

A Case of Nasopharyngeal Posterior Wall Injury due to an Unusual Metallic Foreign Body

Navid Ahmady Roozbahany* and Semiramis Nasri

Loghman Hakim Hospital, Tehran, Iran

ARTICLE INFO

Received Date: January 15, 2023

Accepted Date: April 05, 2023

Published Date: April 06, 2023

KEYWORDS

Nasopharyngeal; Tracheostomy;
Adenoids

Copyright: © 2023 Navid Ahmady Roozbahany et al., Journal of Case Reports: Clinical & Medical. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Citation for this article: Navid Ahmady Roozbahany and Semiramis Nasri. A Case of Nasopharyngeal Posterior Wall Injury due to an Unusual Metallic Foreign Body. Journal of Case Reports: Clinical & Medical. 2023; 6(1):168

Corresponding author:

Navid Ahmady Roozbahany, Loghman Hakim Hospital, Tehran, Iran,
Email: navidar@yahoo.com

ABSTRACT

We present a case of unusual nasopharynx injury caused by a metallic shaving entering the oral cavity, perforating the soft palate, and injuring the nasopharynx mucosa. The imaging revealed that the foreign body is embedded very close to the clivus of the occipital bone. After ruling out major vascular and neurological injury, the foreign body was successfully retrieved, and the post-operative course was favorable. The significance of self-protection devices and familiarity with the region's anatomy is discussed.

CASE REPORT

Following an accident on a construction site, paramedics transported a 30-year-old male patient to the emergency room. The patient, a metal worker, was making hole in a piece of metal with a motorized tool, resulting in production of some metallic shavings including a long swarf. This stringy tendril emerged from the work surface and moved toward the patient. Because the patient's mouth was open at the time, the metal piece got into his mouth. It penetrated the soft palate and became lodged in the posterior wall of the lower nasopharynx. The piece was more than 50 cm long and was cut by paramedics at the scene just outside the patient's mouth to help him move. There was only minor self-limiting bleeding from the mouth and both nasal nostrils.

The patient was agitated and terrified while in the emergency room. He was reassured, and IV lines were put in place. The patient was unable to speak but was alert and cooperative. There had been no previous medical or surgical history. The vital signs remained stable, and the general examination was unremarkable. The function of the cranial nerves was normal, and there were no neurological signs or symptoms. There was no tenderness when the cervical spine was touched. The general examination, which included the heart, lung, abdomen, and extremities, was normal. There had been no other trauma to the body. The CBC, coagulation tests, and basic metabolic panels were all within normal limits.

In the head and neck examination, the patient's mouth was open, and a spiral piece of metal protruded from it (Figures 1 and 2). There was dried blood around the mouth and nose, but no active bleeding was present. Blood clots were found in both nasal cavities during an anterior rhinoscopy, but there was no active bleeding. The metallic piece was found to penetrate the soft palate just posterior to the posterior nasal spine. There was evidence of previous bleeding but no active hemorrhage. The other end of the metal piece was not visible.

Following local anesthesia, nasal and nasopharyngeal endoscopy revealed a foreign body penetrating the midline nasopharyngeal mucosa and lodging in the inferior border of the nasopharynx. Touching the piece gently revealed that it was firmly attached to the surrounding tissue. An anterior-posterior and lateral X-rays of the skull were taken. The images revealed that the foreign body had penetrated deep into the mucosa and fascia before stopping just above the bone above C1, passing through the anterior atlantooccipital membrane part of the anterior longitudinal ligament and almost touching the clivus (Figures 3 and 4). Due to the patient's discomfort, no additional imaging was performed, and the patient was transferred to the operating room.

thiopental, and midazolam, oxygen administered via nasal cannula, the mouth was kept open by manual traction and repeated oropharyngeal suction was performed. The inner end of the foreign body was visualized using a laryngoscopy 75-degree rigid endoscope. Instead of pulling, the surgeon began rotating the piece counter clockwise, dislodging it from the bone, fascia, and mucosa in the same way that a screw was removed. The piece was dislodged after one full turn, and it was out of the nasopharyngeal mucosa after two turns. It was then pulled through the soft palate laceration and delivered out of the mouth. There was minor bleeding at the entry point in the nasopharynx, which was controlled with gentle pressure for 2 minutes. Afterward, the patient underwent general anesthesia, and oral intubation was performed. The nasopharyngeal injury site was washed with normal saline and repaired with one layer of Vicryl sutures. The soft plate injury was repaired in three layers. The postoperative course was uneventful, and the patient was discharged the next day. The injuries were well healed at the two-week follow-up, and the patient had no symptoms.

