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Dental and medical management of children with cerebral palsy: Case series with literature review

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ABSTRACT

Cerebral Palsy is one such condition with high prevalence in India. It is a neuromotor disorder affecting muscle tonicity and posture. Children with cerebral palsy are at high risk in developing dental problems which include high dental caries index, periodontal problems and poor oral hygiene. Providing dental care to these children requires skilled personnel and planned approach. This article presents the case report of two children (five and six years of age) diagnosed with cerebral palsy reporting to the tertiary rural health care center (RDC, Loni) with numerous dental problems. Considering the condition of the children, a full mouth rehabilitation was planned under general anesthesia's case report discusses the treatment strategies with a multidisciplinary approach followed by pre and post operative complications faced while treating the patient under general anesthesia.

Keywords: Cerebral Palsy, Anaesthetic considerations, Dental Management of Special children, Full mouth rehabilitation

1. INTRODUCTION

Special children are of great concern to the family as well as to the society. When disability in children is concerned, about a quarter of chronic childhood problems are neurological in origin. Cerebral Palsy (CP) has been the leading cause of neuromotor disorder which affects the development of movement, muscle tone and posture (Bethesda, 2009). Cerebral Palsy was described first by William James Little, an orthopedic surgeon in 1862. The prevalence of CP for all live births ranges from 1.5 to 3 per 1,000 live births. Preterm infants being at the highest risk for developing CP. CP showed a clinical presentation of a wide variety of cerebral cortical or sub-cortical insults occurring during the first year of life (Pakula et al.,2009; Sankar and

Mundkur, 2005; Alsaad et al., 2021; Mishra et al., 2022).

Children with CP present with developmental delay and motor defects. Motor deficits of CP include weakness, fatigue, incoordination, rigidity, spasms. Cerebral palsy is most commonly classified according to the severity of motor deficits as mild, moderate or severe. Associate manifestations are mental retardation, epilepsy and bladder and bowel dysfunction; sleep dysfunction, hearing and visual abnormalities, orthopedic abnormalities and gastrointestinal problems (Murphy and Neibar, 2003; Jones et al., 2007).

Children with CP are at increased risk of developing dental problems. This can cause deleterious health effects which can further deteriorate their quality of life. Dental manifestations in CP may include development of malocclusion, traumatic dental injuries, bruxism, dental caries, sialorrhea as a consequence of malfunction in swallowing mechanisms, drooling, dental erosion and poor oral hygiene maintainance due to lack of manual dexterity (Sehrawat et al., 2014; Winter et al., 2008). Providing dental care to these children is of great importance and requires a skilled approach.

2. CASE REPORT 1

Patient History and General Examination

A 5-year-old male patient from Jalgaon, Maharashtra, India, diagnosed with Cerebral palsy with an ASA (American Society of Anesthesiologists) category IV and Hippocampal sclerosis reported to the tertiary rural health care center (RDC, Loni-413736) with the complaint of multiple decayed teeth. On general examination his general features showed scoliosis, inability to walk, inability to sit upright, unable to uplift his head, impaired motor and cognitive skills (Figure 1). On intraoral examination 51, 61, 75 were cariously destructed. Deep occlusal caries was seen with 55, 65, 74, 84, 85 (Figure 2).

Figure 1 Photographs showing external general features like orthopedic abnormalities

He was apprehensive on oral examination (Frankel's definitely negative behaviour scale (Mc-Donald et al., 2004)) and showed delayed understanding.

Medical Considerations

He was then referred to the department of pediatrics for a general examination as well as medical fitness. Full mouth rehabilitation was planned out under general anesthesia with the due consent from the patient's parents. A thorough medical review and fitness consent were taken from the Pediatrics and Anaesthesia department before starting the treatment. Our patient, due to his condition was considered under ASA Category IV (patient having a severe systemic condition resulting in severe morbidity according to physical status classification system) (Doyle et al., 2022). Nasotracheal intubation was performed and after the patient was confirmed stable, the intraoral dental procedures were carried out.

