

Transconjunctival approach for orbital cavernous hemangiomas: a report of 74 cases

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经结膜入路眼眶海绵状血管瘤切除术的研究

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摘要

目的:探讨经结膜入路眼眶海绵状血管瘤切除术的手术方式和注意事项,并观察其疗效及并发症。

方法:采用回顾性方法分析 2007-01/2013-11 的 74 例眼眶海绵状血管瘤患者。术前经 CT 或 MRI 联合彩色多普勒检查确诊。手术全部采用结膜入路,鼻下、颞下及正下方肿瘤采用下穹窿结膜切口,颞上象限的肿瘤采用颞侧结膜入路,鼻上及上方肿瘤采用内上方穹窿结膜入路,暴露后钳夹肿瘤,轻轻娩出瘤体;如肿瘤与周围组织粘连紧密,则采用分步切除的方法:先切除部分瘤体,然后直视下再切除残留的肿瘤。

结果:74 例海绵状血管瘤的术前确诊率达到 100%。肌锥内 58 例(78%),肌锥外 16 例(22%),其中颞上方 12 例(16%),上方 16 例(22%),鼻下、颞下方及正下方 46 例(62%),肿瘤直径 8~59mm,手术全都采用结膜入路,其中下穹窿结膜入路 46 例,颞侧结膜入路 12 例,鼻上方结膜入路 16 例,有 9 例患者采取先摘除 1/3 瘤体,瘤体缩小后,再摘除剩下的肿瘤。8 例患者术后视力下降,其中 6 例术后半年视力恢复。5 例患者术后视力提高,术后无眼球突出,球结膜充血水肿 10 例,1 例患者术后瞳孔不等大,复视 6 例。

结论:经结膜入路手术切除肿瘤适用于除眶尖部以外的所有眼眶海绵状血管瘤,结合直视下分步切除肿瘤法,可有效降低手术风险,提高手术安全性。

关键词:经结膜入路;海绵状血管瘤;眼眶

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Abstract

• **AIM:** To remove orbital cavernous hemangioma by transconjunctival approach, and to examine efficacy and complications of this approach.

• **METHODS:** We retrospectively analysed 74 patients with orbital cavernous haemangiomas between January 2007 and December 2013. Cavernous hemangioma was diagnosed preoperatively by computed tomography (CT) or magnetic resonance imaging (MRI) combined with color Doppler. Patients were underwent conjunctival approach, tumors located in the inferior, inferior lateral, or inferomedial sector using inferior fornix conjunctival incision, tumors located in super-lateral sector using the lateral conjunctival incision, tumors located in the superior and inferomedial sector using the super-nasal fornix conjunctival incision. Following exposure, the tumor was clamped and slowly pulled out. Careful dissection is necessary in case where tight adhesions are present.

• **RESULTS:** The tumors were confirmed to be cavernous hemangiomas, consistent with preoperative diagnosis in 100%. Intraconal location was found in 58 (78%), 16 (22%) cases were in extraconal, including 12 (16%) cases located in superlateral sector, 16 (22%) cases located in superiormedial or superior sector, inferior, inferiorlateral, or inferior locations occurred in 46 (62%) cases. The tumor was 8mm to 59mm in diameter. All cases were underwent conjunctival approach, including 46 patients underwent inferior fornix conjunctival incision, 12 patients underwent lateral conjunctival incision, the supernasal fornix conjunctival incision was used on 16 cases. Nine patients were resected one third of the tumor firstly, then removed the rest. In 8 patients in visual acuity worsened postoperatively, 6 of them recovered after 6mo. Five patient's visual acuity improved. No patient had any residual proptosis, chemosis was occurred in 10 patients. One patient had unequal pupils as a result of a lesion of the ciliary nerve. Diplopia was spontaneously in all 6 patients in whom ocular movements were limited preoperatively, there was no diplopia in the other 68.

• **CONCLUSION:** The transconjunctival approach of the tumor is suitable for all other than the tumour in the orbital apex, resect the whole tumor in a fractional resection way under orthophoria can effectively reduce the operation risk and improve operation safety.

• **KEYWORDS:** transconjunctival; cavernous hemangioma; orbital

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INTRODUCTION

Cavernous hemangioma is the most common orbital benign tumor which is kidney-shaped, plum-colored, integrity, often located in the muscle cone that tends to occur in adulthood. A painless gradually progressive proptosis and visual disturbance are the main clinical signs. Surgical excision of symptomatic cavernomas appears to be the treatment of choice^[1-3]. Lateral orbitotomy refers to temporary removal of the lateral orbital rim was first described by Kronlein in 1888^[4,5]. Dandy in 1921 first reported transcranial orbital surgery to remove orbital tumors^[6]. In 1924 Bourget first reported a method by lateral canthotomy together with a transconjunctival incision^[7,8]. The anterior orbitotomy approach through Lynch or Killian incision is advocated by Kocher. In the 1990s Mir-Salim and Berghaus performed an endonasal microsurgical transthemoid access to remove orbital cavernous hemangioma^[9]. After developing more than 100y, orbital surgical tends to the smallest possible incision, shortest recovery time, none affect of the appearance. The conjunctival approach with its less invasive, shorter operation time, no scar on skin has been widespread in recent years. To explore the advantages and disadvantages of the transconjunctival approach for orbital cavernous hemangioma, we observed the 74 cases in our hospital.

