%
Relevance of Provided Learning Material	Couldn't view lecture videos again	12.1%
	Learning objectives not covered in session	14.7%
	Lecture handouts/ PPTs not shared	70.4%
Improvement in Clinical Skills	Novel teaching strategies for skills not used	30.1%
	Lectures were used to teach skills	69.9%
Effectiveness of Mode of Assessment	Infrequent assessments	78%
	Online teaching assessed through on campus examination	58.5%
Overall satisfaction	Pre-clinical	75.6%
	Clinical	31.1%

Correspondence to: Dr. Ashi Ahmed, Deptt of Community Medicine, HITEC-IMS, Taxila, Pakistan.

Email: draashiahmed@gmail.com

Conflict of interest: None
Financial Disclosure: Nil

Received: 06-06-2021
Accepted: 02-08-2021

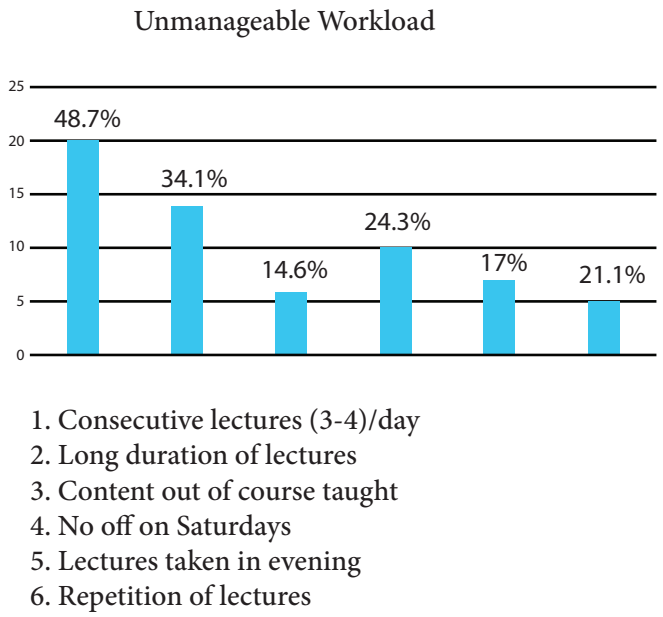


Figure1: Reasons of unmanageable workload during online teaching.

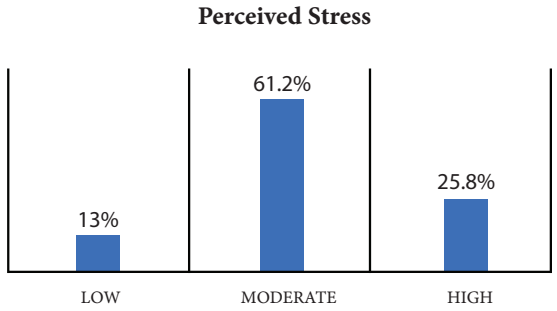


Figure 2: Perceived Stress scores of medical students.

assessment Perceived Stress Scale, General Help Seeking Questionnaire and Meaning in Life Questionnaire were used.

MENTAL HEALTH OF MEDICAL STUDENTS

Student who scored moderate to high on perceived stress scale were less likely to take help from a friend, teacher or health professional, which may perpetuate the stress on one hand and lead to a more negative/stressful appraisal of the current situation and consequently, low scores on the block feedback. Meaning in life is positively related to well-being, help seeking and help-giving behavior and negatively related to perceived stress, anxiety and depression. Students who scored high on Meaning in life questionnaire had relatively less scores on the perceived stress scale <mild to moderate> and showed more willingness in their intention to seek help even if their scores on perceived stress scale were in moderate range which depicts the positive correlation of high scores in this questionnaire to general wellbeing, help seeking and help-giving behavior and negative correlation to perceived stress, anxiety and depression.

Virtual online teaching is an essential alternative in current situation of COVID-19. It is crucial to focus on modalities to improve clinical skills of graduating students to equip them with competencies of effective care provider, critical thinker, lifelong learner, communicator and collaborator and problem solver. Adaptation of innovative online teaching strategies is ineffective without prior training of faculty. Students' mental well-being is of critical importance. Early detection and intervention strategies should be implemented in order to help future physicians go through this challenging period and be better prepared for next large-scale crises.

AUTHORS' CONTRIBUTION

Aashi Ahmed: Development of questionnaire, Data Collection, Data Analysis, Write-up.
Sundas Fatima: Development of questionnaire, Data Collection, Data Analysis.

