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Case Report

Endoscopic drainage of superior subperiosteal orbital abscess

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Abstract. Subperiosteal abscess (SPA) complicating sinusitis is commonly located lateral to the lamina papyracea. There are multiple routes of spread from ethmoidal sinus into subperiosteal space and direct spread through the thin lamina papyracea is one of the routes. Superiorly located SPA is traditionally drained by open approach. We report a 56-year-old man with right SPA located in the superior orbital roof with medial extension secondary to frontal sinusitis successfully drained endoscopically avoiding additional external skin incision and achieve a complete evacuation of abscess without evidence of recurrence on follow up at 1 year.

Key words: Orbit, superior subperiosteal abscess, sinusitis, endoscopic endonasal

1. Introduction

Orbital complication arising from acute rhinosinusitis was estimated to be 74-85% (1). The most common form of suppurative postseptal orbital complication of rhinosinusitis was subperiosteal abscess (SPA) with the reported prevalence of approximately 12-17% (2,3). Although the prevalence has decreased with the advent of antibiotics, untreated SPA or orbital complication of rhinosinusitis may lead to serious complication and even death (4). SPA frequently occurs lateral to the lamina papyracea (5). We report a case of 56- year-old man with SPA located in the superior orbital wall which was drained endoscopically. The location and drainage of SPA without the need for external approach is uncommon.

2. Case report

A 56-year-old man, a chronic smoker with underlying chronic rhinosinusitis with nasal polyposis presented with inability to open right eye for one day and proptosis noted upon waking up from sleep. The proptosis worsened and was associated with throbbing pain, headache and profound reduced vision over the right eye. There was upper respiratory tract infection that occurred one week prior to the onset of proptosis and he did not seek any medical treatment. He is non diabetic or immunocompromised and was not on any long term use of steroid. He had bilateral congenital cataract and both eye was operated at 12 years of age. Both his eyes were aphakic and rely on his right eye for vision.

Initial examination showed that he was afebrile. The right eye was proptosed with the Hertel opthalmometer of 21mm and 12mm on his left eye. The conjunctiva was injected and chemosed with evidence of exposure keratopathy at the inferior part of cornea (Figure 1). There was presence of external opthalmoplegia. The right eye visual acuity was 1/60 and the left eye perceived to light only. The intraocular pressure (IOP) was 67mmHg.

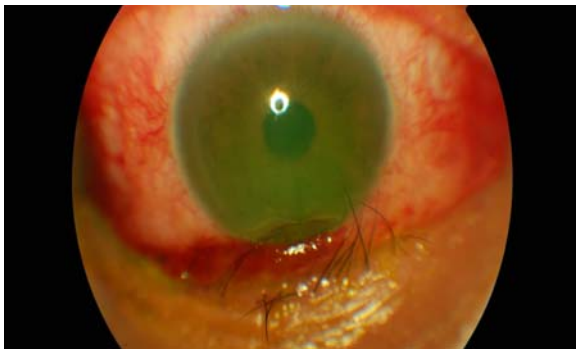

Fig. 1. Anterior chamber examination of the right eye with exposure keratopathy at the inferior part of cornea.

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Rigid nasoendocopy revealed a right Grade II nasal polyp and polypoidal medial surface of middle turbinate. There was pus noted from the right osteomeatal complex region. There were left Grade II nasal polyp arising from anterior ethmoid sinuses. No pus was noted from left nostril. Dental evaluation by the Oromaxillofacial team did not suggest infection arising from dental origin.

He was empirically started on broad spectrum intravenous ceftriazone and metronidazole. An urgent computed tomography (CT) of orbit and paranasal sinuses revealed frontoethmoidal sinusitits and a large subperiosteal abscess (SPA) in the roof of the right orbit as shown in Figure 2. Haematological examination showed a raised white cell count with predominant neutrophils. The random blood sugar was in normal range. The Hepatitis B, venereal disease research laboratory (VDRL) and HIV screening were negative.

He underwent an emergency endoscopic sinus surgery under general anesthesia. Nasal polypectomy was performed followed by medial meatal antrostomy, complete ethmoidectomy and frontal sinosotomy. The lamina papyracea was removed and elevation of the periosteum was extended laterally along the roof of orbit exposing the superior SPA which was drained and gentle irrigation performed using normal saline. The nasal polyps and the orbital abscess wall were sent for histopathological examination and revealed inflammatory nasal polyps and abscess wall respectively. No bony specimen was sent for histopathological examination. Right conjunctival flap advancement was performed for the exposure keratopathy by the opthalmologist. The conjunctival flap was advanced to cover 1/3rd of the inferior cornea to stabilize the corneal thinning and prevent progression of corneal ulceration.

