Acta Scientific Neurology (ASNE)

Volume 9 Issue 4 April 2026

Case Report

A Case of Pediatric Subperiosteal Orbital Hematoma Following Minor Facial Trauma

Jumpei Kato, Keisuke Onoda*, Ryousuke Doi, Shunsuke Hatakenaka, Tomihiro Wakamiya, Masahiro Indou, Kimihiro Nakahara, Tatsuya Tanaka, Takashi Agari, Takashi Sugawara, Kazuaki Shimoji, Eiichi Suehiro, Hiroshi Itokawa and Akira Matsuno

Department of Neurosurgery, School of Medicine, International University of Health and Welfare, Narita Hospital, Narita, Japan

***Corresponding Author:** Keisuke Onoda, Department of Neurosurgery, School of Medicine, International University of Health and Welfare, Narita Hospital, Narita, Japan.

DOI: 10.31080/ASNE.2026.09.0903

Received: February 23, 2026

Published: March 31, 2026

Abstract

Subperiosteal orbital hematoma (SOH) is a rare yet potentially sight-threatening condition in children. Treatment options vary from observation to needle aspiration and surgical evacuation. A previously healthy 13-year-old boy experienced gradual swelling in his left orbit following a minor injury. Despite monitoring, proptosis, diplopia, and visual deterioration worsened over a 10-day period. CT and MRI scans indicated a sizable superior SOH without any fractures or signs of a subacute hematoma. A minimally invasive small craniotomy was conducted via an incision along the upper eyelid crease, excising a 2 cm × 2 cm portion of the superior orbital rim. The hematoma and its capsule were entirely excised under microscopic observation. The symptoms promptly resolved with no subsequent recurrence. As visual impairment advances or suspicion of organization arises, early surgical decompression with capsule excision proves to be effective and long-lasting, especially for superior SOH, where aspiration alone may be inadequate. Removal of the orbital rim aids in secure and thorough evacuation, while maintaining favorable cosmetic results.

Keywords: Subperiosteal Orbital Hematoma; Pediatric Orbital Trauma; Surgical Decompression; Craniotomy; Visual Impairment

Abbreviations

MRI: Magnetic Resonance Imaging; SOH: Subperiosteal Orbital Hematoma

Introduction

Subperiosteal orbital hematoma (SOH) is a rare clinical condition usually linked to trauma, sinusitis, Valsalva maneuvers, or coagulopathy [1-3]. Children are particularly vulnerable because of their loosely attached periosteum, enabling blood accumulation between the periosteum and orbital bone even following minor trauma [1-3].

Although small hematomas may resolve spontaneously, larger collections can lead to optic nerve compression and dysfunction of the extraocular muscles, potentially causing permanent visual deficits if left untreated [4-6]. Needle aspiration is a common procedure for liquefied and accessible hematomas [1,2,7]. However, aspiration may not be effective for organized or superiorly located hematomas [2,6,8].

We present a case of successful treatment of pediatric SOH with a small craniotomy and capsule excision.

Case Presentation

A 13-year-old boy with no pertinent medical history experienced minor facial trauma while participating in a sports activity. The swelling around the eye area worsened progressively over a 10-day period (Figure 1 A). The family doctor referred the patient to our department upon noticing a gradual decline in visual function. Upon admission, the patient's left visual acuity decreased from 1.5 to 0.6. While the extraocular movement was intact, the patient exhibited proptosis and diplopia. There were no signs of afferent pupillary defects.

Figure 1: Clinical photographs.

(A) Preoperative view demonstrating progressive left periorbital swelling and proptosis 10 days after minor facial trauma.

(B) Postoperative view at 3 weeks showing complete resolution of swelling with an excellent cosmetic outcome.

Computed tomography (CT) (Figure 2 A-B) revealed a clearly defined subperiosteal hematoma along the left superior orbital wall. Magnetic resonance imaging (MRI) (Figure 2 C-D) indicated a heterogeneous lesion typical of a subacute hematoma, exerting pressure on the eyeball. Magnetic resonance angiography did not reveal any vascular abnormalities (data not shown).

Rapid progression of visual impairment was observed, and direct visualization and definitive hematoma removal were determined to be necessary.