Figure 2 Preoperative photograph showing cariously destructed 51, 61, 75. Deep occlusal caries with 55, 65, 74, 84, 85

Dental Procedures

The dental procedures that were carried out were oral prophylaxis, pulpectomies, stainless steel crowns placement and extractions. The main aim was to reduce the S. Mutants colony forming units (CFU) as much as possible and restore the normal function owing to the patient's condition. The patient was given controlled amounts of local anesthesia in spite of being under general anesthesia inorder to reduce the postoperative pain. Grossly decayed 51, 61, 75 were extracted. Space maintainer was not given with 75 due to the lack of manual dexterity of the patient to maintain oral hygiene. Pulpectomies were carried out with 55, 65, 74, 84, 85 with the help of Pro AF Baby Gold rotary files (kids e dental) and obturated using Vitapex (J Morita) followed by semi-permanent restoration placements (Figure 3).

Figure 3 Postoperative photographs showing dental treatment carried under general anesthesia were pulpectomies with 55, 65, 74, 84, 85 followed by stainless steel crown placement and extractions with 51, 61, 75

Postoperative care

Complications arised when the patient's reversal didn't occur due to laryngeal edema after extubation, his SpO2 dropped rapidly. Patient was reintubated and was shifted in Pediatric Intensive Care Unit (PICU). After about 5 hours, reversal occurred and extubation was done by the Paediatrician and Anaesthestist.The patient was closely monitored for the next 24 hours in PICU and then was shifted to the ward after his vitals were under control. The patient was kept on postoperative antibiotics (Injection Augmentin 125mg IV TDS and Inj. Metronidazole 100mg IV TDS) and Anti-inflammatories. Careful monitoring for pain, swelling or any bleeding from extraction sockets postoperatively was checked. Patient had difficulty in passing stools and on palpation solid mass was felt in his colon region. He was given enema and laxatives for this. After complete evaluation and monitoring by the Pediatrician and Pedodontist, the patient was discharged to avoid any risk of hospital acquired infections. The patient was recalled after 3 months for follow up.

3. CASE REPORT 2

Patient History and General Examination

Diagnosed case of cortical atrophy of a 6-year-old male patient reported to the tertiary rural health care center (RDC, Loni-413736) with the complaint of multiple decayed teeth and inability to chew food. On general examination, his general features included scoliosis, inability to walk, inability to sit upright, unable to uplift his head, impaired motor and cognitive skills. Intraoral examination showed deep occlusal caries with 54, 64, 74, 75, 84, 85 and occlusal caries with 55 (Figure 4).

Figure 4 Intraoral preoperative photographs showing deep occlusal caries with 54, 64, 74, 75, 84, 85 and occlusal caries with 55

He was apprehensive on oral examination examination (Frankel's definitely negative behaviour scale) and showed delayed understanding.

Medical considerations

He was then referred to the department of pediatrics for a general examination as well as medical fitness. A full mouth rehabilitation was planned out under General Anesthesia with due consent from the patient's parents. A thorough medical review and fitness consent were taken from the Pediatrics and Anaesthesia department before starting the treatment. Our patient, due to

his condition was considered under ASA Category IV (patient having a severe systemic condition resulting in severe morbidity according to the physical status classification system). Nasotracheal intubation was performed (Figure 5) and after the patient was confirmed stable, the intraoral dental procedures were carried out.

Figure 5 Operative photograph under general anesthesia showing nasal intubation

Dental Procedures

The dental procedures that were carried out were oral prophylaxis, pulpectomies, stainless steel crowns placement, restoration. The main aim was to reduce the S. mutans colony (bacterial colony forming units) as much as possible and restore the normal function owing to the patient's condition. The patient was given controlled amounts of local anesthesia inspite of being under general anesthesia inorder to reduce the postoperative pain. Pulpectomies were carried out with 54,64,74,75,84,85 with the help of Pro AF Baby Gold rotary files (kids e dental) and obturated using Vitapex (J Morita) followed by stainless steel crown (3M ESPE) placements. Caries excavation was done with 55 followed by placement of Glass Ionomer cement Type IX (GC Fuji IX, Tokyo, Japan) (Figure 6).

Figure 6 Intraoral postoperative photographs showing dental treatments carried under general anesthesia were pulpectomies followed by stainless steel crown placement with 54, 64, 74, 75, 84, 85 and restoration with 55

Postoperative care

Careful monitoring of the patient's vitals was done during extubation. Patient was kept in postoperative care for 3-4 hrs. His vitals were closely monitored. Patient was shifted to the ward with due consent from Anaesthesiologist. Patient was put on postoperative antibiotics (Injection Augmentin 500mgIV TDS and Inj.Metronidazole 120mg IV TDS) and Anti-inflammatories. Careful monitoring of his vitals and evaluation of his oral cavity was done. After complete evaluation and monitoring by the Pediatrician and Pedodontist, the patient was discharged to avoid any risk of hospital acquired infections. The patient was recalled after 3 months for follow up.

