Complex Retained Ballistic Foreign Bodies of the Nasopharynx and Ethmoid Sinus: A Two-Case Series and Review

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ABSTRACT

Background: Retained ballistic foreign bodies in anatomically intricate regions such as the nasopharynx or paranasal sinuses are exceptionally rare and pose diagnostic and therapeutic challenges.

Cases: We present two cases in 49-year-old males: Case 1 involved a bullet lodged in the posterior nasopharyngeal wall with multiple tooth fragments embedded in the tongue following intraoral gunshot trauma; Case 2 featured a metallic fragment retained in the left posterior ethmoid sinus after a self-inflicted nasal gunshot wound.

Management and Outcome: Both patients underwent emergency surgical intervention—open retrieval and tracheostomy for Case 1, endoscopic sinus surgery with septoplasty for Case 2—and recovered uneventfully.

Conclusion: These cases underscore the critical role of high resolution computed tomography, multidisciplinary planning, and tailored surgical approaches in successfully managing rare upper aerodigestive ballistic injuries.

Keywords: Ballistic trauma; retained foreign body; nasopharynx; ethmoid sinus; endoscopic sinus surgery; Computed tomography scan imaging; gunshot wound

INTRODUCTION

Firearm injuries to the head and neck constitute approximately 6% of all gunshot wounds and frequently result in complex trauma due to the high density of vital structures.[6] Retained projectiles or fragments in confined spaces—such as the nasopharynx and paranasal sinuses—are exceedingly uncommon, often following unpredictable ballistic trajectories after deflection by bone or teeth.[1,4,7,11] These retained foreign bodies may remain asymptomatic or present with nonspecific features, delaying diagnosis and treatment. Potential complications include chronic inflammation, granuloma, infection, and systemic lead toxicity.[2,3,5,7,12] High resolution computed tomography scan (CT) is indispensable for localizing radiopaque material and guiding surgical planning.[5] Herein, we describe two rare cases of retained ballistic foreign bodies—one in the nasopharynx with lingual dental fragments, and one in the posterior ethmoid sinus—highlighting their presentation, management, and outcomes.

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Case 1: Nasopharyngeal Bullet with Lingual Tooth Fragments

A 49-year-old man presented three days after a self-inflicted intraoral gunshot wound, complaining of severe oropharyngeal pain, drooling, and inability to swallow. Examination revealed missing mandibular premolars and lateral tongue lacerations. CT scan showed a bullet lodged in

the posterior nasopharyngeal wall and multiple hyperdense fragments within tongue musculature (Figure 1 & 2).

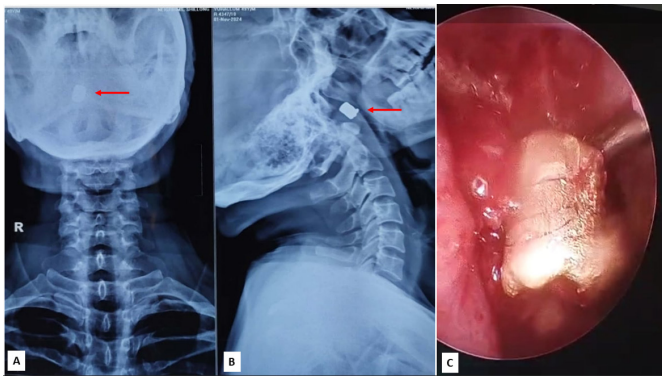

Figure 1: (A) X-ray antero-posterior and (B) lateral view of head and neck showing foreign body (bullet) in nasopharynx (red arrow)

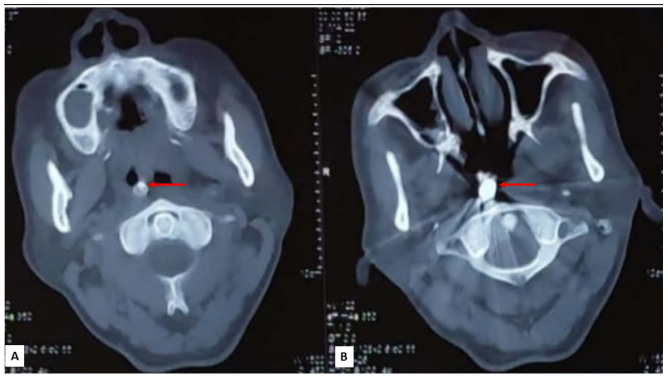

Figure 2: (A) and (B) Computed tomography scan axial view showing foreign body (bullet) in nasopharynx (red arrow)

