Subperiosteal Hematoma of the Orbit Associated with Sinusitis

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Subperiosteal hematoma of the orbit is a rare but well-recognized entity, usually caused by trauma. Two cases of subperiosteal hematoma associated with sinusitis are presented. A 44-year-old woman experienced the sudden onset of proptosis, and decreased visual acuity. Computed tomographic scanning and magnetic resonance imaging revealed a frontoethmoidal mucocele and a biconvex mass in the upper part of the left orbit. The mucocele was drained during nasal endoscopic surgery and the subperiosteal hematoma was evacuated during superior orbitotomy. A 42-year-old man had a headache and proptosis. Computed tomographic scan revealed sinusitis and subperiosteal orbital hematoma of the left orbit. Subperiosteal orbital hematoma associated with sinusitis is extremely rare but should be suspected in a patient with acute onset of proptosis in whom computed tomographic scanning reveals paranasal sinusitis.

Key words: orbit, paranasal mucocele, proptosis, sinusitis, subperiosteal hematoma

INTRODUCTION

Subperiosteal hematoma of the orbit occurs infrequently, which may be divided into traumatic,1-2 congestive,3 spontaneous,4 and the conditions associated with underlying systemic diseases5 or sinusitis.6-8 Subperiosteal hematoma associated with sinusitis has been reported rarely6-8 and the condition with paranasal mucocele has been reported only once9 as far as we know. In that case, frontal sinus mucocele extended into the orbit through bone erosion and was accompanied by bleeding. We present two cases of subperiosteal hematoma associated with sinusitis. In these cases of ours, we have a case of subperiosteal hematoma coexisting but not directly connected with frontoethmoidal sinus mucocele.

CASE REPORTS

Case 1

A 44-year-old woman visited our clinic complaining of proptosis of the left eye; it had occurred three days previously and was accompanied by pain and decreased visual acuity. For ten days prior to visiting our clinic she had had a headache and symptoms of myalgia and then developed periorbital swelling and fever (Fig. 1). She had a history of acupuncture of the forehead, though this had not penetrated the orbit. There was no history of trauma and nothing remarkable in her past medical history. On ocular examination, visual acuity was corrected to 20/20 in the right eye, counting fingers before 20 cm in the left. The intraocular pressure was 12 mmHg in the right eye and 26 mmHg in the left. Hertel exophthalmometry demonstrated 9.5 mm of proptosis in the left eye, which was severely limited in all directions of gaze. There was periorbital edema and erythema, with
downward displacement of the globe. Chemosis and injection were present in the left eye. The pupils were isocoric but had relative afferent pupillary defect in the left eye. Funduscopic examination revealed choroidal folds in the superior portion and marked edema of the disc.

Computed tomographic scanning revealed a small bony defect in the medial wall of the left orbit, and on contrast injection, enhancement of the orbital mass was heterogeneous; the non-enhanced portion was in the superior aspect and the enhanced solid portion in the inferior (Fig. 2). Magnetic resonance imaging demonstrated a biconvex mass in the superior portion of the left orbit; its signal was intermediate on T1- and very high on T2-weighted images in the upper portion of the mass, and high on T1- and intermediate on T2-weighted images in the lower portion (Fig. 3). These features were compatible with a subacute orbital subperiosteal hematoma. There was also an expansile mass in the left frontoethmoid sinus, low signal on T1- and intermediate on T2-weighted images; these findings were different to those of the orbital subperiosteal mass, and it was thus diagnosed as mucocele.

By means of endoscopic surgery, the mucocele was evacuated and the content was submitted for microbial culture. A suction tip was inserted through the bony defect in the medial orbital wall, but only orbital fat was extracted. The subperiosteal orbital mass was not connected directly with the mucocele. A superior orbitotomy was performed and dark blood was evacuated; no tumor or purulent material was found. To continue draining blood, a tube was inserted into the subperiosteal space (Fig. 4).

The postoperative course was uneventful. Not until day 9 had the amount of drainage decreased from more than 10cc to less than 1cc per day. Ocular examination on postoperative day 9 revealed continuing periorbital edema, 4.5 mm exophthalmos, and corrected visual acuity of 20/40 in the left eye. No microorganism was found in culture of the content of the mucocele and subperiosteal hematoma, and the drain was removed on postoperative day 9. Ocular examination 6 weeks after surgery showed that vision had been corrected to 20/25; in addition, positive afferent pupillary defect, normal extraocular motility, and 2 mm exophthalmos were noted. Computed tomographic scanning showed curvilinear band-shaped soft tissue density in the superior portion of the orbit (Fig. 5). Four months after surgery, visual acuity recovered
Fig. 3. (Case 1) A. T1-weighted magnetic resonance imaging demonstrated a hypointense mass in the frontal sinus. A large lenticular orbital mass is compressing the optic nerve and eyeball, which shows intermediate signal intensity in the upper portion and high signal intensity in the lower. B. T2-weighted imaging shows an ethmoid sinus mass of intermediate signal intensity. A very high signal is seen in the superior portion, and an intermediate signal in the inferior.