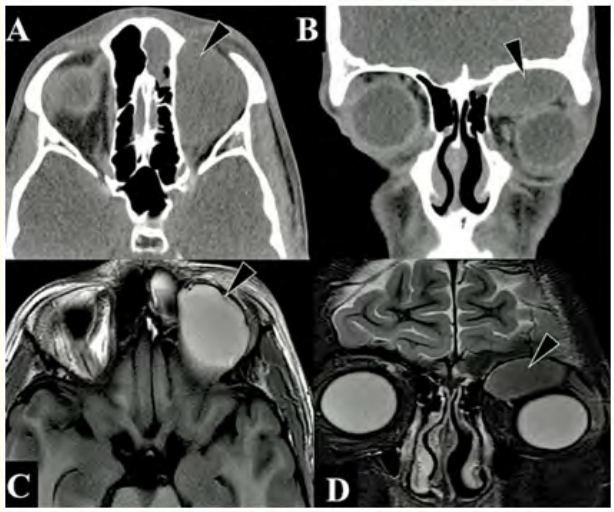

Figure 2: Preoperative imaging findings.

(A) Axial and (B) coronal CT scans demonstrating a well-circumscribed superior subperiosteal hematoma without associated orbital fracture.

(C) Axial T1-weighted and (D) coronal T2-weighted MRI showing a heterogeneous subacute hematoma causing mass effect on the globe.

Arrowhead: hematoma.

Surgical findings and histopathology

A left upper eyelid crease incision was performed under general anesthesia. A 2 cm × 2 cm segment of the superior orbital rim was excised to establish an adequate surgical corridor (Figure 3 A-B). Both liquefied and organized clots were meticulously removed after accessing the subperiosteal plane under microscopic guidance. A thickened hematoma capsule was identified and completely excised. The orbital rim was reconstructed with an absorbable plate, and no active bleeding source was confirmed.

Histopathological evaluation (Figure 4) of the excised capsule using hematoxylin and eosin (H&E) staining showed fibrovascular connective tissue with an organizing hematoma. The assessment revealed a proliferation of small blood vessels, fibrin deposition, and hemosiderin accumulation, indicating a subacute stage of hematoma organization. No neoplastic or infectious features were

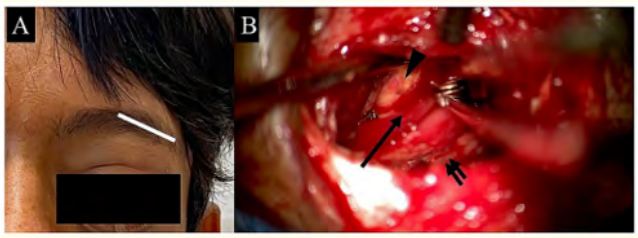

Figure 3: Intraoperative photographs.

(A) A 3-cm skin incision (white line) at the lateral aspect of the left eyebrow.

(B) Microscope-assisted exposure through an upper eyelid crease incision after removal of a 2 × 2 cm segment of the superior orbital rim. The thickened hematoma (arrow) is evacuated.

Double arrow: orbital rim. Arrowhead: periorbita.

identified. These results imply that the maturation of the hematoma capsule probably restricted the efficacy of needle aspiration alone.

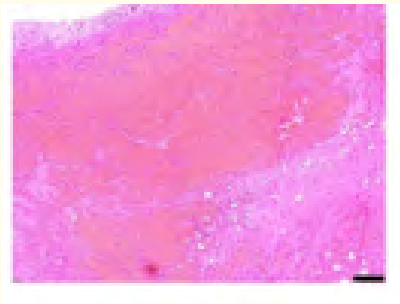

Figure 4: Histopathological findings.

Hematoxylin and eosin staining demonstrating fibrovascular tissue with fibrin deposition and hemosiderin-laden macrophages, consistent with an organizing hematoma (scale bar = 100 μm).

Postoperative course

Two days after surgery, left visual acuity improved to 0.8, and within one week it improved to the previous level of 1.5. Proptosis and diplopia resolved within one week (Figure 1B). The wound healed with excellent cosmetic results. A follow-up CT scan (Figure 5 A-B) confirmed complete resolution without recurrence. At the six-month postsurgical outpatient visit, the eye position and visual acuity were found to have completely improved and remained stable, with no recurrence observed.