REFERENCES

1. Papapanou M, Routsi E, Tsamakis K, Fotis L, Marinos G, Lidoriki I, et al. Medical education challenges and innovations during COVID-19 pandemic. Postgrad Med J. 2021;1–7.
2. Dutta S, Ambwani S, Lal H, Ram K, Mishra G, Kumar T, et al. The satisfaction level of undergraduate medical and nursing students regarding distant preclinical and clinical teaching amidst covid-19 across India. Adv Med Educ Pract. 2021;12:113–22.
3. Mittal R, Su L, Jain R. COVID-19 mental health consequences on medical students worldwide. J Community Hosp Intern Med Perspect [Internet]. 2021;11(3):296–8. Available from: https://doi.org/10.1080/20009666.2021.1918475
4. Gaur U, Majumder MAA, Sa B, Sarkar S, Williams A, Singh K. Challenges and Opportunities of Preclinical Medical Education: COVID-19 Crisis and Beyond. SN Compr Clin Med. 2020;2(11):1992–7.

THE WORTH OF THE NATIONAL LICENSING EXAMINATION (NLE)

Sir,

Pakistan is one of the most populous countries of the world. For a total population of 226,500,302 individuals[1], Pakistan has 222,221 registered MBBS doctors out of which >80% are non-specialist MBBS doctors [2]. Thus, currently the doctor to person ratio in Pakistan is about 1:1000 [3].

With 1.2% of GDP spending of annual budget in the healthcare domain in 2020-21[4], Pakistan is providing limited healthcare facilities to its population mainly through the services of these non-specialist MBBS doctors. These doctors provide their services largely working as General Practitioners (GP) and to a lesser extent as Medical Officers (MO) in public and private hospitals. It should be noted that most of the emergency departments of public and private hospitals are run by these non-specialists MO. Apart from a few exceptions, these emergency doctors do not have formal training (certificate course, diploma, or degree) to handle medical emergencies.

Considering the structure of undergraduate healthcare training in Pakistan, MBBS training is of 6-year duration: 2-year basic sciences, 3-year clinical sciences, and 1-year house-job. For the first five years there is a structured training and assessment program. But there is no structured training and assessment program for house-job training. House officers in most of the cases learn from the working of MO or postgraduate students in the hospitals. In the last 10 years, there has been uncontrolled opening of private medical colleges with limited resources. And, there is also an influx of poorly-trained students in the foreign countries seeking a house-job in Pakistan. Therefore, a structured training and assessment curriculum with the monitoring of house-job is the dire need of Pakistan.

In the above background, the present scenario is that the house-officers who are the backbone of healthcare facility for the Pakistani community are themselves poorly trained and are certified without any formal assessment. PMC is the sole certifying authority to provide license to these house-officers who, after getting certified, are allowed to work anywhere in Pakistan and in any capacity of opening a private GP clinic or working in a public or private hospital including their emergency departments.

PMC has taken two steps for ensuring competencies of these house-officers:

a. With the help of medical leaders all over the Pakistan, PMC in 2021 has defined its Framework of Competencies for medical graduates. It includes 7 steps of 49 competencies and a set of 15 procedural skills.
b. PMC has introduced a National Licensing Examination (NLE).

With the introduction of NLE, PMC is providing a central assessment procedure of house-officers who are not otherwise assessed for their training. In this way, PMC is justifying its responsibility of providing quality doctors to the community. And, it is likely to ensure trust of the Pakistani community in PMC. Here, a question is raised: is a single assessment enough or should there be a renewal of NLE after, for example, 5 years?

It should be noted, NLE is a MCQs-based examination for the assessment of knowledge domain only. For clinical skill and attitude domains, a clinical assessment (e.g., OSCE) is required. Additionally, for appearing in the NLE, house-officers will face a financial cost, which should be kept to a minimum.

Needless to say, an assessment must be preceded by a structured curriculum. And, through this curriculum, PMC may monitor the implementation of its competency framework. In order to effectively save people from medical emergencies there should be at least a short-term training program of 6-month certificate or a 24-month diploma program for post-house-job emergency medicine training. An NLE renewal may also be considered if combined with the requirement of CME hours to ensure update of knowledge.

REFERENCES

1. https://worldpopulationreview.com/countries/pakistan-population
2. https://tribune.com.pk/story/1975950/1-pakistan-facing-acute-shortage-doctors
3. https://data.worldbank.org/indicator/SH.MED.PHYS.ZS?locations=PK
4. https://www.thenews.com.pk/print/847694-health-expenditure-1-2pc-of-gdp-against-who-recommended-5pc

Syed Wasim Akhtar

Prof. of Neurology Syed Wasim Akhtar, , HITEC IMS, Taxila Cantt.