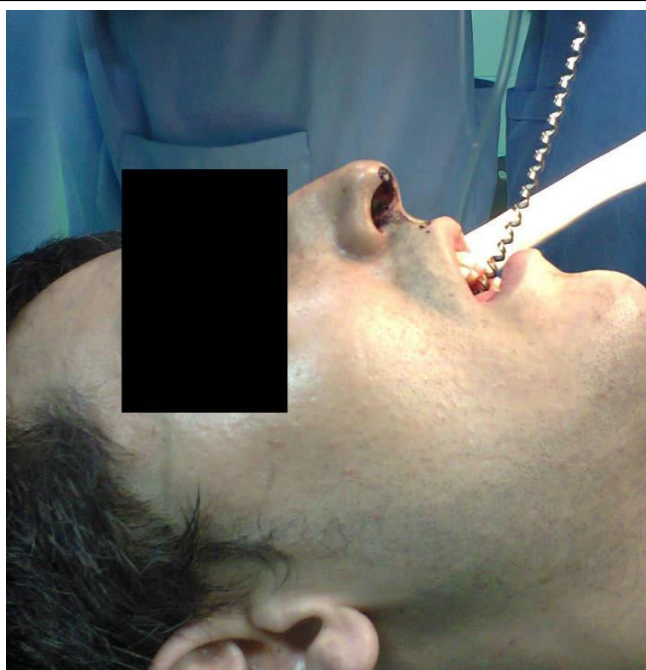


Figure 1: The lateral view of the patient.

It was obvious that pulling the piece out directly would cause additional trauma and had the potential to cause catastrophic neural and/or vascular injury due to its proximity to the skull base, C1, and regional blood vessels. Due to the position of the foreign body, it was also impossible to secure any airways through the mouth or nose. While the tracheostomy and cricothyroidotomy set was being prepared, the team decided to begin with IV sedation and spontaneous respiration but to be prepared to secure a surgical airway if necessary. Following the induction of IV sedation using ketamine, sodium

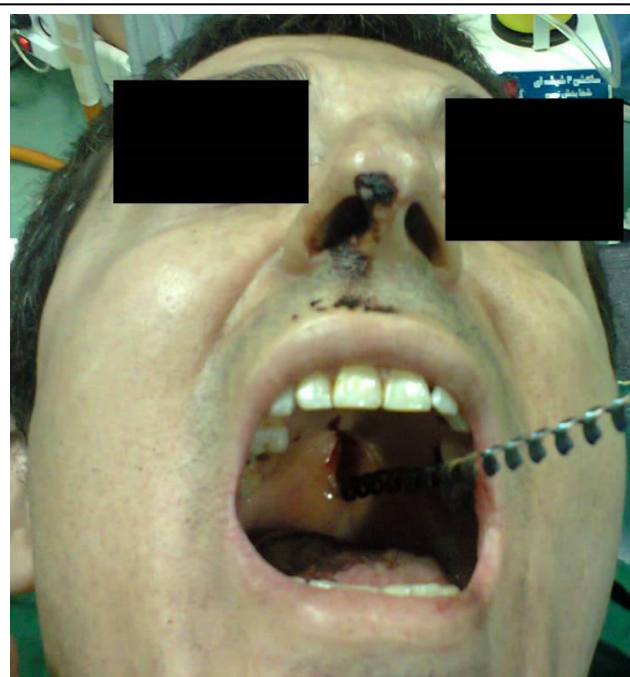


Figure 2: Intraoral view.

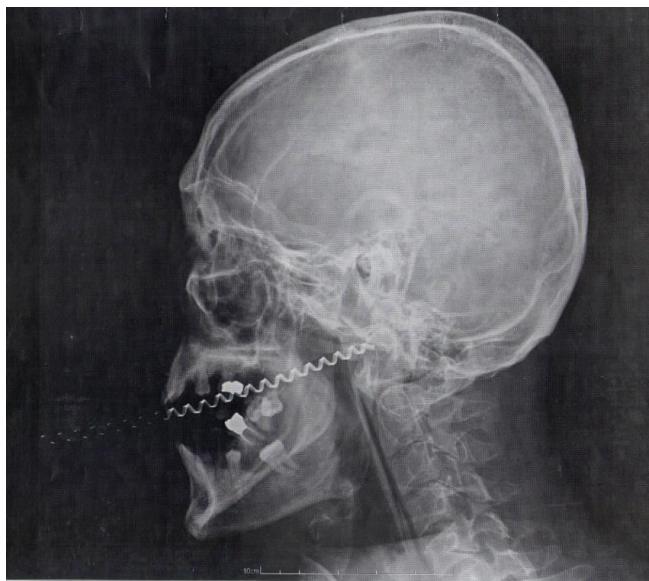


Figure 3: Lateral Skull X-ray.



