LETTER TO THE EDITOR

Orbital Antiobioma: A Rare Sequela of Acute Rhinosinusitis

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ABSTRACT

Aim and objective: To emphasize the infrequent scenarios associated with orbital complications of rhinosinusitis.

Background: Orbital sterile collections leading to functional limitation including diplopia can occur in patients with inadequately treated rhinosinusitis and require timely detection followed by definitive management.

Case description: We present a case of a previously healthy male with sudden onset left eye proptosis and diplopia of 2 weeks duration referred after endoscopic sinus surgery. Contrast-enhanced magnetic resonance imaging confirmed an organized collection with rim enhancement in the inferior orbit. Endoscopic drainage of the collection along with a microbiological and histopathological examination of the specimen was done. The patient had immediate postoperative alleviation of symptoms. Specimen culture revealed no microbiome growth which was suggestive of a sterile collection or an antibioma. A regular follow-up for a duration of 5 months showed no evidence of residual disease postprocedure and complete recovery.

Conclusion: Adequate drainage of the sinuses and orbital abscess with antibiotic coverage during initial surgery with prompt imaging and also ruling out fungal etiology would best treat the orbital complications of acute rhinosinusitis.

Clinical significance: Orbital complications of acute rhinosinusitis can be persistent despite treatment and should arise suspicion of residual or recurrent disease. Fungal disease should be ruled out and prompt imaging is helpful in diagnosis. Endonasal endoscopic surgery whenever feasible gives the best results.

Keywords: Acute rhinosinusitis, Antiobioma, Diplopia, Endoscopic orbital surgery, Functional endoscopic sinus surgery, Orbital abscess, Proptosis.

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BACKGROUND

Orbital complications in the setting of acute rhinosinusitis are fairly common across all age groups.1 Depending on the anatomical location, patients can present with proptosis, lid swelling, diplopia due to limitation of ocular movements, and/or vision deterioration due to optic nerve compression. Mixed bacterial infections are most common; a fungal etiology, though common in immunocompromised patients, may be rarely seen in immunocompetent patients as well. Orbital fungal disease is often misdiagnosed or not suspected and remains a challenge.2 Management includes imaging with computed tomography (CT) to delineate the extent of orbital and sinus involvement. This is followed by abscess aspiration or a nasal smear for microbiological evaluation. Initial medical treatment with broad-spectrum antimicrobials is started which are then tapered as per culture and sensitivity reports. Ruling out fungal etiology in this setting is crucial which would mandate anti-fungal coverage. Guidelines for surgical management are established and the procedure may comprise of endoscopic sinus surgery with or without external drainage of the orbital abscess. Subperiosteal orbital abscesses in an adult usually warrant surgical drainage as they are prone to developing complications including rapid clinical deterioration, intracranial extension, cavernous sinus thrombosis, and vision loss.3-4 Inadequate treatment of the disease—injudicious antibiotic therapy or inadequate surgical drainage slows down recovery and may result in an antibioma formation leading to mass effect.5-6 We present a case of an antibioma in a previously healthy male with sudden onset left eye proptosis and diplopia of 2 weeks duration. The case report adheres to the principles of the Declaration of Helsinki and patient consent was obtained for use of clinico-radiological images.

