Endoscopic Endonasal Transsphenoidal Removal of a Retained Clival Bullet Fragment Following Self-Inflicted Gunshot Wound

Neurosurgery
School of Medicine
University of Missouri

Inamullah Khan, MD[1]; Farzana Tariq, MD[1]; Fareed Jumah, MD[1]; Hunter Brooks; Kaushik Ravipati, MD[1]; Keonho Kong, MD[2]; Michael Chicoine, MD[1]; [1]Dept. of Neurosurgery, University of Missouri; [2]Dept. of Otolaryngology, Head And Neck Surgery, University of Missouri

Background

The endoscopic endonasal approach (EEA) has undergone a dramatic transformation from a limited route for pituitary tumors to a versatile corridor for the ventral skull base.

While most frequently employed for neoplastic and CSF leak pathologies, its use in penetrating ballistic trauma is rarely reported.

Presentation

A 43-year-old man with a history of depression, anxiety, and alcohol use disorder presented to the ED after a self-inflicted submental gunshot wound requiring cricothyrotomy at an outside facility. On arrival, ENT flexible laryngoscopy showed normal bilateral nasal cavity anatomy with diffuse posterior nasopharyngeal wall oozing blood and no clear bullet entry site.

CT bone-window (**Fig. 1a and 1b**) demonstrated a retained ballistic fragment lodged in the sphenoid/clival region and showed no great vessel involvement. He was admitted to the SICU, and operative intervention was deferred pending medical stabilization.

Due to polytrauma, MRI was indicated; retained ballistic fragment removal was pursued to facilitate MRI.

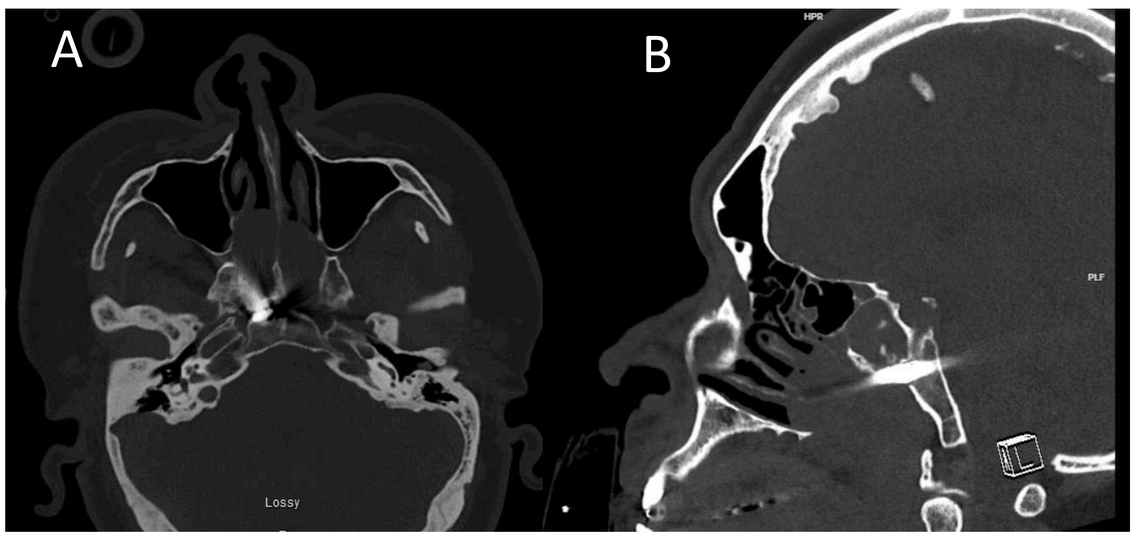

Figure 1. Preoperative CT localizing a retained ballistic fragment to the sphenoid/clival region.
(A) Axial bone-window CT demonstrates a hyperdense retained fragment at the midline skull base.
(B) Sagittal bone-window CT confirms embedding within the sphenoid/clivus.

Hospital Course

Day 0: SICU admission; no acute surgery indicated.

Day 2: Cricothyrotomy converted to standard tracheostomy for respiratory failure.

Day 9: Medically optimized; fragment removed via endoscopic endonasal approach (**Fig. 2**).

Day 13: Tracheostomy tube removed.

Day 14: Discharged home; postoperative imaging showed minimal residual material at the clivus without brain compression or edema.

Day 28: Clinic follow-up.