Figure 4: AP Skull X-ray.

DISCUSSION

Metallic foreign bodies are common and usually secondary to embedded bullets or shrapnel from explosive weapons [1]. On the other hand, work-related foreign bodies are uncommon, and when they occur, they most commonly involve the eyes, facial skin, and subcutaneous tissues [2]. There have been reports of metallic foreign bodies involving arteries and veins, as well as structures as deep as the optic nerve; oropharyngeal and nasopharyngeal submucosal foreign bodies, on the other hand, are extremely rare [3]. After ingestion, sharp foreign bodies can become lodged in the mucosa and submucosa of the oropharynx, hypopharynx, or esophagus. There have been reports of needles or denture parts becoming lodged in these areas [4]; however, occupational injuries to the mucosa and submucosal structures of the nasopharynx are unique and have not been reported previously.

A chain of events resulted in the unusual presentation of our case. He was working with high-speed and high-power instruments without proper protection, which was most likely the most critical factor in his injury. The subsequent injury was also influenced by the head's position and the mouth's opening. If the mouth had been closed, the damage could have been limited to the lips and teeth. The angle at which the metallic piece traveled was also important, as it avoided the hard plate and instead injured the soft plate. Sharp object injury to the palate is not uncommon, and it usually occurs in children who fall while holding a pencil in their mouth [5]. By the way, perforating injury caused by a foreign object is extremely rare.

Nasopharynx is the pharynx's most superior portion. It is bounded superiorly by the skull base and inferiorly by the soft palate. The nasopharynx connects the nasal cavity to the oropharynx and houses the adenoids and Eustachian tube openings. Posterior pharyngeal wall bounds the posterior, and the medial pterygoid plates and superior pharyngeal constrictor muscles are lateral walls of nasopharynx. The nasopharynx has an anterior-posterior diameter of about 2 cm and a height of about 4 cm [6]. Nasopharynx contents include the opening of the eustachian tube, which is located on the posterolateral wall. The torus tubarius is located immediately posterior to the opening of the eustachian tube, the fossa of Rosenmuller is superior and posterior to the torus tubarius, and

the adenoids (nasopharyngeal tonsils) are located in the nasopharynx's roof and posterior wall [6].

Branches of the internal carotid artery (mandibular artery), maxillary artery (pterygopalatine artery), facial artery (ascending palatine artery), and ascending pharyngeal artery (superior pharyngeal artery) supply the nasopharynx. The parapharyngeal venous plexus drains venous blood. It drains into the retropharyngeal and facial veins, connecting to the internal jugular vein [7]. The initial lymph-collecting system consists of a capillary network within the mucosal membrane linked to a similar network within the nasal atrium, turbinates, and posterior floor. The Rouvière nodes are the first encountered lymph nodes retropharyngeal lymph nodes. The internal jugular nodes are connected to the retropharyngeal nodes [8]. The maxillary division of the trigeminal nerve travels through the sphenopalatine ganglion and provides sensory innervation anterior to the eustachian tube opening. The glossopharyngeal nerve innervates the posterior sensory system. Except for the tensor veli palatini muscle, which is supplied by the mandibular division of the trigeminal nerve, muscles originating in the nasopharynx receive motor supply from the Vagus nerve [9].

