

Treatment of impalement injuries of the oropharynx in children

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Abstract: *Impalement injuries of the oropharynx and particularly of the soft palate are relatively common in children. Impalement injuries of the soft palate have been reported in patients of all ages, ranging from the newborn to geriatric patients. However, young children, particularly toddlers are most involved in these types of injuries. Children frequently run around with objects in their mouths and when left unsupervised, they may fall and suffer minor oropharyngeal trauma. Safety neglect is the main cause of this type of injuries.*

Keywords: *oropharynx, soft palate, impalement injuries, cerebral ischemia, surgery, safety neglect.*

I. Introduction

Oro-dental injury in children is a cause of much concern and anxiety for the patient and the parents. Impalement injuries are relatively common in children and have an estimated annual incidence of 1-2% of all pediatric traumas [1]. These injuries most commonly affect children aged 6 years or lesser because they often walk about sucking or holding objects in their mouth. The active toddler and young child are likely to sustain an impalement injury to the palate. The most common objects causing impalement injuries are sticks, pencils, tooth brushes, toys, eating utensils etc. The objectives of the present report are to describe an impalement injury in a 4-year old, review the relevant anatomy, treatment, and possible sequelae associated with such injuries. Most of these injuries may be managed by conservative approach followed by observation since the initial symptoms are limited. Complications or long term sequelae are very rare. The injuries appear innocuous but these types of injuries can result in several complications requiring active management in some patients [2]. Devastating neurological complications such as cerebral ischemia caused by thrombosis of the internal carotid artery can arise, and given the delayed onset of neurological signs, these life-threatening situations can be easily overlooked. Such complications are rare and there is no clear, accepted consensus on a particular management protocol for these types of injuries. The present report describes the case of a 4-year old child who sustained an impalement injury to the palate corrected by surgical intervention without any complications.

2. Clinical case presentation

Four years old male child sustained injury to the palate due to a fall while playing with a wooden stick in his mouth and running around with other children. On examination, there is an avulsion injury on the right side of the palate extending to the midline and to the junction between the hard and soft palate (Figure: 1). On the right side the injury extends up to the anterior pillar of the tonsil.

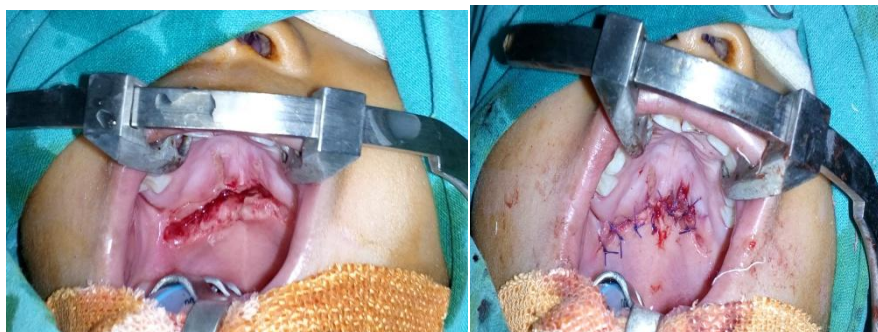


Fig: 1. Preoperative and postoperative pictures of Impalement injury to the palate

The child was comfortable and there was no active bleeding. Neurological evaluation revealed no abnormality. The patient was planned for surgical repair of the palate since the injury was through and through at the junction of hard and soft palates. Under intubation general anesthesia exploration was done for possible foreign bodies. There was a full thickness injury at the hard and soft palate junction. The wound edges were debrided and sutured with 4-0 vicryl sutures. The patient was administered a course of antibiotics. The patient had good healing of the wound. The patient will be followed up for possible complications and for speech evaluation.

3. Prevalence and etiology

The mean age of children presenting with impalement injuries has been reported as 4. Male children are two to three times more likely to be involved than female. The most common objects causing impalement injuries in children are

- Sticks,
- Pens/pencils,
- Cylindrical toys
- Straws.
- Tooth brushes and
- Eating utensils.

Sticks were implicated in 25% To 30% of the cases reviewed. Even tooth brushes have been reported to be the cause of injury in young children. The child may fall on the object kept in their mouth or receive a direct force on the object causing injury to the soft palate tissue.

4. Common sites of injury

Injuries of the soft palate and oropharynx may include the following areas:

- Posterior pharyngeal wall,
- The tonsillar regions,
- Uvula,
- The midline of palate , and
- The left and right soft palate regions superior to the tonsils.

The most common site is the left supratonsillar area. The higher incidence of left sided injuries may reflect predominant right-handed children among the injured patients. Injuries are predominately in the soft and hard palate without perforation. Linear and superficial wounds are frequently seen. A typical injury is described as

- Flat,
- U-Shaped, or
- V-Shaped with the apex directed anteriorly.