Outcome / Follow-up

- Neurologically stable at follow-up
- No sign of infection present
- Denied headache, fever, visual changes, or diplopia
- Reported minimal nasal drainage

Operative Details

Operative Technique

- General anesthesia; airway managed via existing tracheostomy
- CT-based stereotactic **navigation** registered and used throughout
- A binarial endoscopic endonasal corridor with wide sphenoidotomy and posterior septectomy performed
- **Transclival drilling** performed to expose the embedded fragment
- Fragment localized with navigation; bone overlying/surrounding it removed to permit mobilization
- Fragment removed **intact**; no dural violation/CSF leak or vascular injury noted; hemostasis achieved (bone wax) and irrigated

Reconstruction

- Vascularized nasoseptal flap placed, then rotated to cover the clival defect
- Surgicel placed over flap edges; Nasopore packing placed bilaterally
- Free mucosal graft used to cover exposed anterior septal cartilage; Doyle splints placed

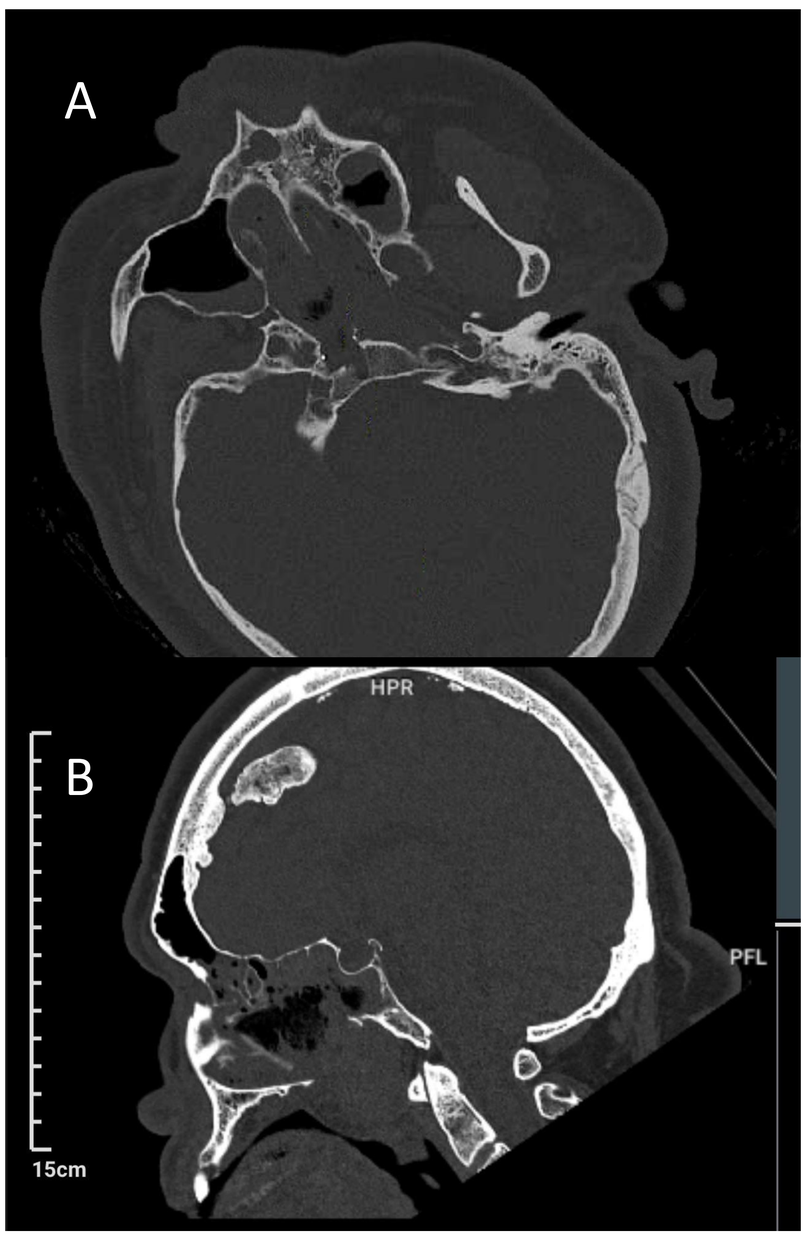

Figure 2. Postoperative CT Confirming Fragment Removal
(A) Axial bone-window CT.
(B) Sagittal bone-window CT.

Conclusions

Endoscopic endonasal transsphenoidal removal of a clival ballistic fragment was feasible and safe in this case, with navigation-guided drilling, intact fragment extraction, and watertight nasoseptal flap reconstruction. The patient had no new neurologic deficits, CSF leak, or infectious complications.

EEA may be considered for **select** ventral skull base ballistic injuries when paired with careful vascular evaluation and multidisciplinary expertise

Contact

Kaushik Ravipati
University of Missouri – Columbia School of Medicine
1 Hospital Drive Columbia MO 65201
krvmv@umsystem.edu
(561) 459-0666