

Subgaleal Hematoma with Orbital Extension After Minor Head Trauma

Siham Oukassem*, Aya Laridi, Abourak Chaimae, Lina Belkouchi, Siham El Haddad, Nazik Allali and Chat Latifa

Department of Radiology, Mother-Child, Faculty of Medicine and Pharmacy of Rabat, Children's Hospital, Ibn Sina University Hospital, Mohammed V University, Rabat, Morocco

***Corresponding Author:** Siham Oukassem, Department of Radiology, Mother-Child, Faculty of Medicine and Pharmacy of Rabat, Children's Hospital, Ibn Sina University Hospital, Mohammed V University, Rabat, Morocco.

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Abstract

Subgaleal hematomas (SGH) are rare accumulations of blood between the galea aponeurotica and the periosteum, often resulting from minor head trauma. These hematomas are usually self-limiting and localized but can occasionally extend into the orbital region, causing significant complications such as proptosis, vision impairment, and ophthalmoplegia. Orbital subperiosteal hematomas (OSPH) are uncommon and require prompt diagnosis and differentiation from other orbital pathologies, including cellulitis and tumors. Computed tomography (CT) is the imaging modality of choice, offering rapid and detailed visualization of hematoma extent and orbital involvement. While conservative management is adequate for minor cases, surgical intervention is necessary for large hematomas to prevent severe complications, such as optic neuropathy or corneal damage. A multidisciplinary approach is critical to achieving favorable outcomes in these cases.

We report the case of a 6-year-old boy presenting with progressive diffuse scalp swelling and left-sided proptosis one week after a minor fall. Examination revealed tender scalp swelling and conjunctival chemosis, with preserved visual acuity. CT imaging identified a large subgaleal hematoma with orbital extension, displacing the eyeball inferiorly without fractures. Surgical evacuation removed 200 mL of subgaleal blood and 7 mL of orbital clots. The procedure was uneventful, and the patient experienced complete symptom resolution.

This case underscores the need for early detection and intervention in pediatric SGH with orbital involvement, as timely management can prevent permanent vision loss.

Keywords: Subgaleal Hematomas (SGH); Orbital Subperiosteal Hematomas (OSPH); Computed Tomography (CT); Trauma

Introduction

Subgaleal hematomas (SGH) are generally self-limiting and remain localized, with minimal involvement of surrounding structures. Orbital extension is an unusual occurrence and is most often linked to blunt head trauma [1]. Early diagnosis and intervention are essential to mitigate potential vision-threatening outcomes, as orbital involvement can lead to permanent ocular damage if untreated [2].

Case Report

A 6-year-old boy was brought to our department through the emergency unit, presenting with a week-long history of gradually worsening diffuse scalp swelling. A minor fall at home had occurred several days before his symptoms began. The patient exhibited no signs of fever, seizures, limb weakness, or vomiting and was fully alert with a normal mental state.

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Examination revealed left-sided proptosis with conjunctival chemosis, and his visual acuity (VA) was 6/9. No signs of meningeal irritation were present. The scalp swelling was broad, compressible, and sensitive, accompanied by bulging in the bilateral parietal regions.

Cranial computed tomography (CT) revealed an extensive subgaleal collection accompanied by a left orbital subperiosteal hematoma causing inferior displacement of the eyeball (Figure 1). No fractures of the orbital roof were identified. The patient was optimized for surgery and underwent a joint neurosurgical intervention.

Through bilateral linear frontal and parietal stab incisions, approximately 200 mL of altered acute/subacute subgaleal blood was evacuated. Incisions were made below the brow to access the left orbit, allowing for the removal of 7 mL of blood clots from the extraconal space. The procedure was uneventful, with no intraoperative or postoperative complications. The patient's symptoms progressively resolved.

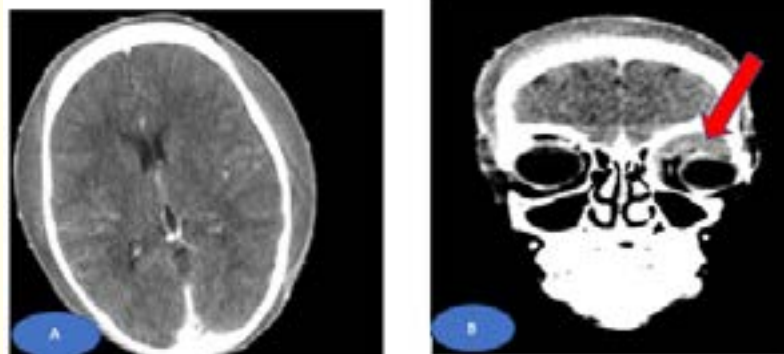


Figure 1: Cranial CT images of the massive SGH and OSPH: (a) Axial CT image showing the massive subgaleal collection; (b) Coronal image showing the intraorbital bleed.

Discussion

Subgaleal hematomas (SGHs) are characterized by the collection of blood within the subaponeurotic cranial space, often following minor trauma. This subgaleal region consists of loose connective tissue and small emissary veins. When exposed to shearing or tangential forces, these vessels may rupture, leading to bleeding and the accumulation of blood between the galeal aponeurosis and the periosteum of the cranial bones. In rare cases, SGH can extend into the orbit, leading to significant ocular complications that necessitate urgent medical intervention [1].