5. Treatment

The majority of soft palate and oropharyngeal impalement injuries can be managed on an outpatient basis. Conservative treatment is recommended. Most palate injuries heal without surgical intervention. Avoid the impulse to suture the wound [3]. Brief episode of intraoral bleeding which stops spontaneously is the common presentation [4]. Life threatening profuse bleeding is usually not a problem with these injuries. Primary healing is usually uneventful. Even gaping and through-and-through wounds of the hard palate have been reported to heal spontaneously. According to Takenoshita.Y et al (1996) and Crawford BS (1970) suture placement is contraindicated in most situations. The use of sutures may cause further damage and delay wound healing [5, 6].The oropharyngeal area has a very high potential of wound healing capacity.

The indications for surgery include

- Large flap avulsion injuries of palate
- Through-and-through wounds, or
- The need to explore the wound for suspected foreign objects.

Prophylactic antibiotic therapy may be prescribed immediately following injury to prevent infection, especially in wounds greater than 1 cm in greatest dimension to prevent the possible complication of facial cellulitis [7]. Healing of the wound should be complete by three weeks with minimal scarring. The parents are instructed regarding the postoperative care (Table: 1) and to report back if there are any complications.

Eating, speaking and talking may be difficult for a few days
Soft diet for five days.
Observe child closely for 48-72 hours

Table: 1.Parental instructions following surgical repair for impalement injury of oropharynx.

6. Complications

Most palatal injuries, including perforating injuries of the hard palate will heal spontaneously without intervention. Neurologic sequelae secondary to carotid artery injury are rare but have been reported mostly as

lateral soft palate injuries. The mechanism of injury or the degree of initial injury does not correlate with the potential for neurovascular sequelae.

7. Mechanism of neurovascular sequelae

The first true anatomical descriptions of normal anatomy of palate and pharynx were published by H. Von Luschka in German in 1868. The carotid artery in its sheath is susceptible to injury due to its anatomic proximity to the lateral peritonsillar and palatal tissues of the oropharynx (Figure: 2). Injury may lead to **disruption of the intima** of the artery and result in the formation of a mural thrombus that may cause future formation of a stroke [8].

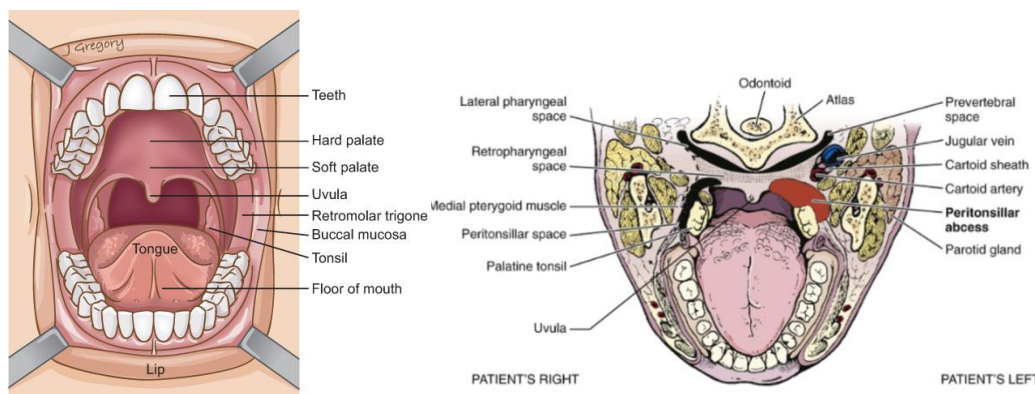


Fig: 2. Carotid sheath is in close proximity to the peritonsillar and palatal tissues. Compression of the artery between the penetrating object and the transverse process of the cervical vertebrae may lead to thrombus formation and delayed development of neurovascular deficit.

Fortunately, most individuals have adequate collateral circulation and can tolerate acute occlusion of one internal carotid artery. Onset of symptoms may occur several weeks or even months after the initial injury to the artery. Outpatient management with parental counseling for close observation is recommended. Diagnostic measures prior to the development of neurologic symptoms appear is not indicated and does not alter the final outcome of these injuries. Parents are instructed to observe for any of the symptoms listed below and seek medical help immediately (Table: 2). Referral to an oral surgeon, ENT specialist or neurologist and evaluation with angiography may be required.

1. Altered level of consciousness
2. Irritability
3. Vomiting
4. Weakness of either arm or leg
5. Headache, blurred vision, convulsions
6. Neck swelling or bleeding from the mouth

Table: 2. Clinical guidelines for follow up treatment of impalement injuries of the oropharynx

8. Conclusion

Impalement injuries to palate are preventable injuries. There is a reported case of a 2-year old child fell on a tooth brush, sustaining a pharyngeal injury. Eighteen hours later, localizing symptoms of a cerebrovascular accident became evident. Magnetic resonance angiography showed occlusion of the internal carotid artery and a cerebral infarction. She was treated with anticoagulation and made a complete recovery. If neurologic damage is suspected, immediate medical referral is indicated. A neurologic assessment of the patient can be achieved in a short time by screening protocol as described by Croll [9]. **Awareness on part of the parents is very important in preventing such injuries and to avoid associated complications.** The medical team treating such injuries must keep the parents informed of the possible complications and the need to follow their child for development of symptoms of ischemia.

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