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MANAGEMENT OF OPEN APEX IN A PATIENT WITH SICKLE CELL ANEMIA: A 6YEAR LONG FOLLOW UP CASE

Dental Science

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ABSTRACT

Sickle cell anaemia is one of most common genetic disorder world wide, with estimated 70 million people carrying the sickle genes. Most dental procedure present some form of bacteremia. Preventive dental therapy is an ideal approach for treatment of SCA patient. The goal of pediatric dentist is to improve oral health of patient and to decrease possibility of oral infections. Infected immature permanent teeth could be source of infection in such patient. Present case shows conservative management of immature permanent teeth with a 6 year long follow up .

KEYWORDS

sickle cell anemia, revascularization, calcium hydroxide.

Introduction:

Sickle cell anaemia (SCA) is one of the familiar haemoglobinopathies inherited through an autosomal recessive mutant gene. It is inherited defect that affects the structure and synthesis of haemoglobin. In sickle cell trait, the affected individual carries one gene for the abnormal haemoglobin (HbS).[1] The pathological manifestations of this disease can be observed in mineralized tissue, connective tissues of the body, kidneys, liver, heart, lungs and also the oral tissues.[2] Infection is the most common precipitating event in a sickle cell crisis. Any source of infection, general or oral should be considered seriously. Deep carious lesions, periodontitis and , pericoronitis can be a potential source of oral infections. [1] Infected immature permanent teeth in a patient with Sickle Cell Anaemia becomes challenging to the dentist as situation becomes more complex. In the past extraction was treatment of choice. Apexification could be another conservative option in such cases. This procedure involves long term periodic exchanges of calcium hydroxide paste into the root canal to induce the formation calcified barrier. Furthermore, presence of calcium hydroxide for long periods of time may weaken the root. Though MTA apexification can be accomplished in short duration, radicular dentin remains thin. Hence, increases the risk of the future root fractures. So, revascularization is the next best treatment option for cases of incomplete root closure. This method not only provide apical seal (closure), but also increases the dentin wall thickness.[3] This paper presents a case of revascularization in immature young permanent tooth with necrotic pulp in a patient having sickle cell anemia with 6 years follow up.

Case Report:

A 10 year old female patient reported to the Department of Pedodontics & Preventive Dentistry with a chief complaint of pain in lower left back tooth region and swelling on lower left cheek since 3-4 days. Her medical history revealed that she is a known patient of sickle cell disease and had undergone blood transfusion six months back. She was diagnosed with the Sickle cell Anemia(SCA) 6 years back. Repeated sessions of blood transfusion were done (every 2-3 months) until one year back. A detailed history of medications, allergies, surgeries, transfusion related complications, frequency of hospitalization was obtained. A brief history of social and psychological profile was also obtained. In last one year she had only one blood transfusion i.e 6 months back. Presently, her condition is stable and is not under any medications. Blood investigations were within normal limits.

On examination, the patient was conscious, cooperative with normal gait and well oriented. Intraoral examination revealed grossly carious left lower first premolar. Mild diffuse extra oral swelling was present on the left side of cheek extending from corner of mouth to angle of mandible. Grade 2 mobility was present with respect to primary left second mandibular molar. On radiographic examination, intraoral periapical radiographs reveled deep dentinal caries involving pulp, blunder buss canal and periapical radiolucency with lower left first premolar [Figure 1].

Patient was referred to her hematologist for complete thorough examination. After consulting patient's hematologist, revascularization procedure was planned under antibiotic coverage.

Patient was recalled after 5 days. Examination revealed absence of pain and swelling in lower left cheek region. Through oral prophylaxis was done. During entire treatment procedure care was taken for management of dental treatment related anxiety and stress. Tell-show–do technique was considered for behavior modification and to cope up with stress. After administration of local anesthesia (with epinephrine 1:100000). Rubber dam was placed for isolation, an access cavity was prepared and necrotic coronal pulp was confirmed clinically. Pulp chamber was irrigated with normal saline. Triple antibiotic paste (1:1:1 ciprofloxacin: metronidazole: minocycline) was placed in the root canal below CEJ to minimize crown staining. Zinc oxide eugenol was placed followed by sealing of the access cavity by GIC to ensure proper coronal seal. Patient was recalled after 3 weeks and found to be asymptomatic. In the second visit, local anesthesia was administered, rubber dam was placed and the tooth was reentered and antibiotic paste was removed. The apical tissue beyond the confines of the root canal was stimulated with a sterile endodontic file to induce bleeding into canal space (approximately little beyond CEJ).Once bleeding was seen it was allowed to clot. Calcium hydroxide idoform paste (Metapex, Meta /biomed Co, Ltd, Chungbuk, Korea) was placed over the clot. The access cavity was sealed with RMGIC (Fuji Filling LC, GC Corp., Tokyo, Japan) having thickness of at least 3mm. The patient was asked to report after 1 week and was found to be asymptomatic. Patient was recalled after 3 months, 6 months, 12 months and further after every 6 months till 6 years. On each recall appointment, clinical and radiographic evaluation was done.