The pus obtained intraoperatively from the superior SPA cultured pseudomonas aeruginosa and was sensitive to ciprofloxacin. He was not placed in isolation. However, standard precautions were observed while handling the patient. He completed one week of intravenous ceftriazone and metronidazole and was later started on intravenous ciprofloxacin once the result of pus culture and sensitivity testing was obtained. He was subsequently given oral cefuroxime for a week and oral ciprofloxacin for another 2 weeks following advice from the infectious disease team. He was reviewed in the

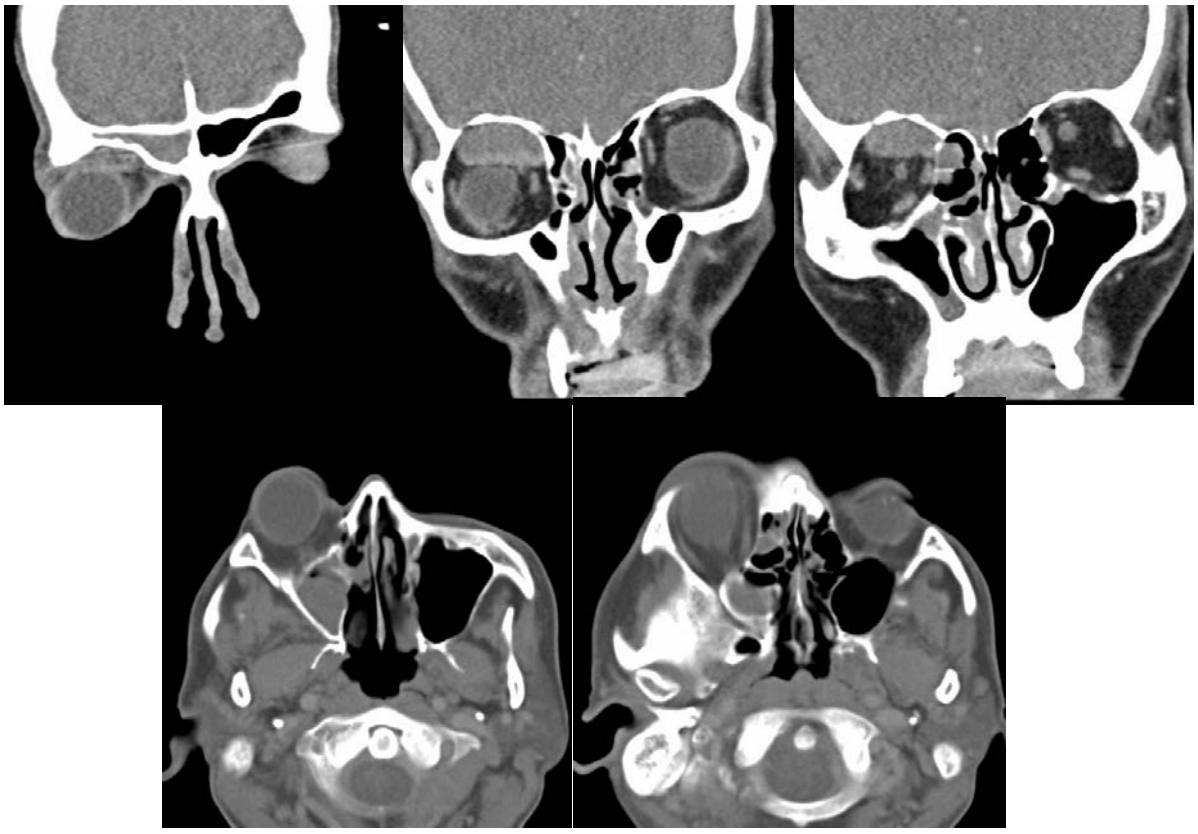

Fig. 2. Coronal and axial computed tomography (CT) of paranasal sinuses and orbit showing right proptosis and superior subperiosteal abscess.

clinic two weeks post operatively and the proptosis had improved tremendously and he is able to read big letters. The opthalmoplegia resolved and the vision had improved to 6/36. There was no evidence of recollection after 1 year of follow up.