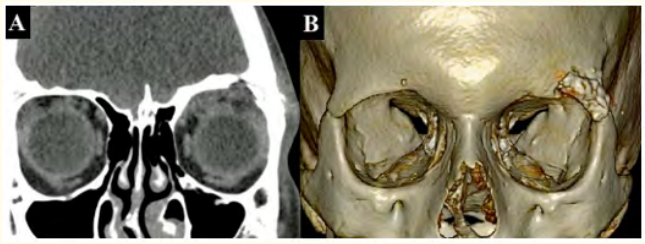

Figure 5: Postoperative imaging at 1 month.

(A) Coronal CT confirming complete resolution of the subperiosteal hematoma.

(B) Three-dimensional reconstructed CT demonstrating restoration of the normal orbital contour following orbital rim reconstruction.

Discussion

SOH in children usually occurs due to the rupture of diploic or periosteal vessels after trauma [1-3]. The pediatric periosteum, being loosely attached to the orbital bone, allows blood to accumulate quickly even from minor injuries [1-3]. Hematomas located superiorly are particularly concerning, as they can easily lead to venous congestion and compressive optic neuropathy [4], even without direct impingement on the optic nerve in imaging.

Although needle aspiration is widely accepted as a minimally invasive first-line treatment when the hematoma is liquefied and accessible [1,2,7], its effectiveness diminishes as the organization progresses [2,6,8]. In the subacute phase, fibrin deposition and capsule formation impede spontaneous resolution and prevent complete drainage via needle aspiration alone [5]. Furthermore, the blind nature of aspiration restricts intraoperative visualization and contributes to recurrence in organized hematomas [8].

Our case shows that a small craniotomy of the orbital rim offers direct access to superior subperiosteal hematomas with minimal invasiveness. Microscope-assisted evacuation enabled the complete removal of both liquefied and organized components while preserving the neurovascular structures. Notably, excising the capsule eliminates potential residual cavities and decreases the risk [5].

Based on clinical experience and prior literature, the choice between aspiration and surgical evacuation should be based

on worsening visual impairment and radiological indications of organization [6,8], particularly for superior lesions [4-6]. When these factors are present simultaneously, immediate surgical action is necessary to prevent irreversible optic neuropathy and ensure lasting decompression [4,6]. The upper eyelid crease method yields outstanding cosmetic results.

In summary, this case highlights that direct microscopic evacuation with capsule removal is a safe and definitive strategy for organized or progressively symptomatic pediatric SOH [5].

Conclusion

Pediatric SOH can develop following minor trauma and may worsen despite observation. If visual symptoms deteriorate or imaging indicates organization, particularly in superior lesions, surgical evacuation assisted by a microscope with capsule excision can effectively decompress the area and lower the recurrence risk. The small craniotomy through an eyelid crease approach offers superior visualization, functional preservation, and optimal cosmetic results, rendering it a valuable treatment option for pediatric SOH that are becoming increasingly symptomatic.

Acknowledgements

We would like to thank Editage (www.editage.jp) for English language editing.

Conflict of Interest

The authors declare that they have no conflict of interest.

Bibliography

1. Yazıcı B and Gönen T. "Posttraumatic subperiosteal hematomas of the orbit in children". *Ophthalmic Plastic and Reconstructive Surgery* 27.1 (2011): 33-37.
2. Eshraghi B., *et al.* "Pediatric posttraumatic orbital subperiosteal hematoma". *European Journal of Ophthalmology* 31.3 (2021): 1085-1093.
3. Kim UR., *et al*. "Clinical features and management of posttraumatic subperiosteal hematoma of the orbit". *Indian Journal of Ophthalmology* 59.1 (2011): 55-58.
4. McCallum E., *et al*. "Orbital compartment syndrome: An update with review of the literature". *Clinical Ophthalmology* 13 (2019): 2189-2194.
5. Sabet SJ., *et al*. "Subperiosteal hematoma of the orbit with osteoneogenesis". *JAMA Ophthalmology* 117.4 (1999): 533-536.
6. Meltzer DE., *et al*. "Subperiosteal hematoma of the orbit: a variety of presentations". *Journal of Radiology Case Reports* 13.6 (2019): 3628-3632.
7. Gore SM and Evans BJW. "Spontaneous orbital subperiosteal haemorrhage in a child". *Eye (Lond)* 6.5 (1992): 545-548.
8. Shah AN., *et al*. "Non-traumatic subperiosteal orbital hematoma associated with exercise". *Orbit* 26.3 (2007): 211-214.