Orbital involvement following SGH is a rare complication that occurs when blood under pressure accumulates at the superior orbital ridges, where the attachment between the galea aponeurosis and periosteum is relatively loose, particularly in children. This accumulation can separate and disrupt the attachments of the arcus marginalis from the orbital rim, leading to subperiosteal blood collection within the orbit [3,4].

Minor traumas, such as hair-pulling or braiding, have been linked to orbital extension of SGHs in pediatric patients [2]. It is important to keep child abuse in mind as a potential diagnosis, as these manifestations may serve as a red flag [5].

A variety of conditions have been implicated in the development of subgaleal hematomas. Associations have been anecdotally reported with blood disorders, including sickle cell disease, factor VII deficiency, platelet dysfunction, and vitamin C deficiency. In one case, undiagnosed hypertension was suggested as a contributing factor, particularly in instances involving orbital and auricular extension [6]. It is important to investigate potential underlying predisposing factors when a significant bleed occurs following minor trauma.

In our case, the subgaleal hematoma with orbital extension occurred following a minor fall, without any predisposing factors.

This process may result in symptoms such as proptosis, ocular pain, reduced vision, and ophthalmoplegia. A comprehensive ophthalmologic examination is crucial when evaluating patients with suspected SGH and potential subperiosteal extension. This assessment should include baseline visual acuity, intraocular pressure, afferent pupillary defects, ophthalmoplegia, and optic nerve findings. Close collaboration with emergency room physicians is essential to ensure timely and appropriate management of potential ophthalmologic complications associated with orbital subperiosteal hemorrhage (OSPH) [2].

Imaging plays a crucial role in the evaluation and management of SGH, especially when orbital extension is suspected following head trauma. Computed tomography (CT) remains the gold standard for assessing SGH with orbital involvement, as it provides rapid and detailed visualization of hematoma extent and associated complications. In the case of SGH with orbital extension, CT can reveal important radiological signs, such as a well-defined subgaleal fluid collection, which appears as a hypodense area between the galea aponeurotica and the periosteum. When the hematoma extends into the orbit, CT imaging can show a subperiosteal hematoma, which typically appears as a collection of blood located between the periosteum and the bone, often causing displacement of orbital structures. The inferior displacement of the eyeball, as seen in our case, is a common finding in OSPH and can be visualized on axial CT scans. In some cases, CT can also help identify fractures of the orbital roof or skull base, though these were not present in our patient. The ability of CT to rapidly assess the extent of the hematoma, as well as any associated fractures or displacement, makes it an indispensable tool.

While magnetic resonance imaging (MRI) provides superior soft tissue contrast, it is generally not preferred in acute cases due to longer scanning times and limited availability in emergency settings.

OSPH can mimic conditions like orbital cellulitis, subperiosteal abscess, vascular lesions, or orbital tumors such as rhabdomyosarcoma, requiring careful differentiation. These can present with proptosis and orbital displacement but differ in clinical course. Accurate distinction relies on history and associated systemic or localized findings. Imaging is essential for diagnosis, distinguishing OSPH from infectious or neoplastic causes.

Complications associated with SGH involving the orbit include elevated intraocular pressure, ophthalmoplegia, corneal exposure leading to ulceration, and compressive optic neuropathy [1]. Several reports have noted a delay between the initial trauma, the development of the SGH, and the onset of orbital symptoms. Healthcare providers managing pediatric SGH cases should remain vigilant for potential orbital involvement and monitor patients closely until the hematoma fully resolves [7].

The management of orbital subperiosteal extension of a SGH begins with stabilizing the patient, including managing airway, breathing, and circulation, followed by imaging to assess the extent of the hemorrhage and orbital injury. In this case, a CT scan revealed an extensive subgaleal collection and a left orbital subperiosteal hematoma with inferior displacement of the eyeball. Conservative management is appropriate for small hemorrhages without major complications, focusing on observation and pain control with acetaminophen while avoiding NSAIDs to prevent worsening bleeding [6,8,9]. Surgical intervention, as performed in this patient, is necessary for significant orbital involvement and hematoma evacuation. Through bilateral linear frontal and parietal stab incisions, the subgaleal blood was evacuated, and sub-brow incisions were made to remove blood clots from the extraconal orbit. In severe cases, emergency measures like lateral canthotomy may be needed to relieve pressure [1,10].

Close follow-up is essential to monitor for complications such as infection, persistent bleeding, or reaccumulation of blood in the subperiosteal space, and to ensure hemorrhage control from the subgaleal source. Multidisciplinary management, involving coordination between ophthalmologists, radiologists, and emergency staff, is critical for effective treatment of these serious complications.

Conclusion

SGH with orbital extension are rare but potentially vision-threatening complications of head trauma. Early imaging, prompt recognition, and multidisciplinary management are key to ensuring optimal patient outcomes. Awareness of this condition among emergency physicians, ophthalmologists, and radiologists is essential for timely diagnosis and intervention, ultimately preventing permanent visual impairment.

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