Management of foreign body ingestion in children with cerebral palsy: Need for proper trauma management protocol

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Abstract

Cerebral palsy (CP) is described as a group of permanent, nonprogressive movement disorders that cause physical disability in development and further affecting body movement and muscle coordination. The condition develops when certain abnormalities persist inside the developing brain that ultimately disrupts the brain’s ability to control movement and maintain posture and balance. Patients with CP are more susceptible to dental trauma due to the lack of muscle coordination and unexpected involuntary movements. The present case series highlights the need for emergency protocol management when these patients report with dental trauma and complications which can happen in dental office. The first case report is about ingestion of permanent incisor following trauma which was diagnosed incidentally in the abdominal radiograph, and the second case is reported to be accidental ingestion of head of dental mouth mirror during the routine oral examination. These two case reports emphasize the need for more comprehensive trauma management protocol in these children.

Keywords: Avulsion, cerebral palsy, ingestion, trauma

Introduction

Accidental ingestion of foreign bodies is a common situation encountered in children and patient with psychological problems. In most of the cases, the foreign object pass through the digestive tract and they are eliminated in about a week.¹ Whereas, ingestion of a tooth following trauma or dental prosthesis is relatively uncommon and is considered to be a serious medical emergency condition. It is indicated as an emergency medical situation since the tooth or prosthesis can cause obstruction in the esophagus or can lead to damage of the lining epithelium. Most cases of foreign-body ingestion or aspiration are known to be accidental traumatic events occurring in children, whereas majority of the adults will have neurological dysfunction, trauma, alcohol abuse, or psychological disorders.²

No adverse effects related to ingestion were reported. Although in most cases, these objects are excreted, it is found that in <1% of the case reports, complications such as gastrointestinal (GI) perforation arise which can be fatal.³ However, considering the risk of life-threatening emergencies related to accidental aspiration/ingestion, dentists must take meticulous precautions and be ready to deal with this kind of emergency during dental procedures.⁴

Cerebral palsy (CP) forms a complex group of motor abnormalities and functional impairments that can affect muscle
coordination. CP describes a group of disorders of movement and posture. This developmental disability is associated with uncontrolled body movements, seizure disorders, balance-related abnormalities, sensory dysfunction, and mental retardation. These children exhibit vulnerability to trauma of the face and mouth. Some children also show tendency for self-injurious behavior such as cheek biting. At present there is no protocol regarding the management of ingested foreign body in the GI tract; however, sharp instruments should be removed using endoscopy, since the rate of perforation is much higher. The use of such invasive treatment procedures for retrieval of blunt objects is still not clearly understood.\[7\]

The purpose of this case series is to present a case of incidental diagnosis of tooth ingestion following trauma and an accidental ingestion of head of mouth mirror in a patient with CP.

**Case Reports**

**Case report 1**

A 10-year-old girl reported to the Department of Paediatric Dentistry with a chief complaint of missing upper front incisor following trauma which occurred 2 days earlier. Medical history revealed that the child has a history of CP and is currently under medication for seizures for the past 6 years (gabapentin 100 mg). The child's mother gave a history of the child falling from the chair about 2 days back at home, in which one of her upper central incisor was completely lost. The tooth could not be retrieved during the trauma. No treatment was rendered since the child was not cooperative. Intraoral examination was done under physical restraint with a Papoose Board (PB, Olympic Medical Corporation, Seattle, WA) and revealed an empty socket in the upper left central incisor. Since the tooth was not traced, it was suspected that the child could have swallowed the tooth. To eliminate the ambiguity, a chest and abdomen radiograph (posteroantero [PA] view) was advised. Fortunately, a tooth-like radio-opacity was traced in the GI tract in large intestine after 48 h [Figure 1]. The child was admitted to the emergency medical department and monitored. The abdomen radiograph was repeated after 24 h i.e., after 3 days and a tooth-like radio-opacity was revealed in the descending colon [Figure 1]. The stool was examined for the presence of tooth. On the 4th day the presence of tooth in the stool was identified and the subsequent abdominal radiograph was clear.

**Case report 2**

A 14-year-old boy, with a known history CP, was referred to a dental office following trauma to his upper anterior teeth during a seizure episode 1 day earlier. The child was more relaxed and comfortable sitting upright on a dental chair. Extraoral examination revealed mild lacerations on the upper lip and lower mandible. When the oral cavity was examined for any injury to the dental structures, the child suddenly closed his mouth and drew his head back as a reflex. Immediately afterward, the patient started gagging violently. It was observed that the head of the dental mirror was missing. The patient had accidentally swallowed the head of the mouth mirror. Vigorous attempts were made in removing the instrument and were unsuccessful. The patient was immediately sent to the Otolaryngology Department for emergency intervention. Under mild sedation, a diagnostic endoscopy was taken. There was no foreign object found at the level of the vocal cord. Since it was a larger object, and the patient had no difficulty in breathing, chest PA radiograph was taken, which revealed that the object had entered gastrointestinal tract. In the postero-anterior X-ray of the chest, the mouth mirror was found to have lodged in the body of stomach. Considering the age and the medical history of the patient, conservative management was decided. The patient was kept under observation with semi-solid diet and liquid food items. Regular assessment and serial radiography were taken at an interval of 24 h, 48 h, 4th, and 6th day. On 6th day, the dental mirror was defected. The patient was reviewed after a week. No discomfort was reported by the patient [Figure 2].