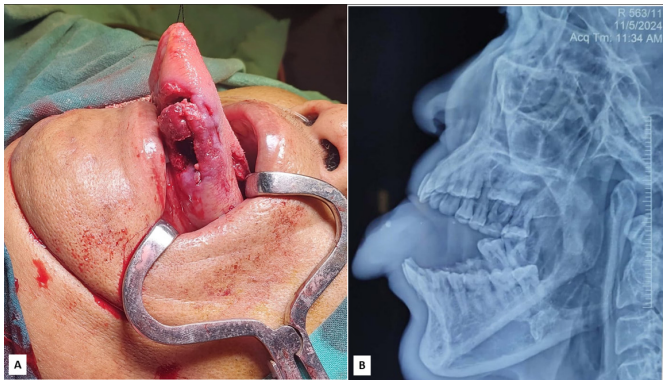

Figure 3: (A) Intra-operative picture showing tongue after exploration and (B) intra-operative X-ray showing residual foreign body in tongue

Under general anesthesia, a diagnostic nasal endoscopy was done. The bullet was difficult to locate intraoperatively, using a transoral approach, a blunt finger dissection was done to locate the foreign body in the posterior wall of the nasopharynx and was brought to the right side, wherein a dissection was done to retrieve the bullet via the nasal cavity under endoscopic visualization. Figure 1C. Four dental fragments were removed from the tongue. Intraoperative radiography confirmed a minute residual fragment in the tongue, which was deemed irretrievable. A tracheostomy secured the airway in view of tongue edema by the end of the procedure (Figure 3). The patient's postoperative course was uneventful; decannulation occurred on postoperative day 7, with full symptomatic resolution uneventfully.

Case 2: Posterior Ethmoid Sinus Retained Fragment

Another 49-year-old man presented three days after a self-inflicted nasal gunshot injury, reporting nasal pain and epistaxis. Physical examination revealed a healed nasal dorsum laceration and septal deviation. CT demonstrated a displaced nasal bone fracture and a metallic fragment within the left posterior ethmoid sinus, with an additional subcutaneous piece adjacent to the nasal bone (Figure 4).

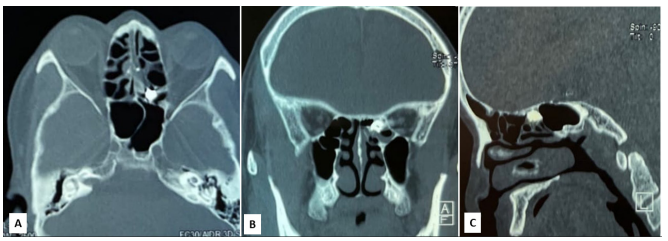

Figure 4: Computed Tomography of nose and paranasal sinus region showing foreign body in left posterior ethmoidal sinus in axial view (A), coronal view (B) and sagittal view (C)

Diagnostic nasal endoscopy confirmed septal deviation and blood clot on left side. The patient underwent functional endoscopic sinus surgery (FESS) combined with septoplasty; the ethmoidal fragment was extracted without complications. Follow-up endoscopy showed a well healed sinonasal cavity with no retained material.

DISCUSSION

Retained ballistic foreign bodies in the nasopharynx or paranasal sinuses account for <1% of head and neck gunshot wounds.[11] Case 1 illustrates how intraoral trajectories can result in unpredictable lodgement sites and associated dental trauma; retained tooth fragments may mimic neoplasms on clinical exam, necessitating CT for diagnosis.[2,3,7] Case 2 demonstrates that ethmoidal retention poses risk of orbital or intracranial extension; CT and endoscopic techniques enable safe removal with minimal morbidity.[4,6,10]

CT remains the diagnostic gold standard; intraoperative imaging verifies complete retrieval. FESS is now preferred for sinus foreign bodies due to superior visualization and lower morbidity compared with open approaches. Adjunctive septoplasty may enhance access in anatomically restricted fields. Finally, prolonged mucosal contact with metallic debris carries the risk of lead absorption—clinicians should monitor lead levels when removal is incomplete.[12]

CONCLUSION

These two cases emphasize the rarity and complexity of retained ballistic foreign bodies in the upper aerodigestive tract. Timely CT imaging, multidisciplinary coordination, and individualized surgical strategies—whether open or endoscopic—are paramount to achieving favorable outcomes and preventing complications.

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