

## Lateral Orbitotomy: approach to intraorbital bullet

### Case report

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### ABSTRACT

**Background :** Multiple approaches to intraorbital foreign bodies and lesions have been described. The selection of the right and proper approach is always a challenging decision. A 9 years old Sudanese child was shot when a plummet of a blank bullet shot him while sleeping in his house. In multidisciplinary joint surgery, Lateral orbitotomy through Cantholysis with canthotomy approach was performed to remove the intraorbital bullet.

**Key Words:** Trauma, Gunshot, intraorbital bullet, lateral orbitotomy approach, cantholysis

**Received:** 22 September 2021, **Accepted:** 20 November 2021 .

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**ISSN:** 2090-097X, July 2021, Vol. 12, No. 4

### INTRODUCTION

Approaches to the orbit and globe are common due to tumors invasion, invasive trauma to the orbit and gunshots to the globe. Gunshot to the craniofacial region is not common it is divided to high and low velocity gunshot, its damage mostly need a multidisciplinary team approach from eye surgeons and Neurosurgeons along with the maxillofacial surgeons, in Sudan its incidence is rare, they may be caused after using firearm weapons in traditional wedding in Sudanese cultural wedding ceremonies (as in our case) , the tribal problems and issues.

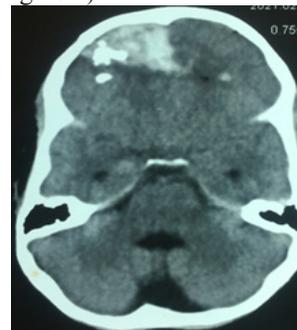
Bullets can be less harmful than expected in case of gunshot to the globe although its incidence in the craniofacial region is uncommon.

Horizontal lateral canthotomy is an incision made of the lateral aspect of the orbit through the skin or crease of the lid which means its surgical exposure of the canthal tendon along with the incision of the inferior branch of the tendon is called cantholysis.

Lateral orbitotomy is an extracranial approach to the globe with intra and extraconal tumors<sup>[1-7]</sup>, lacrimal gland tumors, orbital apex, lateral and basal optic nerve or foreign bodies inside the orbit this approach include removal of lateral bony part of the orbit after cutting the segment using saw or surgical fissure bur.

### CASE PRESENTATION

A 9 years old Sudanese child was suddenly injured when a plummet of a blank bullet shot him while sleeping in his house, the plummet had lodged in his frontal bone from the right side it crossed the frontal lobe of the brain and settled in his left globe and remained inside as a penetrating gunshot wound<sup>[8]</sup>. After the initial medical management including the primary and secondary surveys in Alobayed hospital where the accident happened then he was referred to Omdurman Military Hospital for advanced medical care where cranialization and evacuation through craniotomy was held from neurosurgery department due to traumatic brain injury. (Figure 4).



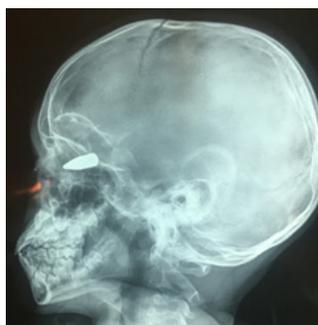
**(Figure 4)** Axial view for brain shows radioopaque area of the Right frontal lobe due to Traumatic brain injury.

After examination, the Left eye had proptosis , ptosis, epiphora, and showed complete blindness due to optic nerve avulsion with negative response to light, no direct or consensual reflexes with dilated fixed pupil of the Left side which was completely mydrasied (Figure 3). The right eye showed 6 / 6 visual acuity with positive direct light reflex and negative consensual light reflex.



**(Figure 3)** a photograph shows proptosis Ptosis and epiphora of the left eye.

Plain radiographs (Lateral skull view) and computed tomography were requested and they showed a radiopaque foreign body lodged in the left orbital floor on the inferiomedial surface of the eyeball. (Figure 1 and 2 ). with damage to medial orbital wall of the same globe.



**(Figure 1)** lateral Skull view shows a foreign body (bullet) in orbital region



**(Figure 2)** Axial view of (CT Scan) shows radiopaque mass in posterior orbital region (behind the eyeball)

After consultation and preoperative preparation; under general anesthesia the foreign body was removed through Lateral orbitotomy and cantholysis with canthotomy approach,

Marking the incision by drawing a line from the lateral canthus to the tragus of the ear, then incision was done halfway the drawn line then exposure to the lateral bony wall of the orbit was achieved with periosteal elevator and removal to the fibrofatty sling of the inferior rectus, then a fine cut to the lateral wall was carried out using a carbide diamond fissure bur to access the posterior orbital region then the splitted segment was removed after detachment of any attach tissues and after placement of 10 holes titanium mini plate to the segment (Figure 5).



**(Figure 5)** Lateral orbital wall after surgical removal with 10 holes mini titanium plate fixed into it.

A careful dissection of the orbital fascia for exposure of the foreign body was done. A purulent yellow discharge was observed and tracking of the pus discharge was used as guidance for the bullet. Consequently, the blunt ended high velocity bullet was removed and it was 7 mm in diameter (Figure 7) after adequate homeostasis and lavaging of the sinus with normal saline for drainage and evacuation of pus then the lateral segment were placed with a 10 holes titanium mini plate and secured by 6 screws.