4. DISCUSSION

Cerebral palsy, a motor disorder which appears in the early childhood is caused by the abnormal development or damage to the parts of brain that control the movement, posture and balance. Out of all the neuromuscular disorders, cerebral palsy is one of the most common disorders occurring in children. Epidemiological incidence shows the incidence of CP being approximately 2 to 2.5/1000 live births worldwide. In India the incidence is estimated to be approximately 3-4 cases/1000 live births. The incidence is strongly associated with gestational age occurring in preterm infants. The etiology of CP can be multifactorial and the primary factor being trauma or any pathology to the developing brain during these periods. CP can be classified according to the motor involvement (Colver et al., 2014).

The disorder involves medical and dental related problems such as mental retardation, seizures, sensory and motor deficits, bladder and bowel dysfunction, visual and hearing abnormalities, orthopedic abnormalities like spasticity leading to joint contractures, hip and foot deformities, scoliosis and manifestations involving severe motor disability and immobility (Dougherty, 2009). Dental manifestations in CP may include development of malocclusion, traumatic dental injuries, bruxism, dental caries, sialorrhea as a consequence of malfunction in swallowing mechanisms, dental erosion and poor oral hygiene maintainace (Sehrawat et al., 2014). Hence, it is imperative to improve the oral hygiene of such patients to prevent the worsening of their condition. The management of such children in the dental chair is a challenge because of the uncontrolled involuntary movements, inability to open the mouth, abnormal posture, inability to communicate and multiple dental treatments to be carried out as in the two case reports discussed. Hence, planning for full mouth rehabilitation for these children under general anesthesia is the best way to provide the best quality of treatment and also the considering the safety of the patient (Wass et al., 2012). In both the case reports, the children had multiple deep carious lesions and considering the age of the children, it was ideal to save these teeth for restoring the normal form, function and maintaining the normal development of the arches and to prevent any further dental malocclusions. Performing pulpectomy was the best option to save the carious tooth (Santos et al., 2009). Stainless steel crowns are one of the best restorative materials in pediatric dentistry. Children with CP have a higher incidence of bruxism and to provide stainless steel crowns in these patients is the best choice to withstand the heavy occlusal load (Oliveira et al., 2011). Complete oral prophylaxis and restorations of all carious teeth should also be done to reduce the colony forming units in the oral cavity. Postoperative follow up with proper guidance to parents/caregivers should be of utmost importance for long term success of treatment (Das et al., 2010). Pre

and postoperative complications had occurred in first case report such as delayed reversal, difficult tracheal intubation, upper respiratory tract infections, laryngeal edema, Gastrointestinal effects such as constipation, aspiration of gastric contents, intraoral ulcerations (Wass et al., 2012). Effective management of such complications was a task but with a multidisciplinary approach these complications were managed effectively. A thorough understanding about the pre and post complications and the etiology of occurrence of these complications showed that it was very common for such complications to occur in patients with cerebral palsy. This knowledge and better awareness of the condition were taken in mind to treat the next case of CP under general anesthesia (case report 2) which showed minimal post operative complications.

Therefore, it is imperative to provide oral health and hygiene related, diet counselling guidance to the caregiver before the discharge of the patient. Oral health related problems are very common in children with CP, hence, a multidisciplinary approach with active involvement of the pediatric dentist, the caregiver is required along with long term strategic follow ups should be done to improve the oral health quality of the patient and to promote good health and wellbeing of the patient (Das et al., 2010; Jaya et al., 2014).

5. CONCLUSION

Good team work is extremely important in treating such cases. It is one's great privilege to contribute to the wellbeing of our society and treat such children who are neglected from our society. Although there were complications postoperatively, the end results made it worth taking the risks to restore the oral health of the child. As a Paediatric dentist having proper medical and dental knowledge to find the cause for such complications and efficiently managing them is of utmost importance. Frequent follow-ups and routine dental check-ups are mandatory to provide good oral hygiene and prevent further occurrence of caries in such children.

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Author Contributions

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Informed consent

Written and Oral informed consent was obtained from all individual participants included in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this manuscript.

Data materials availability

All data associated with this study are present in the paper.

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Conflict of interest

The authors declare that there is no conflict of interests.

Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

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