SUBJECTS AND METHODS

This study was approved by Ethics Committee of Daping Hospital and Research Institute of Surgery, the Third Military Medical University, all of the procedures were performed in accordance with ethical approval institutional guidelines.

This retrospective study includes 74 patients with histopathologically proven orbital cavernous hemangiomas between January 2007 and December 2013. Our population was composed of 30 men and 44 women. The mean age of the patients at the time of surgery was 43.55y (SD 11.54, range 20-83y). 35 had the tumor located in the right orbit, and 39 patients had it in the left orbit. The mean maximum diameter of the lesions measured by magnetic resonance imaging (MRI) and/or computed tomography (CT) was 2.2cm (SD 0.8, range 0.8-5.9). Including 2 cases of male patients were multiple orbital cavernous hemangioma, the diameter of two larger tumors were 3.7, 2.0cm (Figure 1).

CT and MRI scans were performed in all cases preoperatively^[10,11], meanwhile combined with color Doppler. Diagnostic criteria are as follows: CT shows a smoothly marginated high density round or oval intraconal mass that densely enhances. MR images showed hypointensity on T1-weighted images and well-defined hyperintensity on T2-weighted images with marked homogeneous enhancement after contrast material administration (Figure 2). Color doppler shows a smoothly marginated homogeneous echo, compressibility, less or no blood flow signal.

Selection Criteria Cases that fulfilled the following inclusion criteria were treated with transconjunctival orbitotomy: 1) Patients with exophthalmos, eye movement disorder, visual impairment; 2) The diameter of tumor is more than 1cm; 3) A preoperative diagnosis of presumed cavernous hemangioma, based on data derived from CT and MRI scans.

Exclusion Criteria 1) Tumors is close proximity to the orbital apex and adhere tightly to the optic nerve; 2) The diameter of tumor is less than 1cm.

Technique All patients were operated on under general anesthesia. Patients are underwent conjunctival approach, tumors located in the inferior, inferiorlateral, or inferiomedial sector using inferior fornix conjunctival incision, tumors located in superlateral sector using the lateral conjunctival incision, tumors located in the super and inferiomedial sector using the supernasal fornix conjunctival incision (Figure 3). Clamps the tumor after exposure, pulling out with rotating movements. If adhesions between the tumor and surrounding tissues were loosen, the tumour can resect directly, if adhesions tightly, first resect 1/2 or 1/3 part of the tumor, reduce the volume, and then clamped the rest of the tumor can easily separate the residual tumors directly (Figure 4).

RESULTS

There were 74 patients in our research, including 30 males and 44 females. In 38 cases, the lesions were located in left orbital, 35 cases occurs in right orbital, and there was 1 case which the tumour occurred in both orbital. All the patients with histopathologically proven orbital cavernous hemangiomas whose preoperative diagnosis rate was 100%. Intraconal location was found in 58 (78%), 16 (22%) cases were in extraconal, including 12 (16%) cases located in superlateral sector, 16 (22%) cases located in superiomedial or superior sector, interior, inferiorlateral, or inferior locations occurred in 46 (62%) cases. The tumor was 8mm to 59mm in diameter. All cases were underwent conjunctival approach, including 46 patients underwent inferior fornix conjunctival incision, 12 patients underwent lateral conjunctival incision, the supernasal fornix conjunctival incision was used in 16 cases. Nine patients were resected one third of the tumor firstly, then removed the rest. The complications were shown in Table 1.

