INTRODUCTION

Cavernous hemangiomas are the most common intraorbital tumors in adults and are the second most common cause of proptosis following thyroid disease. They usually present with painless, unilateral proptosis. Workup includes ophthalmologic examination, as well as computed tomography (CT) or MRI. They are most commonly located at the orbital apex between the optic nerve and the extraocular muscles. They are, therefore, truly intraocular tumors.

Historically, surgery for orbital tumors has been performed almost exclusively through external approaches. Laterally based tumors have usually been accessed through a transcutaneous or transconjunctival lateral orbitotomy. Tumors of the medial corridor required a medial orbitotomy with take down of the extraocular muscles, since the optic nerve precludes access from a lateral approach.

Recently, endoscopic transnasal techniques have been utilized in an attempt to remove orbital hemangiomas with less patient morbidity than conventional approaches.

METHODS AND TECHNIQUE

A retrospective review of seven patients who underwent transnasal endoscopic excisions of orbital hemangiomas by the senior otorhinolaryngologist (RMJ) and ophthalmologist (AF) between 2007 and 2011 was performed.

Surgical Technique

After completion of endoscopic ethmoidectomy, the skeletonized lamina papyracea is opened with a spoon curette. Bone removal extends posteriorly to the sphenoid face, superiorly to the ehtmoid roof and skull base, inferiorly to the orbital floor, and anteriorly to the maxillary line. Using the infraorbital canal as the lateral limit of dissection, the medial orbital floor is down-fractured and removed. The periorbita is then incised and removed to expose the medial orbital fat compartment.

Attention is turned to identification of the medial and inferior rectus muscles. Forced duction testing or directed suture placement around the muscle insertions may be useful to confirm identification if muscles are displaced by the tumor.

Extreme care is necessary to avoid injury to the optic nerve, which usually lies lateral to the tumor (Figure 2). It is important to be aware that orbit structures converge as dissection proceeds posteriorly towards the apex, and the optic nerve may be obscured due to mass effect by the lesion. While complete resection is optimal, orbital decompensation with tumor debulking may be sufficient to alleviate symptoms. The risk of injury to neurovascular structures must be weighed against the feasibility of total excision.

Dissection with blunt instruments such as a curved suction or ball-tipped probe is used to carefully mobilize the tumor. A Blakeleys forceps or similar grasping instrument may be used toatraumatically excise the lesion (Figure 1). We have also found the ophthalmologic cryoprobe® (MIRA, Waltham, MA) to be extremely useful for large tumors (Figure 3). This device has been established as an effective tool for ophthalmologic surgery. The rapidly freezing tip bonds to the tumor surface which can be slippery to grasp with conventional forceps. The frozen tip can instantly be released to minimize trauma or disruption to the capsule. Intranasal packing is not used because of the potential for pressure ischemia on the optic nerve.

RESULTS

The study group consisted of four males and three female patients, with a mean age of 48.8 years. One tumor was an incidental finding during the workup of pulsatile tinnitus. The remainder were diagnosed on MRI scan performed for ocular symptoms. Proptosis and decreased visual acuity were present preoperatively in all seven patients. Dyschromatopsia (4/7) and diplopia (5/7) were also observed.

The average tumor size was 1.74 cm (Table). All tumors were histologically consistent with venous hemangiomas.

Complete tumor resection was achieved in five patients. Two patients underwent subtotal resections in order to limit the amount of traction on the optic nerve. Of the subtotal group, one patient had a concurrent lateral orbitotomy to assist with tumor resection.

Postoperative diplopia was present to some degree in all patients, although it resolved by the second postoperative visit in six patients. One patient was treated with corrective prism lenses, as the double vision was not severe enough to warrant operative eye muscle treatment. Two patients developed enophthalmos. In one case this finding was presented as “silent sinus syndrome” due to negative pressure in an obstructed maxillary sinus. The patient was treated with revision maxillary antrostomy and placement of an orbital floor implant. The second patient developed enophthalmos due to removal of the relatively large tumor and adjacent orbital fat. She is currently being managed with intermittent fat injections. Overall, six of seven patients had complete resolution of their ophthalmologic complaints following surgery.

DISCUSSION

Although most intracranial hemangiomas are asymptomatic and slow growing, significant ophthalmologic deficits may occur due to their anatomic location. Stretching and pressure along the optic nerve can lead to visual field and acuity loss, which mandates surgical extirpation. In all seven patients, endoscopic excision led to stabilization of ophthalmologic symptoms. There were three complications - two patients with enophthalmos and one patient with diplopia. These complications were largely correctable with manual surgical or optometric intervention.

Stamm was the first to demonstrate the feasibility of endoscopic resection of an orbital hemangioma. In a review of the combined experience of the University of North Carolina and the University of Pittsburgh, McKinney et al. described their technique for endoscopic resection in six patients.

The endoscope provides improved visualization with magnification when compared to more traditional, external approaches. Currently, endoscopic resection is only indicated for tumors located in the medial orbit. With large tumors, the insertion of the medial rectus may be detached as is done with an open orbitotomy. However, we have not yet found the need to perform this maneuver in our practice. Additionally, an important concept is that the vast majority of intracranial hemangiomas are benign and slow growing, and therefore partial resection with orbital decompression is an acceptable technique that will likely result in symptomatic improvement. Even if the residual tumor continues to grow, further surgery would be expected to prevent further optic nerve compression.

The cryoprobe is a useful instrument in retinal and corneal surgery, and familiarity with its function may enhance endoscopic resection of hemangiomas and similar lesions. The smooth and delicate capsules of these tumors are sometimes difficult to grasp with standard instrumentation, and the freezing tip of the cryoprobe is ideal as it strongly adheres to the capsule. The manual release function allows facile manipulation of the capsule while reducing risk of rupture.

Nearly all patients in our series experienced complete symptomatic resolution following surgery. Diplopia is not unexpected given the extensive dissection required to mobilize tumors from the orbital apex. It is possible that delayed enophthalmos in two of our patients may have been prevented by reconstruction of the medial orbital wall, although as mentioned, we do not routinely perform this given our experience with orbital decompression.

CONCLUSIONS

This is the largest series of endoscopic intraorbital tumor resections presented to date. This technique has proven to have several advantages over traditional open techniques including more direct access, improved visualization, enhanced cosmesis, and reduced postoperative morbidity. In this series, postoperative enophthalmos and diplopia were render managed. More serious complications such as optic nerve and extraocular muscle injury were not encountered, but remain a real possibility when operating on intracranial tumors of this type. This surgical approach should only be utilized by experienced endoscopic surgeons in conjunction with their ophthalmologic colleagues.

REFERENCES