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CASE DESCRIPTION

A 26-year-old previously healthy male complained of sudden onset, progressive painful proptosis of the left eye associated with diplopia for the past 2 weeks. Computed tomography scan showed homogenous soft tissue density in bilateral maxillary sinuses, left ethmoid sinus, and left orbit suggestive of orbital cellulitis secondary to rhinosinusitis. Personal history ruled out any drug addiction and systemic evaluation was unremarkable with no evidence of immunodeficiency. The patient gave a history of surgery at a local hospital 8 days before the presentation. Surgical records were suggestive of bilateral middle meatal antrostomy and left-sided functional endoscopic sinus surgery (FESS). After...
the initial surgery, there was a partial reduction in proptosis but the patient continued to have orbital pain and persistent diplopia, and thus presented to the ophthalmology emergency of our institute. An ophthalmologic evaluation revealed a visual acuity of 6/6 in the right eye (OD) and 6/24 in the left eye (OS) and a left eye abaxial proptosis (up and forward) of 4 mm on Hertle’s exophthalmometry. Ocular motility examination revealed restriction in medial, superior, and inferior gazes with left eye exotropia in primary gaze (Fig. 1A). On palpation, a tender firm mass was noted along the inferior orbital rim with surrounding erythema. A repeat CT imaging was ordered and was suggestive of a subperiosteal abscess in the inferior quadrant of the left orbit. Percutaneous drainage with a wide bore (17 Gauge) needle was attempted but did not yield any aspirate. In view of non-response to anti-bacterial antibiotic therapy and persistent proptosis, a fungal etiology was suspected and a magnetic resonance imaging (MRI) of orbit with a sequence for fungal pathology was sought. Magnetic resonance imaging confirmed the presence of a well-localized, organized collection with rim enhancement in the inferior quadrant of the left orbit with indentation of the inferior rectus associated with loss of fat planes and mild adjoining inflammation (Figs 2A and B). The corresponding wall of the ipsilateral maxillary sinus did not show significant mucosal hypertrophy. The lesion was not hypointense on T2-weighted images, making fungal etiology less likely. A provisional diagnosis of orbital abscess with a differential of antibioma was kept. The patient was taken up for endoscopic endonasal drainage of the antibioma. The transorbital approach was not preferred as the previous FESS had opened up the maxillary antrum and ethmoids and a surgical corridor for accessing the collection already existed. An inferomedial orbital decompression was performed. Intraoperative findings included black crusting overlying the sinonasal mucosa, yellowish discoloration of the orbital floor with a smooth bulge medial to the infraorbital nerve (Figs 3A and B). On incising the periorbita over the bulge (Fig. 3C), approximately 25 mL of pus was drained which was sent for microbiological examination. The inferior rectus muscle was noted to be healthy (Fig. 3D). The black crustous overlying the mucosa and surrounding unhealthy periorbita were removed and subjected for microbiological and histopathological examination, respectively. Postoperatively, on day 1, there was a significant improvement in proptosis. The bacterial and fungal culture of the pus was sterile and the histopathology of unhealthy periorbita revealed non-specific inflammation. The microbiological yield from the black crusting showed septate hyphae on KOH mount and Aspergillus flavus on fungal culture. In view of expedited resolution of clinical symptoms, a significant reduction in proptosis, adequate surgical debridement achieved during the procedure, and absence of microbiological yield from the pus, a decision was taken to discontinue all antibiotics and withhold empirical antifungal therapy. Clinical surveillance of eye status with a weekly endoscopic examination of the operated site was done. At 2-week follow-up, the patient had residual left exotropia and diplopia but proptosis had reduced significantly (Fig. 1B). A contrast MRI showed no residual disease/collection (Figs 2C and D). The final follow-up visit at 5 months showed complete recovery of proptosis, absence of diplopia, and full restoration of extraocular motility (Fig. 1C).

**Discussion**

Orbital involvement may result from direct extension of pathology in patients of rhinosinusitis. Conversely, up to 75–78%, of orbital cellulitis can be attributed to rhinosinusitis. The initial surgery, there was a partial reduction in proptosis but the patient continued to have orbital pain and persistent diplopia, and thus presented to the ophthalmology emergency of our institute. An ophthalmologic evaluation revealed a visual acuity of 6/6 in the right eye (OD) and 6/24 in the left eye (OS) and a left eye abaxial proptosis (up and forward) of 4 mm on Hertle’s exophthalmometry. Ocular motility examination revealed restriction in medial, superior, and inferior gazes with left eye exotropia in primary gaze (Fig. 1A). On palpation, a tender firm mass was noted along the inferior orbital rim with surrounding erythema. Repeat CT imaging was ordered and was suggestive of a subperiosteal abscess in the inferior quadrant of the left orbit. Percutaneous drainage with a wide bore (17 Gauge) needle was attempted but did not yield any aspirate. In view of non-response to anti-bacterial antibiotic therapy and persistent proptosis, a fungal etiology was suspected and a magnetic resonance imaging (MRI) of orbit with a sequence for fungal pathology was sought. Magnetic resonance imaging confirmed the presence of a well-localized, organized collection with rim enhancement in the inferior quadrant of the left orbit with indentation of the inferior rectus associated with loss of fat planes and mild adjoining inflammation (Figs 2A and B). The corresponding wall of the ipsilateral maxillary sinus did not show significant mucosal hypertrophy. The lesion was not hypointense on T2-weighted images, making fungal etiology less likely. A provisional diagnosis of orbital abscess with a differential of antibioma was kept. The patient was taken up for endoscopic endonasal drainage of the antibioma. The transorbital approach was not preferred as the previous FESS had opened up the maxillary antrum and ethmoids and a surgical corridor for accessing the collection already existed. An inferomedial orbital decompression was performed. Intraoperative findings included black crusting overlying the sinonasal mucosa, yellowish discoloration of the orbital floor with a smooth bulge medial to the infraorbital nerve (Figs 3A and B). On incising the periorbita over the bulge (Fig. 3C), approximately 25 mL of pus was drained which was sent for microbiological examination. The inferior rectus muscle was noted to be healthy (Fig. 3D). The black crustous overlying the mucosa and surrounding unhealthy periorbita were removed and subjected for microbiological and histopathological examination, respectively. Postoperatively, on day 1, there was a significant improvement in proptosis. The bacterial and fungal culture of the pus was sterile and the histopathology of unhealthy periorbita revealed non-specific inflammation. The microbiological yield from the black crusting showed septate hyphae on KOH mount and Aspergillus flavus on fungal culture. In view of expedited resolution of clinical symptoms, a significant reduction in proptosis, adequate surgical debridement achieved during the procedure, and absence of microbiological yield from the pus, a decision was taken to discontinue all antibiotics and withhold empirical antifungal therapy. Clinical surveillance of eye status with a weekly endoscopic examination of the operated site was done. At 2-week follow-up, the patient had residual left exotropia and diplopia but proptosis had reduced significantly (Fig. 1B). A contrast MRI showed no residual disease/collection (Figs 2C and D). The final follow-up visit at 5 months showed complete recovery of proptosis, absence of diplopia, and full restoration of extraocular motility (Fig. 1C).