DISCUSSION

Orbital cavernomas represent 10% - 23% of all orbital tumors, though it is a benign tumor, progressive painless proptosis can affect the appearance of patient, slow enlargement leads to compression of the optic nerve, finally need operation^[1-3]. Lateral orbitotomy is a classic technique used traditionally in the management of most intraorbital lesions with established advantages and complications. It efficiency, but it used direct cutaneous access that left an ugly scar, removal of the orbital wall take more damage to the body^[12,13]. Percutaneous anterior approach is relatively less aggressive and traumatic than the lateral orbitotomy, but still affect cosmesis^[14,15]. Transcranial approach is more dangerous

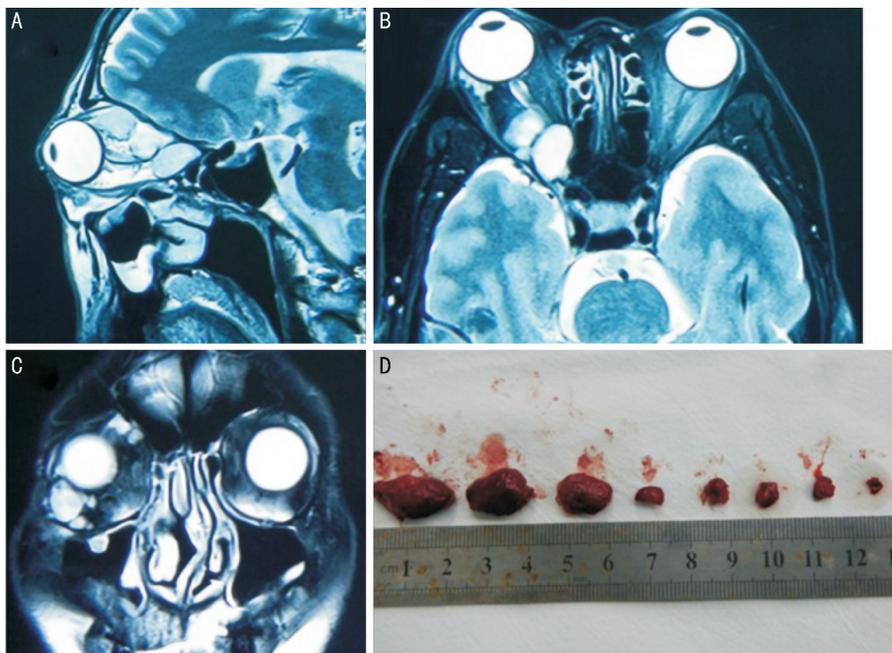


Figure 1 Multiple orbital cavernous hemangioma removed intactly by transconjunctival approach. There were 8 tumours in the right orbit, located in the inferior, medial intraconal, superlateral, superior and supernasal sector A: in Sagittal position 3 tumours were found; B: in horizontal position 3 tumours were found, one of them was in the orbital apex; C: in Coronal position tumours were found located in extraconal; D: the multiple orbital cavernous hemangioma removed intactly by transconjunctival approach.

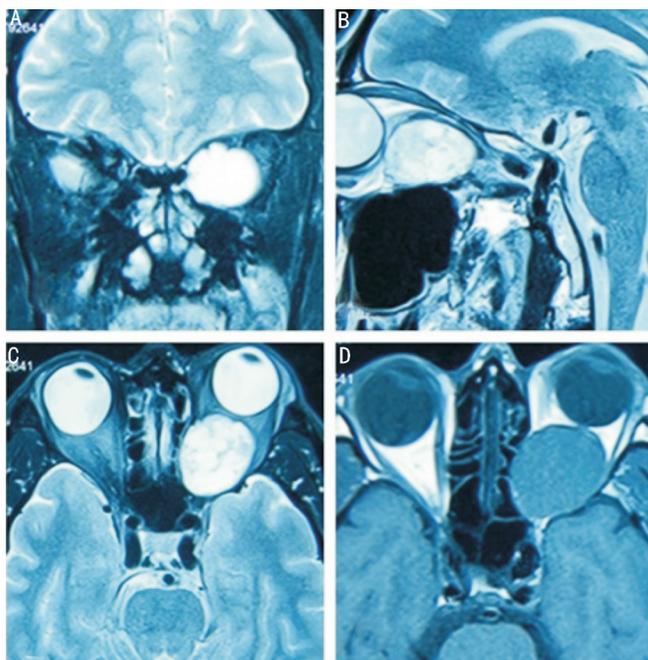


Figure 2 MR images A–C: well-defined hyperintensity on T2-weighted images; D: hypointensity on T1-weighted images.

than the other approach, especially for tumours in the orbital apex or medial to the optic nerve, the operative field is deep and narrow, patients are often difficult to accept^[16,17]. Transendoscopic approach for cavernous hemangioma achieved good results, but it difficult for larger tumor resection^[18,19]. Despite the variety of method, surgical treatment for cavernous hemangioma gradually tends to less invasive, shorter operation time, no scar on skin in recent years.



Figure 3 The picture showing the location of tumour and the incision we were choosed The inferior fornix conjunctival incision (black line), the lateral conjunctival incision (red line), the supernasal fornix conjunctival incision (yellow line).