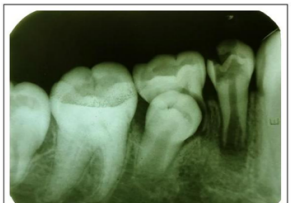

Fig 1: Preoperative IOPA radiographs showing lower left first premolar

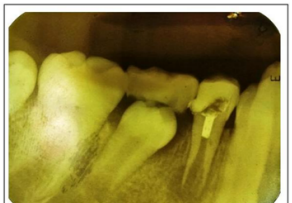

Fig 2: 3 months Postoperative IOPA radiographs

After 3 months, patient was totally asyptomatic with no pain on percussion. Vitality test was not responsive. Radiographic evaluation showed complete resolution of periapical radiolucency [Figure 2]. Further IOPA radiographs reveled continued growth of root and increased thickness of dentinal walls [Figure 3].IOPA after 4 years revealed continued growth of root with apical constriction[Figure 4].

After completion of 5 yrs years, IOPA[Figure 5]. and CBCT was done to review the formation of root. It revealed radioopaque filling material

till coronal 1/3, middle 1/3 appeared to be wide, apical 1/3 constricted with apical foreman almost (not completely) close [Figure 6a,6b].

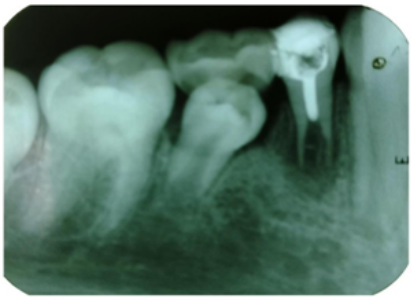

Fig 3: IOPA radiographs reveling increased thickness of dentinal walls wrt 34

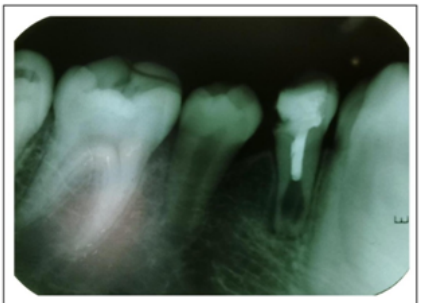

Fig 4: IOPA radiograph after 4 years postoperative

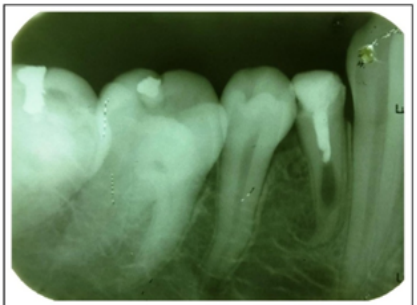

Fig 5: IOPA radiograph after 6 years postoperative

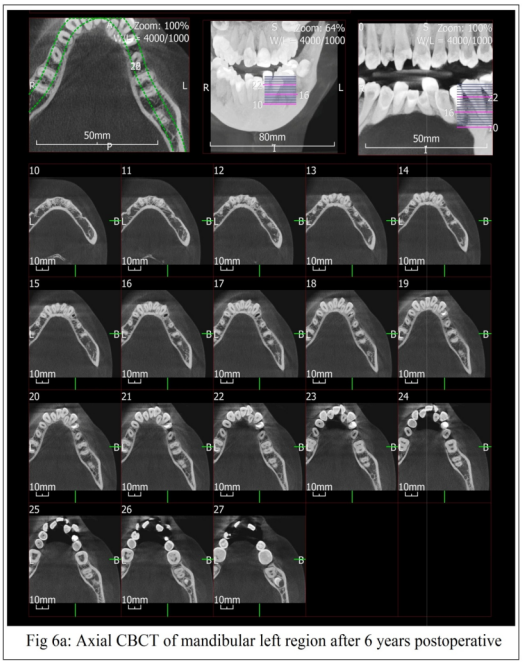

Fig 6a: Axial CBCT of mandibular left region after 6 years postoperative

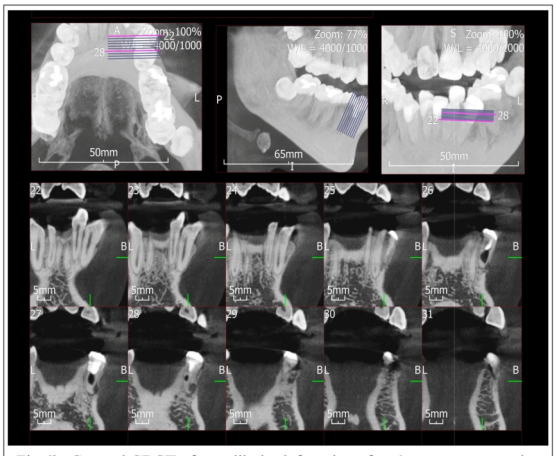

Fig 6b: Coronal CBCT of mandibular left region after 6 years postoperative

Discussion:

Sickle cell anemia is the best known hereditary hematological disorder in human beings. Estimates suggest that 250,000 children are born annually with sickle cell anemia worldwide.[4]

Reduction in oxygen-transport capacity results in circulatory difficulties in such patients. In addition, sickled erythrocytes may occlude the microvasculature causing tissue anoxia, necrosis and pain, resulting in multiple organ involvement. Frequent disturbances of the mineralization of the skeleton, affecting vertebrae, skull, mandible and maxilla are also seen.[5] These changes results when the abnormal erythrocytes that are produced act as foreign bodies and are destroyed prematurely by reticulo-endothelial system causing anemia. This also result in mineralization disturbances in enamel, dentin and cementum.[6]

Chaudhary et al in their study has observed decrease in number of dentinal tubules, thickness of the secondary tubules, irregular decreased dead tract formation, increase in enamel lamellae, presence of gnarled enamel more towards the DEJ and hypercementosis in patients suffering from sickle cell anaemia.[7]