Correspondence to: Prof. Syed Wasim Akhtar, HITEC-IMS Taxila, Pakistan.

Email: drwasim.neuro@gmail.com

Received: 02-08-2021
Accepted: 20-10-2021

INSTRUCTIONS TO AUTHORS

Articles and all editorial correspondence should be sent to the Editor. HMDJ accepts manuscripts prepared in accordance with the "Uniform Requirements submitted to the Biomedical Journals" as approved by the International Committee of Medical Journal Editors (ICMJE) guidelines, published in the British Medical Journal 1991;302:334-41.

1. HITEC Medical and Dental Journal (HMDJ) agrees to accept the manuscripts prepared in accordance with the 'Uniform Requirements for a manuscript submitted to the Biomedical Journals' as approved by the International Committee of Medical Journal Editors (ICMJE) guidelines, published in the British Medical Journal 1991; 302:334-41.

2. GENERAL CONSIDERATIONS:

a. Ethical / Legal matters:

i. Authors are required to send approval letter from Institutional Review Board (IRB)/ Ethical Review Committee (ERC) along with Original articles, short communications and Case reports. It is mandatory that IRB/ERC should have the date of approval along with the reference number.

ii. A submitted manuscript must be an original contribution, not previously published (except as an abstract or preliminary report), must not be under consideration for publication elsewhere, and if accepted, it must not be published elsewhere in a similar form.

iii. Manuscript must be accompanied by a certificate, signed by the author and all co-authors that they have seen and approved the final version of the manuscript and they have not submitted the manuscript to any other journal.

iv. Randomized Controlled Trial (RCT) should be registered and the trial registration number is mandatory.

v. It is the author's responsibility to ensure that the patient's anonymity is carefully protected and to verify that any experimental investigation with human subjects reported in the manuscript was performed with their informed consent and following all the guidelines for experimental investigations with human subjects required by the institution(s) with which all the authors are affiliated.

b. Responsibility

i. Although the editors and referees make every effort to ensure the validity of published manuscripts, the final responsibility rests with the authors, not with the Journal, its editors, or the publisher.

c. Authorship

i. Each person listed as an author is expected to have participated in the study according to ICMJE criteria.

1. He/She should have substantial contribution to:

a. Conception and design

b. Acquisition of data

c. Analysis and interpretation of data

d. Drafting the article or revising it critically for important intellectual content.

2. Agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

3. Should have participated sufficiently in the work to take public responsibility for appropriate portions of the content.

ii. Those who provide technical support, writing assistance, or department chair who provided just general support should also be mentioned in acknowledgment

d. Conflict of Interest: The authors must provide a formal statement including any potential conflict of interest at the time of submitting the article. HMDJ follows the International Committee of Medical Journal Editors guidelines available www.icmje.org. In case of any conflict of interest, the author must submit an ICMJE form for disclosure of potential conflicts of interest (Available at the official website of HITEC- IMS(www.hitec-ims.edu.pk)

e. Financial Disclosure: Each author should submit a financial disclosure, warranting that he or she has no commercial associations (e.g., consultancies, stock ownership, equity interest, patent/licensing arrangements, etc.) that might post a conflict of interest in connection with the submitted article. All funding sources supporting the work and all institutional or corporate affiliations of the authors are acknowledged in a footnote in the work.

f. Copyright: All authors must sign a copy of the HMDJ author's certification proforma including information regarding the responsibilities of authors and copyright transfer and submit it with the article. The authors will be requested to sign an agreement to give copyright to the publishers.

g. Permissions: Authors must submit written permission from the copyright owner (usually the publisher) to use direct quotations, tables or illustrations that have appeared in copyright form elsewhere, along with complete details about the source.

h. Plagiarism Policy: All the submitted manuscripts will be checked for plagiarism by "TURNITIN" software. Articles with a similarity index of more than 19% will not be published. If the submitted article is found to have been totally or substantially plagiarized then the article

is rejected outright with information to the author. The plagiarism certificate is sent to the corresponding author and the article is reconsidered after amendments. HITEC Medical and Dental Journal follows the ICMJE and HEC criteria for plagiarism. The criteria can be accessed at www.icmje.org & www.hec.gov.pk.