The conjunctival approach with its hidden incision, no visible scar, less invasive has received many doctor's attention. A360 peritomy was performed by Kiratli at the limbus with additional conjunctival-relieving incisions if needed. The conjunctiva was then retracted and traction sutures were placed under at least 2 rectus muscles to guide the globe in the desired direction to reach the retrobulbar space. For large tumors, it was usually necessary to temporarily disinsert a rectus muscle depending on the location of the tumor. Then the anterior tip of the tumor was exposed. If the tumor was relatively mobile, the anterior portion was frozen with a standard retinal cryoprobe and pulled out gently as described previously^[20,21]. After complete removal, the rectus muscle was reinserted and the conjunctiva was sutured to its normal position.

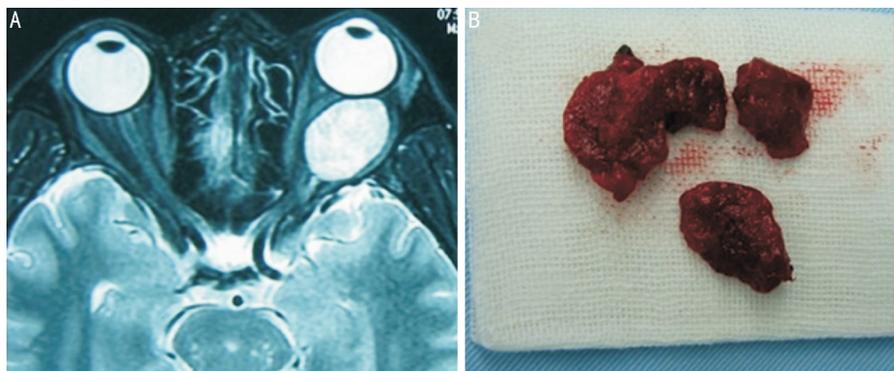


Figure 4 The tumour was resected partly A: the tumour located in the orbital apex; B: the tumour was substep resected.

Table 1 Complications

Clinical signs	No.	Inferior fornix		Supernasal fornix		Lateral conjunctival	
		1wk	6mo	1wk	6mo	1wk	6mo
Conjunctival hemorrhage	74	46	0	16	0	12	0
Vision worsening	8	6	2	2	0	0	0
Ptosis	1	0	0	4	0	0	0
Diplopia	11	4	1	6	0	1	0
Dilated pupil	1	0	0	1	1	0	0
Chemosis	15	12	0	2	0	1	0
Local pain	6	4	0	1	0	1	0

It is easier to damage levator palpebrae muscle which lead ptosis through upper fornix conjunctival approach, because it's near the levator palpebrae muscle, and the temporal conjunctiva approach may damage lacrimal duct. We choose the supernasal, the lateral and lower fornix conjunctival incision, to a certain extent to avoid the injury.

The 74 patients are underwent conjunctival approach, by supernasal, lateral, and lower fornix conjunctival incision, tumors located in the inferior, inferiorlateral, or inferiomedial sector using inferior fornix conjunctival incision, tumors located in superlateral sector using the lateral conjunctival incision, tumors located in the super and supernasal sector using the supernasal fornix conjunctival incision. Following the exposure, the tumor was clamped and slowly pulled out with rotating movements. If adhesions between the tumor and surrounding tissues were tightly, it is better to resect one third of the tumor first, reduce the volume, and the tumor had become smaller when the blood flowed out. It is easier to observe the adhesion between tumors and the surrounding tissue, and can easily separate the residual tumors directly. Though the incision of the conjunctival approach is concealed, but the exposure is poor, operation field is narrow, if adhesion tightly, the separation of the tumor is very difficult. Due to the adhesion of the cavernous hemangioma are much better compared to the other orbital tumors, preoperative diagnosis is very important. CT or MRI scans combined with color Doppler were performed in all cases preoperatively, that preoperative diagnosis rate is basically 100%. In addition, some of the cavernous hemangioma tumors have a bulky nourish vein, separating tumours might rupture the vessels

which could lead to orbital hemorrhage serious and serious vision loss will occur. We are using fractional resection which is easy to observe the vascular on tumors and the adhesion, finally enhance the security of operation, reduce the risk of vision loss.

Through follow-up observation, we think the advantages of conjunctival approach in the treatment of cavernous hemangioma were followed: 1) the incision is less traumatic and conceal; 2) the operation time is short (usually take half an hour) and less complication, less trauma to orbital structures; 3) the method of fractional resection can remove tumors which are large and adhesion tightly, reduce the risk of orbital hemorrhage which leads to vision loss. Disadvantages: 1) not suitable for small tumors located in orbital apex; 2) the supernasal fornix conjunctival incision has the risk of oblique muscle damage.

All in all, the orbital cavernous hemangioma was confirmed by preoperative CT or MRI combined with color doppler examination that the transconjunctival approach combined with fractional resection technique can be applied to the vast majority of orbital cavernous hemangioma.

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