**Discussion**

Most of the ingested foreign bodies pass through the GI tract uneventfully. Sharp instruments are known to increase the risk of perforation. Approximately 10% of the ingested foreign objects need endoscopic removal.\[7\] Impaction of the foreign body can occur at sites of anatomical or physiological narrowing, such as in the lower esophageal sphincter, ileocaecal valve, or in the areas of stricture formation.\[8,9\] There is no consensus when it comes to the decision as to whether to remove the foreign body or not. The presentation, clinical findings, and management of foreign bodies are distinct and are based on the anatomical region where the foreign body is located. Determining the type and location of the foreign body changes the treatment approach.\[9\]
The diagnosis of foreign body may be suspected on roentgenogram; however, computed tomography (CT) is a prerequisite for exact localization and diagnosis of associated complications.([9]) The diagnosis of ingestion/aspiration may be challenging in patients with special needs who may be unable to give a reliable medical history. Careful examination and proper investigations are the significant factors for diagnosis and management. In situations where aspiration/ingestion is suspected and the foreign objects cannot be located in a normal chest radiograph, advanced imaging modalities such as CT is indicated. Careful monitoring of the patient until the excretion of the foreign objects through GI tract is an important consideration in management of these situations. In the present case reports, the foreign bodies were traced in the GI tract in routine radiography, and hence CT was not advised.

The first important protocol involves the early location of the foreign body which can facilitate correct diagnosis and appropriate management. Aspiration of foreign body is considered an emergency when compared to objects which are ingested. Sharp objects have a lesser chance of uneventful excretion when compared to blunt objects. Majority of the dental instruments or teeth for that instance are radio-opaque which can be clearly visible in the radiograph. Since the risk of ingestion/aspiration is more common in dentistry, dentists should be educated on various preventive strategies and management protocols when such emergencies happen. The clinical symptoms should be monitored closely until the foreign body is excreted or removed. Clinical follow-ups should be done with a series of abdominal radiographs. Table 1 depicts the detailed illustration of management protocol at a different level of foreign body obstruction. In the first case report, if abdominal radiograph was not taken then the case may have gone undiagnosed. The child did not present with any other complication, and hence, the management was comfortable. This case highlights the need for proper investigations for missing teeth following trauma. In the second case report, as the ingestion of dental mirror happened in the dental operatory, early diagnosis, and intervention reduced the complication. These complications can be reduced by careful immobilization

Table 1: Protocol algorithm for management of patient with foreign objects ingestion/aspiration

| Place the patient in Reverse Trendelenburg position |
| Examine the oral cavity for aspiration of the foreign object |
| • If present in the oral cavity, remove and reconfirm it |
| • Re-assure the patient |
| • If not present in the oral cavity, attempt to dislodge it by repeated back blows or Haltitch Manoeuvre |
| If the object not retrieved, proceed with medical and radiographic examination |
| Radiopaque sharp/Blunt instrument Chest radiograph-posterior/lateral over/abdominal |
| Radiopaque sharp/Blunt instrument CT/MRI/Endoscopy |
| Passed GI Tract |
| Symptoms GI Discomfort/No symptoms |
| 1. If the object is less than 6 cm in length and 2 cm in diameter and not a sharp object wait and watch for 2 weeks |
| 2. Series of radiographs to be taken |
| Object not retrieved, medical opinion for endoscopy/surgery |
| Thoracotomy |
| Bronchoscopy |
| Entered Thorax |
| Object entered bronchus |
| Symptoms Partial Blockade Difficulty in breathing, cough Complete Blockade Vigorous and spasmodic cough and difficulty in breathing decreased breathing sound, choking and inflammation |
| Thoracotomy |
| Bronchoscopy |
| Entered oesophagus |
| Symptoms Vomiting, gagging, chest pain, abdominal pain |
| Endoscopy |
| Perforated GI Tract |
| Abdominal pain /Blood in the Stool |
| Immediate surgery/Bronchoscopy |
head and extremities in children who are more prone for sudden movements.

Orofacial injuries are more common in children with special needs such as CP. When compared to other movement disorders, patients with CP present with an abnormal increase in muscle tone and uncontrolled movements. The patients when subjected to physical restraints show increased behavioral changes. The main aim of management is to limit limb deformities as far as possible and to minimize any disability. The caretaker should have the responsibility of immediate management in such situations. The dentist attending such patients needs to be well prepared in managing this kind of complication. The present case reports illustrate the need for careful radiographic examination in patients who reported with foreign body aspiration. Intestinal perforation or sometimes even aspiration of foreign body into the trachea poses a serious complication which should be properly explained to the caregivers. Since chest radiograph will not be able to clearly locate the position of the foreign body, the use of CT scan is indicated. In clinical situations where aspirated foreign body is detected or if the clinical suspicion is high, the patient should undergo bronchoscope to confirm the diagnosis and to remove the foreign body. Educating the caregivers regarding proper oral hygiene and trauma management as well as preventive strategies can have long-term implications in preventing this kind of delay in treatment. Dentist treating children with special care needs should be aware of the protocol for prevention and also to manage the iatrogenic causes.

**Conclusion**

These case reports signify the need for careful evaluation of the patients immediately after the incident, and the dentist should be aware of the protocol to prevent and manage the iatrogenic causes. These case reports also an emphasis on the need of educating the caregivers regarding dental trauma in patients with CP.

**Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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**Conflicts of interest**

There are no conflicts of interest.

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