Fig. 4. (Case 1) This photograph, 7 days after surgery, shows improvement with a drain.

Fig. 5. (Case 1) Six weeks after surgery, a coronal computed tomographic scan reveals resolved hematoma in the superior portion of the orbit.

to 20/20, and four months later computed tomographic scanning showed no subperiosteal density or other abnormalities.

Case 2

A 42-year-old man had a headache and proptosis of the left eye for two days. Ten years earlier, he had undergone sinus surgery (Caldwell-Luc antrotomy) for sinusitis at another hospital, but he had no history of trauma, clotting disorders, vascular disease, or hypertension. On ocular examination, visual acuity was corrected to 20/20 in the right eye and 20/40 in the left and intraocular pressure was 15 mmHg in the right eye and 35 mmHg in the left. Hertel exophthalmometry represented 11 mm of proptosis in the left eye and there was marked restriction of ocular movement of the left eye in all directions. There was periorbital edema and downward displacement of the globe and conjunctival chemosis of the left eye. Examination of the fundus showed no papilledema or other abnormalities. The patient had neither leukocytosis nor bleeding tendency.

Computed tomographic scanning revealed a lenticular mass displacing intraorbital structures inferiorly in the superior portion of the left orbit and a soft tissue density in ethmoid, maxillary sinus and part of nasal cavity (Fig. 6).

An endoscopic sinus surgery was performed and purulent discharge was evacuated from the maxillary sinus and retention cyst in the nasal cavity. A superior orbitotomy was performed and
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Fig. 6. (Case 2) Computed tomographic scan demonstrates a lenticular mass in the superior portion of the left orbit and bilateral opacification in sinus and nasal cavity.

approximately 4.5 ml of blood and clot were removed. No drainage was set up. After operation, there was marked recovery of the visual acuity, intraocular pressure, and restriction of the motility. Exophthalmos decreased gradually for 3 weeks. Culture of the sinus aspirate was positive for Staphylococcus epidermidis and that of subperiosteal hematoma yielded nothing.

DISCUSSION

Most subperiosteal hematomas are post-traumatic, though may arise secondary to many other conditions. In traumatic cases, the condition is due to the mechanical disruption of small vessels under the periosteum, while in congestive cases, the pathogenesis of subperiosteal hematoma is believed to involve the transmission of increased pressure from the adjacent venous network directly to the orbital veins, which lack valves. In the cases of associated sinusitis, phlebitis in the sinus mucosa may extend to veins in the periorbita, resulting in subsequent rupture of the vessels. The resultant orbital hematoma may undergo supplicative changes, producing orbital abscess. In a case associated with mucocele, described by Aoki et al., the preexisting mucocele compressed and destroyed the wall of the orbit, and infection extending to the subperiosteal veins induced rupture of the vessels, finally resulting in acute hemorrhage.

As evidenced by CT scanning and MR imaging, the first case had frontoethmoid mucocele and orbital wall defect; but the mucocele and subperiosteal hematoma were isolated, not as in the case described by Aoki et al. They stated that frontoethmoid mucocele extended directly into the orbit and content of the same nature, namely dark grayish hematoma, was drained from the sinus and subperiosteal space. In our first case, the pathophysiology of the subperiosteal hematoma was thought to be the same as that of cases associated with sinusitis.

Increased intraocular pressure and direct compression of the optic nerve and/or nutrient vessels supplying the nerve might cause decreased vision in subperiosteal hematoma. Although blindness following this condition has been reported, the potential for reversal of severe visual impairment has been emphasized, as in our cases.

The treatment of subperiosteal hematoma depends upon the severity of orbital compression and the nature of combined disease. In patients in whom the amount of hematoma is not significant and visual acuity is unaffected or improving, observation and follow-up without surgery are recommended. Subperiosteal hematoma, when associated with sinusitis, should be managed surgically. Surgical exploration confirms diagnosis, provides drainage, and prevents possible orbital complications.

Needle aspiration has been reported to be the safest and simplest method of surgical management. Several authors, however, have stated that an incisional approach to subperiosteal hematoma has several advantages over needle aspiration. If an incision is made, direct visualization facilitates direct coagulation of actively bleeding vessels and a drain can be inserted to allow continuing drainage of blood. Needle aspiration, on the other hand, would be unproductive, and additional bleeding could be caused.

Subperiosteal orbital hematoma associated with sinusitis is rare but should be suspected in a patient with acute onset of proptosis in whom computed tomographic scanning reveals paranasal sinusitis.
REFERENCES