The clivus is a bony structure at the base of the skull. It is a shallow depression behind the sphenoid bone's dorsum sellae. It gradually slopes to the anterior part of the basilar occipital bone, where it meets the sphenoid bone. The pons rests on the clivus' basilar surface. The abducens nerve follows the clivus during its track [10]. The ligaments that connect the occipital bone to the C1 and C2 vertebral bodies allow the craniovertebral junction to be extremely stable and flexible. The craniovertebral junction is made up of the occipital bone and condyles, as well as C1 and C2. The cruciate ligament, the paired alar ligaments, the tectorial membrane, the apical ligament, and the anterior and posterior atlanto-occipital membranes are all important ligaments that help hold these osseous structures together. The osseous elements' unique structure and horizontal orientation of their articulations allow for significant movement, with the majority of cervical spine flexion and extension occurring at occipital condyl-C1, and the majority of cervical spine axial rotation occurring at C1-C2. As a result, the craniovertebral junction ligaments are crucial to the

stability of these unusually shaped joints [11] The foreign body in our patient was precisely inside this junction.

Plain x-ray imaging of the craniovertebral junction is a quick and easy way to assess alignment. Because dynamic views are easily obtained, stability and ligamentous structure integrity can be determined. Plain radiographs, however, do not show the ligaments because of poor soft tissue contrast resolution and a lack of cross-sectional information [11]. In our case, we did not perform a CT scan because the patient was in a very uncomfortable state, and we could clearly observe in the plain film that the bone had not been penetrated. We concluded that adding another imaging modality would have no effect on the management plan.

Neurovascular injury in a complex anatomical site like the skull base is always a concern. In our case, the injury occurred in the midline, away from the internal carotids and vertebral arteries. We also believed that the injury was not caused by a high-velocity projectile, so trauma to distant anatomical elements was unlikely. Therefore, we decided not to perform an angiographical examination of the regional vessels before proceeding with surgery. The favorable post-operative course of our patient demonstrated that our approach was correct.

CONCLUSION

Occupational injuries to the nasopharynx and oropharynx are extremely rare. Using a face shield while working with a high-speed cutting instrument is critical in preventing these injuries. When they occur, the surgeon should thoroughly examine the patient for any signs of vascular, neurologic, or skull-base injury. In addition, familiarity with the anatomy of the region allows the surgeon to avoid unnecessary work-up, reducing patient discomfort and potential morbidities.

REFERENCES

1. Negoduyko V, Mikhaylusov R, Velikodnyi A, Kovtun K. (2019). Research of Foreign Bodies Soft Tissue Gunshot Origin. Georgian medical news. 297: 13-17.
2. Zhao Y, Li Y, Li Z, Deng Y. (2020). Removal of Orbital Metallic Foreign Bodies with Image-Guided Surgical Navigation. Ophthalmic plastic and reconstructive surgery. 36: 305-310.
3. Zhang C, Wu J, Zhang W, Yuan H, Yang C, et al. (2022). Preliminary Study of the Treatment Strategy for Retaining

- Traumatic Foreign Bodies Involving the Carotid Artery. The Journal of craniofacial surgery. 34: 475-479.
4. Bendjouiri R, Chennoufi I, Lachkar A, Benfadil D, Abdenbi A, et al. (2021). Internal jugular vein thrombosis by sewing needle ingestion. International journal of surgery case reports. 83: 105988.
 5. Qing-Bin Z, Zhao-Qiang Z, Dan C, Yan Z. (2013). Epidemiology of maxillofacial injury in children under 15 years of age in southern China. Oral surgery, oral medicine, oral pathology and oral radiology. 115: 436-441.
 6. Mukherji SK, Castillo M. (1998). Normal cross-sectional anatomy of the nasopharynx, oropharynx, and oral cavity. Neuroimaging Clin N Am. 8: 211-218.
 7. Tobias PV. (1981). The nasopharynx: review of structure and development, with notes on speech, pharyngeal hypophysis, chordoma and the dens. The Journal of the Dental Association of South Africa 36: 765-778.
 8. Davis KR. (1987). Embolization of epistaxis and juvenile nasopharyngeal angiofibromas. AJR. American journal of roentgenology. 148: 209-218.
 9. Chong VF, Ong CK. (2008). Nasopharyngeal carcinoma. European journal of radiology. 66: 437-447.
 10. Rai R, Iwanaga J, Shokouhi G, Loukas M, Mortazavi MM, et al. (2018). A comprehensive review of the clivus: anatomy, embryology, variants, pathology, and surgical approaches. Child's nervous system : ChNS : official journal of the International Society for Pediatric Neurosurgery. 34: 1451-1458.
 11. Nidecker AE, Shen PY. (2016). Magnetic Resonance Imaging of the Craniovertebral Junction Ligaments: Normal Anatomy and Traumatic Injury. J Neurol Surg B Skull Base. 77: 388-395.