i. Other Publication Misconducts: Other publication misconducts including fabrication (picture as well), falsification, duplicate submission, redundant publication, multiple submission, selective and misleading reporting, selective and 'misleading referencing are liable to strict action. All publication misconducts are dealt by first asking the corresponding author for an explanation in view of the available evidence. In case of non-response or unsatisfactory response from the authors, the manuscript is rejected if unpublished and retracted if published. Due notice of retraction will be given in print and on the website. The authors will be blacklisted for further submissions and considerations at the journal. The authors' institutional Head will also be informed of the misconduct and relevant action in such a case.

j. Peer Review: Authors are advised to suggest 1* National & 1* International Reviewer in giving his/her Name, Designation, Affiliation, Subject Specialty, Country, Email and Mobile number. If the author does not provide the reviewer information then the editors will select the reviewers from Journal reviewer database according specialty and expertise. Each manuscript will be sent to two external peer reviewers. Once the reviewed manuscript is received from both the reviewers, their comment/suggestions (if any) are communicated to the author for correction. The revised manuscript received from the author is re-assessed by the editor and the final decision regarding article acceptance/rejection is also made by the editor. Final version of manuscript is sent to corresponding author for proof reading before publication to avoid any mistakes. Corrections should be conveyed clearly & Editor informed by E-mail.

k. Article Publishing Charges: For the first year, there will be no publication charges.

3. SCOPE OF PUBLICATIONS:

a. Original Articles: Original articles should report original research of relevance to clinical medicine. These include randomized controlled trials, intervention studies, and studies of screening /diagnostic tests, outcome studies and cost- effectiveness analysis .The article should not exceed 4000 words in length (excluding title page, abstract, tables, figures, and references). The article words count for quantitative study should be in range 2000 - 2500 words (excluding references and abstract) with at least 18-25 references and 3–5 figures or tables. For qualitative study article word count should be in range of 3000-4000 words (excluding references and abstract) with at least 20-30 references and 3–5 figures or tables. Studies more than three years old at the time of submission are not entertained as per journal's policy. Any study ending three years before the date of submission is judged by the Editorial Board for its suitability as many changes take place over the time period, subject to the area of the study. The original article should contain the following sections.

i. Title page: It should include the following information:

1. Complete title as well as a short title of the article
2. Name of author(s)
3. Department(s)
4. Institution(s) at which work was performed
5. Author Affiliation
6. Subject Specialty
7. Corresponding authors phone/fax no, cell no, personal e-mail address and postal address
8. Short running title for header

ii. Abstract: It should contain a structured abstract of about 250 words and should include following sections

1. Objective
2. Study Design
3. Place and duration of study
4. Patients and Methods
5. Results
6. Conclusion
7. Keywords 3–10 (Medical Subject Headings – MeSH) in alphabetical order. If suitable MeSH terms are not yet available for recently introduced terms, present terms may be used.

iii. Text

1. Introduction: This should summarize the purpose and the rationale for the study. It should neither review the subject extensively nor should it have data or conclusions of the study. . At the end of the introduction, mention the rationale or scientific significance of the study.
2. Patients and Methods: This should include exact method or observation or experiment. If an apparatus is used, its manufacturer's name and address should be given in parenthesis. If the method is established, give reference but if the method is new, give enough information so that another author is able to perform it. If a drug is used, its generic name, dose and route of administration must be given. Methodology section should contain (without headings) study design, place and duration of study, sample size, sampling technique, inclusion and exclusion criteria, data collection and analysis procedure. Statistical method must be mentioned and specify any general computer programme used. The information system used should be clearly mentioned.
3. Results: Must be presented in the form of text, tables and illustrations. The contents of the tables should not be repeated in the text. Instead, a reference to the table number may

be given. Long articles may need sub-headings within some sections (especially the results and discussion parts) to clarify their contents. Extra or supplementary materials and technical details can be placed in an appendix where it is accessible. It may be omitted from the printed version but may be published in the electronic version of the journal.

