Postoperative arachnoid cyst causing visual deterioration following transsphenoidal excision of a pituitary adenoma

Sir,

Acute visual deterioration following endoscopic trans-sphenoidal surgery for a pituitary adenoma could be due to a postoperative hematoma, over-packing of the sella turcica with a fat graft, direct operative trauma to the optic apparatus or due to a vascular compromise. Delayed visual dysfunction is commonly due to tumor recurrence, and rarely due to either chiasmal herniation into a secondary empty sella or a radiation-induced optic neuropathy (if postoperative radiation therapy has been administered).[1-5] In our two patients, visual compromise occurred due to the formation of a suprasellar cystic collection; in one patient, in the immediate postoperative period, and in the other, 4 years after surgery. We discuss the possible mechanisms responsible for the development of these cysts and discuss the methods of diagnosing as well as preventing this postoperative complication.

Our first patient was a 37-year-old man who presented with progressive diminution of vision in both eyes for 6 months. He was able to count fingers at 4 feet in the left eye and at 10 feet in the right with a bitemporal hemianopia. The magnetic resonance imaging (MRI) scan showed a 3 cm Hardy’s grade C cystic pituitary adenoma with an enhancing periphery [Figure 1]. An endoscopic transsphenoidal surgery was performed, the tumor was radically excised and the sella was packed with fat since there was an intraoperative cerebrospinal fluid (CSF) leak. His vision remained unchanged in the immediate postoperative period. When he woke up the next morning, he complained of inability to perceive light with both eyes. His Glasgow Coma Scale (GCS) and extraocular movements were normal. A cranial computed tomography (CT) showed a large cystic collection between the fat graft and the optic chiasm with a peripheral rim of blood [Figure 2]. He underwent an emergency resurgery. As soon as the fat graft was removed, the CSF gushed out under pressure. There was no hematoma seen. Following this, the suprasellar arachnoid was seen pulsating well. The optic chiasma was clearly visualized through the arachnoidal
membrane. Postoperatively, his vision improved to finger counting at 10 feet with both eyes.

The second patient was a 29-year-old man who underwent a transsphenoidal radical excision of a Hardy’s grade C pituitary adenoma at our hospital 4 years ago [Figure 3a-c]. He had an intraoperative CSF leak requiring sellar repair with fat. Regular postoperative MRI scans showed no residual tumor [Figure 3d-f]. He presented to us with diminution of vision (6/12 in the right eye and 6/60 in the left eye with a bitemporal hemianopia) for 6 months. The MRI showed a 3 cm sellar-suprasellar cystic lesion with a cyst wall that was enhancing in some areas [Figure 4a-c].

Figure 3: (a-c) Axial, sagittal and coronal, gadolinium-enhanced preoperative MRI of a 29-year-old man showing a 3 cm Hardy’s grade C solid and cystic pituitary adenoma. (d-f) a 2-year postoperative axial, sagittal and coronal gadolinium enhanced MRI showing the postoperative changes but no recurrence of tumor. There is a small cystic collection in the sella

Figure 4: (a-c) A 4-year postoperative axial, sagittal and coronal gadolinium enhanced MRI showing a 3 cm cystic collection in the sella, extending into the sphenoid sinus below and the suprasellar cistern above with chiasmal compression. There is a scanty and patchy enhancement of the cyst. (d-f) A repeat enhanced MRI performed 3 months following the re-surgery in axial, sagittal and coronal planes showing no residual lesion
At surgery, the sellar floor had ballooned into the sphenoid sinus and on opening the dura, it was discovered that the cyst wall had reached the sellar floor. After drainage of the loculated CSF, we found that the suprasellar arachnoid had receded superiorly and had a small tear in it. There was no tumor in the sella. The compressed adenohypophysis and neurohypophysis had been displaced to the periphery and were probably being represented on the MRI as the enhancing wall of the cyst. We packed the sella with fat, and layered it with fibrin glue. Postoperatively, his vision improved to 6/6 in the right eye and 6/12 in the left. At a follow-up visit after 3-months, the MRI showed no residual lesion or cyst [Figure 4d-f].

The incidence of immediate postoperative visual deterioration following transsphenoidal surgery for pituitary adenomas is about 0.5–2%, the causes being either an intraoperative manipulation of the optic apparatus or a postoperative hematoma.[1-3,6] The visual decline in our two patients was due to a trapped cystic collection between the fat graft and the optic chiasma. The rapidity of CSF collection was different in the two cases resulting in an acute deterioration in one patient and a more delayed collection in the other. It is likely that following repair of the sella with the fat graft, CSF continued to leak from the small arachnoidal tear and was trapped above the fat ultimately compressing the optic chiasm. Over packing of the sella with fat was not the cause of the visual problems since the onset of deterioration of the visual acuity occurred only the next day in our first patient and was significantly delayed in our second patient.

In order to prevent this complication, it is probably best to directly plug the tear in the arachnoid particularly when the defect is small. The bath-plug technique[7] has now been routinely employed for closure of these defects. In this technique, a fat plug with a vicryl suture is introduced into the intradural space. This snug fit of the graft prevents the increased pressure due to CSF leakage from pushing away the graft from the defect. Occasionally, a Valsalva maneuver during surgery helps to determine the stability of the graft.

This report describes a rare complication of transsphenoidal surgery and emphasizes the importance of prompt intervention in reversing the deteriorating vision, both in the acute and the chronic setting.

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References