**(Figure 7)** Photograph shows the removed bullet

(Figure 6).After that closure was performed in 4 planes periorbital tissues and orbital margins with vicryl 6/ 0 and 5/ 0. The orbital and subcutaneous tissues with 3/ 0 internally then skin was closed using 4/ 0 and 5/ 0 nylon.

The postoperative follow was done for 7 days following surgery and admission on OMFS ward then 2 weeks, 1 month and 3 months respectively. The follow up results were satisfactory for the patient and his relatives. Normal movement and visual acuity of the right eye was scored.



(Figure 6) Intraoperative photograph shows reattachment of the segmented bone

## DISCUSSION

Firearms regardless its velocity when targeting or hitting the craniofacial region can cause be either fatal or mostly causing severe damaging injuries<sup>[2,7]</sup>. Degree and severity of damage depend on multiple factors like type of a bullet (rim-fire, centerfire or shotshell), velocity and distance of shooting as well as site of entrance and exit (most massive damage)<sup>[9]</sup>. A multidisciplinary team approach does improve and facilitating diagnosis and treatment of such a surgery (as in our case) including eye surgery, neurosurgery and a maxillofacial surgery teams. Lateral orbitotomy approach was described in 1888 by Kronlein<sup>[1,10]</sup>, - A multidisciplinary team approach does improve and facilitating diagnosis and treatment of such a surgery (as in our case) including eye surgery, neurosurgery and a maxillofacial surgery teams<sup>[11]</sup> since then it has subjected to many variations and modifications. Skin incision and landmarks depend on the type of Lateral orbitotomy planned. In this case our land marks were a horizontal line extending from the lateral canthus passing the lateral canthal crease to the tragus of the ear through crew foot crease. Many incisions for Lateral orbitotomy approach was described in literature, in our case we used a cantholysis with lateral canthotomy using horizontal (Berke) incision instead of the common (Stallard-Wright) incision as mentioned by P. Claros et al., for optimal cosmetic results and a maximum accessibility to the posterior globe (Fig 8).



(Figure 8) Immediate postoperative photograph

overall physical status does quite affects the patient psychological and mental health which affects the surrounding humans and relative of the patient and it has a high impact on the recovery time as well as patients activities and spiritual health, thus patient was referred to psychiatrist for optimizing good result of multimodality treatment for rehabilitation of the child.

## CONCLUSION

Severe gunshot injuries in craniofacial region can cause significant impact on quality of life and clinical outcomes of the involved patients. The surgical intervention specifically in orbital and intraorbital regions needs multidisciplinary team approach. Lateral orbitotomy now became one of the ideal functional and cosmetics approach of removal of intraorbital tumors, different pathologies in intraconal/ extraconal and foreign bodies removal.

## CONFLICT OF INTEREST

The authors declare no conflict of interest.

## REFERENCES

- 1- P. Clarós, J.V.F. Fokouo, A. Clarós. Intraorbital foreign body: A rifle bullet removed 20 years after the accident. *European Annals of Otorhinolaryngology, Head and Neck Diseases* 2017; 134:63-65.
- 2- T. Lavy, S.A. Asleh. Ocular rubber bullet injuries. *Eye*, 17 (7) (2003), pp. 821-824
- 3- W. Cukier. International fire/small arms control. *Can Foreign Policy J*, 6 (1) (1998), pp. 73-89.
- 4- E. Gönül, M. Akbörü, Y. Izci, E. Timurkaynak. Orbital foreign bodies after penetrating gunshot wounds: retrospective analysis of 22 cases and clinical review. *Minim Invasive Neurosurg*, 42 (04) (1999), pp. 207-211
- 5- D.G. Charteris. Posterior penetrating injury of the orbit with retained foreign body. *Br J Ophthalmol*, 72 (6) (1988), p. 432
- 6- M. Finkelstein, A. Legmann, P.A. Rubin. Projectile metallic foreign bodies in the orbit: a retrospective study of epidemiologic factors, management, and outcomes. *Ophthalmology*, 104 (1) (1997), pp. 96-103

7- Lee RP, Khalafallah AM, Gami A, Mukherjee D. The Lateral Orbitotomy Approach for Intraorbital Lesions. *J Neurol Surg B Skull Base*. 2020 Aug;81(4):435-441. Imad Elimairi

8-(Lorenzo Gitto, 2021)

9-Mutsavi T. The Reliability of Firearm Identification in South Africa: A Comparative Perspective (Doctoral dissertation, University of Fort Hare).

10-Hamed-Azzam S, Verity DH, Rose GE. Lateral canthotomy orbitotomy: a rapid approach to the orbit. *Eye*. 2018 Feb; (S Hamed-Azzam, 2018).

11-Elimairi I, Suleiman A, Sami A, Elnyal A, Musa B, Awad A. Lateral orbitotomy with osteotomy: team approach to extraocular space occupying lesions. *International Journal of Oral and Maxillofacial Surgery*. 2017 Mar (al., 2017).