CASE REPORT

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

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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*

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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

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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.

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