3. Discussion

Subperiosteal abscess (SPA) is an abscess collection in a potential space that lies between the periorbita and the bony orbital wall. SPA is frequently associated with ethmoid rhinosinusitis alone or in association with maxillary sinusitis (6). SPA is rarely associated with frontal rhinosinusitis unless occurs as part of a pansinusitis. The thin lamina papyracea that separates the orbit from the ethmoid sinus allows easy and direct spread of infection. Apart from this, the periorbita that covers the internal orbit is loosely attached except at the orbital suture lines and the orbital rims. SPA collected within the subperiosteal space is limited by the attachment of the periorbita to the fronto-ethmoidal suture line. This explains the reason why medial SPA is the most common site of SPA (3,5).

Ragab and Samaka (7) had postulated that orbital SPA is similar to subperiosteal abscess associated with osteomyelitis of bone all over the body. In their series of 8 patients with SPA, the histopathological bone examination revealed bony osteitis and sequestrum in both bones of the bulla and lamina papyracea.

The location of the SPA was described based on the medial axis of the orbit on coronal and axial computed tomography of paranasal sinuses (8). Pure superolateral or superiorly based extraconaI SPA is uncommon. Some of the superolateral or superiorly located SPA are extension from medial SPA or recollection after inadequate medial SPA drainage. A 4 year review reported five cases of medially located SPA with superolateral extension (9). It was Pond and Berkowitz (5) that reported a case of pure superolateral based SPA.

In superior or superolateral SPA, the source of infection spreads from the frontal sinus to the orbit. The abscess collected superiorly in the orbit is in a dome shaped configuration, limited medially by the attachment of periorbita to the frontoethmoidal suture line. The infection from the frontal sinus spread through congenital or acquired bony dehiscence. The other possible route of spread is through local thrombophlebitis or thromboemboli along the valveless venous system (8). Williamson-Noble pointed out three areas of bony dehiscence in the frontal sinus. The dehiscences are behind the trochlear fossa, behind the supraorbital notch and at the junction of the middle and outer thirds of the sinus (10).

The management of SPA requires a multidisciplinary approach by the ophthalmologist, radiologist, otolaryngologist along with good quality computed tomography of the paranasal sinuses and orbit, intravenous antibiotic and surgical drainage. The treatment for SPA is controversial. Most surgeons agree that presence of abscess on CT scan warrants surgical drainage. Progression of orbital signs, failure of improvement after 36 to 48 hours of intravenous antibiotics, proptosis greater than 5mm, visual acuity less than 20/60, signs of systemic manifestation, clinical deterioration, older age group and immunocompromised patients are the other indications for surgical drainage (3,8,11). Some authors advocate immediate drainage of superior SPA because of the rapid progression of the infection towards an intracranial complication (12). SPA in the only eye with vision warrants an emergency drainage without waiting for the results of medical treatment as it can lead to unfavorable outcome such as blindness. Some authors' advocates the initial treatment of SPA with intravenous antibiotics despite presence of SPA on CT scan. The authors' reasons for surgical drainage are significant complications rate of up to 20% and visual loss rate of 14-33% (13). Apart from this, the orbital periosteum forms a strong barrier confining the SPA and allows resolution of the abscess during conservative treatment (13). Series of cases by different authors also showed good response of medial SPA to medical therapy alone (14).

Undoubtedly, failure of medical therapy warrants surgical drainage. Recent study predicted the factors that influence the choice of approaches either endoscopically or external approach. SPA with minimal extraocular muscles involvement on radiographic images could be approached endoscopically. Medial rectus, superior rectus and superior oblique muscles involvement require external approach (8). There are disadvantages of the external approaches resulting in unsightly scar, facial or eyelid edema and longer hospital stay (15).

The position of SPA also determines the route of surgical drainage (8). Medial SPA is drained endoscopically by performing complete ethmoidectomy with removal of lamina papyracea to allow drainage of abscess. However, many authors prefer to drain superolateral or superior SPA by external approach or combine endoscopic-external approach (9,15,16). In our case with superior SPA, the disease sinuses were

addressed endoscopically. The lamina papyracea and the roof of ethmoid cavity were skeletonized to decompress the orbit and drain the superior SPA. We consider that superior SPA can be approached endoscopically and there is little lateral extension. We agree with Tanna et al. (9) that SPA extended superolateral necessitated an open approach. Clinicians should be aware of the different variation of SPA and the different operative approach best suited for the patient yet pose as little complications for the patient.

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