**Discussion**

Orbital involvement may result from direct extension of pathology in patients of rhinosinusitis. Conversely, up to 75–78%, of orbital cellulitis can be attributed to rhinosinusitis.
Chandler classified the orbital involvement in five stages—preseptal cellulitis, orbital cellulitis, subperiosteal abscess, orbital abscess, and cavernous sinus thrombosis. Initial treatment includes broad-spectrum antibiotics and supportive therapy. Most patients show a good response to medical management, especially in the pediatric population. Subperiosteal orbital abscesses in an adult usually warrant surgical drainage as they are prone to developing complications.

Endoscopic sinus surgery and endoscopic drainage of abscess via internal ethmoidectomy and maxillary antrostomy are recommended as the treatment of choice for medial and inferior orbital abscesses secondary to rhinosinusitis. Inadequate treatment of the disease may result in an antibioma formation leading to mass effect and persistence of symptoms, as seen in our case. Despite undergoing endoscopic sinus surgery, our patient was symptomatic. Imaging confirmed a well-localized lesion in the inferior orbit resulting in a mass effect on the inferior rectus muscle. This caused persistence of painful proptosis, limitation of ocular movement, and diplopia. Despite tailored antibiotic therapy, the patient did not show any improvement. Imaging and initial surgical tissue evaluation were not corroborative with fungal disease. On CT scan, fungal sinus disease appears heterogeneous due to a combination of the following factors: trace metals like manganese, presence of fungal hyphae, elevated protein, and decreased water content of sinonasal secretions. Magnetic resonance imaging findings include non-enhancing, hypointense turbinates, known as the “black turbinate sign” and obliteration of the nasopharyngeal planes. Within the sinuses, there may be variable intensity on T1-weighted and hypointensity on T2-weighted images. There is a loss of contrast enhancement of the sinonasal mucosa and inflammatory changes in the extraocular fat and muscles. Magnetic resonance imaging in our patient was not suggestive of fungal disease. It helped identify a persistent, limited, well-organized antibioma like collection in the inferior orbit. Repeat endoscopic surgical drainage enabled us to adequately address the residual disease and resulted in a successful outcome without the need for further antibiotics or antifungal therapy. Furthermore, the surgical tissue samples were not confirmatory for ongoing invasive fungal disease, thus making the diagnosis of an antibioma more likely.

**Conclusion**

In our experience, this is a rare case of inadequately treated acute rhinosinusitis with an orbital abscess which led to the formation of a well-organized sterile orbital collection leaving the patient symptomatic. Even though the fungal disease was suspected, the clinic-radiological features guided us for prompt surgical drainage. Injudicious use of antibiotics and inadequate surgical drainage may result in the formation of such sterile collections which may not respond to further medical therapy. Timely identification, close

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**Figs 3A to D:** (A) Functional endoscopic sinus surgery (FESS) sinus cavity with medialized middle turbinate, a wide middle meatal antrostomy, and ethmoidectomy. Orbital lamina is completely exposed and a collection with surface discoloration is noted on the floor of the orbit. A black area of crusting is also noted in the overlying sinus mucosa (arrow); (B) Inferomedial orbital decompression exposing the periorbita overlying the antibioma. The red arrow points to the infraorbital nerve and the black arrow points to the area of the maximal bulge; (C) Periorbital incision and drainage of pus; (D) Healthy inferior rectus muscle and complete drainage of the collection.
interdepartmental working, and appropriate surgical management are imperative for a complete recovery and a successful outcome.

**Clinical Significance**

Persistent symptoms despite medical and surgical treatment in patients with orbital cellulitis secondary to rhinosinusitis should arise suspicion of residual or recurrent disease. Injudicious use of antibiotics and inadequate surgical drainage of the diseased paranasal sinuses and an orbital abscess may result in the formation of an orbital antibioma which may not respond to further medical therapy. Ruling out a fungal etiology even in an immunocompetent host is mandatory to execute appropriate treatment options. Timely identification of the persistent disease using repeat imaging is useful. Resorting to endonasal endoscopic drainage of an orbital collection through a previously operated sinus cavity keeps it minimally invasive, adequate, and safe.

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