Present paper describes management of immature permanent tooth with necrotic pulp in a patient with Sickle cell anemia. Franklin Garcia- godoy et al [8] has described different treatment options for such teeth, like non surgical root canal MTA apexification, root canal revascularization and endodontic regeneration. Revascularization is based on root canal decontamination followed by the induction of blood migration from the periapical tissues and the development of new vascular tissue in the canal space. The principle of disinfection in regenerative endodontics is that it should be achieved with minimum root canal instrumentation; an intracanal medication is used to inhibit bacterial growth and appropriate sealing of the coronal portion is performed. The American Association of Endodontists (AAE) considerations for regenerative endodontics include calcium hydroxide as an alternative intracanal dressing. [9]

Revascularization process, over period of years, has proved to be one of the successful treatment options. Several case reports have documented revascularization of necrotic root canal system in healthy individuals. However, web search of revascularization procedure for immature necrotic tooth in a patient with SCA , showed no results. To the best of our knowledge this is the first case report of revascularization process in sickle cell anemia patient with follow up of 6 yrs. Success in our case was determined by clinical and radiographic measures. Long follow-up was mandatory to determine any post operative associated complications. Present case revealed root almost completed (Nolla's stage 8). However, this process of root formation was comparatively slower. Usually, time taken for completion of root after eruption is 2-3years. In the present case approximately 5-6 yrs was taken for root formation till present state. The reason could be attributed to pulpal necrosis for comparatively slower process of root formation . According to Study by Andrew et al [10](1983), Rowe & Pitt ford [11] (1990), Bishop et al (1995) [12], SCA affects pulpal microcirculation, pulpal necrosis occurs without any aetiological factors. Healthy microcirculation is must for hazel free completion of root process.

It is important for clinicians to be aware of physiopathology and oral manifestations of SCA. A thorough understanding and knowledge of the disease before dental treatment is must. Dental treatment should be initiated keeping in mind patient's limitations and needs. Pedodontist should instill a positive attitude in the patient and parents toward maintaining good dental health. Methodical preventive dental program should be followed along with routine follow-up visits.

Conclusion:

Sickle cell anaemia presents with variable clinical manifestations. The degrees of severity of disease depend on the stage at which this disease is found, the patient's age, number of hospitalizations, need for blood transfusions and need for continuous drug use. A thorough understanding and knowledge of pathophysiology of disease is must before initiating any dental treatment. Goal of treatment plan should be to maintain complete health. A Pedodontist should not only take care of dental infections but also at the same time instill a positive attitude in the patient and the parents towards maintain good oral hygiene.

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