4. Discussion: This should emphasize present findings & the variations or similarities with other work done in the field by other workers. Detailed data should not be repeated in the discussion again. Emphasize the new and important aspects of the study and the conclusions that follow from them. It must be mentioned whether the hypothesis mentioned in the article is true, false or no conclusions can be derived.
5. Conclusion: Should be in line with the objectives and results and should be same as given in abstract.
6. Limitations of the study (if any)
7. Recommendations of the study (if any)
8. Conflict of Interest: When authors submit a manuscript they must disclose all financial and personnel relationship that might bias their work. Authors must state explicitly whether potential conflicts do or do not exist. They should do so in the manuscript on the title page. Additional details can be provided if necessary in a covering letter which accompanies the manuscript. Authors of study funded by an agency with proprietary or financial interest in the outcome must sign a statement that they had full excess to all the data in the study and take complete responsibility for the integrity of the data and the accuracy of the data analysis. This statement should be submitted along with the manuscript.
9. Acknowledgements (if any)
10. References: References must be numbered consecutively according to their appearance in the text. References appearing in a table or figure should be numbered sequentially with those in text. References should be cited in the correct "Vancouver style" with a DOI number. List all authors if the total number of authors is six or less and for more than six authors use et al. after six. Journal names should be abbreviated according to the Index Medicus/MEDLINE. The date of access should be provided for online citations. Fifty Percent References should be last five years and all references listed consecutively as superscript.
    a. Standard journal article.
        i. You CH. Lee KY, Chey WY, Manguy R. Electrogastrographic study of patients with unexplained nausea, bloating and vomiting. Gastroenterology 1980; 79: 311-4.
    b. Chapter in a book:
        i. Weinstein L, Swartz MN. Pathogenic properties of invading micro organisms. In: Sodeman WA Jr, Sodeman WA, eds. Pathologic physiology: mechanisms of disease. WB Saunders, Philadelphia 1974; 457-72.
11. Tables: All tables should be numbered with roman numerals. Headings should be placed above tables, left justified.
12. Figures: All figures should be numbered with numeric numerals. Headings should be placed below figures, left justified.

b. Clinical Case Reports: Must be of academic & educational value and provide relevance of the disease being reported as unusual. It should have a non-structured abstract of about 100-150 words (case specific) with around 5-6 references and 3 keywords.

c. Letters to The Editor (LTE): It is usually a type of short communication that can be written on any topic that attracts the attention of the reader. There are different types of letters to the editor. If the purpose of the LTE is to comment on a published article, the first sentence of the LTE should include the name of the published article's first author along with the title of the published article and then the comments. If the LTE is a reply to a previously submitted LTE, the first sentence should include the name of the letter's author and cite the letter as a reference. The previously published article should then be referenced as well either in the body of the text or at the end of the response to the LTE.

d. Review Article: Should consist of critical overview/ analysis of some relatively narrow topic providing background and the recent development with the reference of original literature. It should incorporate the author's original work on the same subject. The review article should be 2500 to 3000 words in length. It should have a non-structured abstract of 150 words with a minimum of 3 keywords. An author can write a review article only if he/she has written a minimum of three original research articles.

e. Systematic Review Article: It should consist of a well-defined research question and should provide detailed review of a specific topic based on the existing literature. It should include the collection and analysis of data from all the relevant research in support of the research question being asked. The text should be 2500-3000 words. It should have a non- structured abstract with a minimum of three keywords.

f. Meta-Analysis: It should comprise a statistical analysis of combined results of numerous scientific studies addressing the same research questions. Meta-analysis is a quantitative and epidemiological study design that should critically analyze the results of previous scientific researches, mostly randomized controlled trials.

g. Short communication: Short communication or brief report of research works, containing new findings. The short communication consists: Title, Abstract (structured - no more than 150 words), Keywords (max. 5), Introduction, Methods, Results, Discussion, Conclusion, Ethical Consideration, Acknowledgment and References. Short communications should not

exceeding 2500 words from introduction through references. Short communications should contain no more than 3000 words totally. The number of tables/ figures should be in maximum 3.

h. Photo Essays: The journal accepts manuscripts for consideration as photo essays. These essays include the visual presentation of material where the prima, emphasis is on the images. These images can include colored images, angiograms, optical coherence tomography, histologic sections, x-rays, ultrasounds, and other studies. The images can be an outstanding presentation of classic findings, atypical findings or new findings. These are not case reports, but rather a visual presentation of material as a teaching tool. The images need to be of the highest quality. The accompanying manuscript should be limited to a total of 300 words. A maximum of 5 separate images and 5 references can be included. Please refer to the rest of the author's instructions for other requirements for manuscripts submitted to HMDJ.

4. SUBMISSION OF MANUSCRIPT

a. All manuscript should be typed in double spacing on A-4 paper (8.25" x 11.70" = 21.0 cm x 29.70 cm) with one inch (2.5 cm) margin on both sides.
b. All pages must be numbered starting with the title page being page one.
c. Each figure and table must be submitted separately.
d. All manuscripts must be submitted by email to the address:
editor.hmdj@hitec-ims.edu.pk
