ISSN: 2155-9570

Journal of Clinical & Experimental Ophthalmology

The International Open Access Journal of Clinical & Experimental Ophthalmology

Available online at: OMICS Publishing Group (www.omicsonline.org)

Digital Object Identifier: http://dx.doi.org/10.4172/2155-9570.1000321

Clinical & Experimental Ophthalmology

Lešták et al., J Clin Exp Ophthalmol 2014, 5:1
http://dx.doi.org/10.4172/2155-9570.1000321

Research Article Open Access

Tumors and Pseudotumors of the Orbit and their Surgical Removal

Jan Lešták[1-3]*, Zdeněk Voldřich[1], Daniel Kovář[1], Ladislav Houšťava[1], Jiří Pašta[1], Pavel Voska[1] and Pavel Rozsíval[3]

[1]*Central Military Hospital, Prague, Czech Republic*
[2]*Czech Technical University in Prague, Faculty of Biomedical Engineering, Czech Republic*
[3]*Charles University, Faculty of Medicine in Hradec Králové, Czech Republic*

Abstract

Purpose: To determine the share of malign and benign formations of the orbit and to select their optimum surgical intervention.

Design: Retrospective observation of a case series.

Methods and subjects: The authors evaluated a set of 100 tumors and pseudotumors in 93 patients who were operated on at the Central Military Hospital over the period of 13 years (1982-1994). The average age of patients (56 men and 37 women) was 45 years.

Results: 59 primary orbital tumors, 41 secondary tumors, no metastases observed. There were 27 malign tumors. Most of the 29 benign neoplasms were meningeomas (10) and hemangiomas (9). The rest of the tumors of the orbit (12) were operated for granulomas (4), pseudocholesteatomas (3) and dermoid cysts (3), papilloma of the paranasal sinuses (1) and epidermoid cyst of the orbit (1). There were 32 muco- and pyoceles of frontal sinuses and ethmoid cells. We applied the following surgical methods: anterior and lateral orbitotomy, exenteration and extended exenteration of the orbit, rhinologic surgical techniques, partial and complete transcranial orbitotomy and a combination of several surgical methods. Seven patients operated for malignant neoplasm survived five years after the operation (25.9%). There are no reports on five other operated patients. Recurrence of benign tumors was found three times (10.3%), and once (8.3%) for the rest of tumors. As far as muco- and pyoceles are concerned, no recurrence has been ascertained.

Conclusion: Our set comprised 59 primary orbital tumors, 41 secondary tumors and, metastases were not found. Successful surgical treatment of tumors and pseudotumors of the orbit lies in the exact diagnosis, the choice of convenient surgical methods and appropriate interdisciplinary cooperation. With regard to the small recurrence rate in all tumors and to the time of survival in malign neoplasms, the therapeutic methods we used can be considered as useful and contributing.

Keywords: Tumors and pseudotumors of the orbit; Muco- and pyoceles with propagation into the orbit; Surgical treatment

Introduction

Tumors of orbit are fortunately not a common occurrence in ophthalmology practice. That is why it is more difficult to determine the type of tumor process and appropriate therapeutic approach. It is therefore advisable to direct patients with orbital abnormalities to centers with great experience with such diagnoses. The Central Military Hospital was one of these centers during the evaluation period (1982-1994).

Methods and Subjects

The authors evaluated a set of 100 tumors and pseudotumors in 93 patients who were operated on at the Central Military Hospital over the period of 13 years (1982-1994). The average age of patients (56 men and 37 women) was 45 years.

Four patients had more than one of the conditions mentioned above. The set comprised 56 men and 37 women with an average age of 45 years.

Malign orbital tumors

Most of the total number (27) of malign tumors were baso- and spinocellular carcinomas (10). Carcinomas infiltrated from the skin of eyelids into the orbit. All patients showed deviation of the eye bulb. Due to their penetration into the soft tissues of the orbit, we performed extended exenteration in all cases. Seven patients lived more than three years, three of which lived for 5 years, which is a favorable result. However, it is necessary to consider the fact that one operated patient died of another disease two years after the operation mentioned above and there are no reports on two others. Postoperational irradiation was applied in 5 patients (i.e. half of the total number only). The reasons were as follows: actinotherapy was contraindicated in four cases and one case was not considered as suitable. This decision proved correct as the last mentioned patient has been living for six years since the operation without any recurrence.

Carcinomas of the nose and paranasal sinuses were treated surgically in 8 cases. Six of them were living for more than three years, two for more than 5 years. This group of malign tumors will be discussed in more details hereinafter. In four cases, the eye bulb was deviated before the surgery.

Adenoid cystic carcinoma of the lacrimal gland caused deviation of the eye in all three cases. In all cases of adenoid cystic carcinomas of the lacrimal gland, exenteration of the orbit followed by irradiation was performed in all patients.

***Corresponding author:** Jan Lestak, JL Clinic, V Hůrkách 1296/10, Prague, Czech Republic, Tel: +420 296 186 111; E-mail: lestak@seznam.cz

Received October 14, 2013; **Accepted** January 23, 2014; **Published** January 30, 2014

Citation: Lešták J, Voldřich Z, Kovář D, Houšťava L, Pašta J, et al. (2014) Tumors and Pseudotumors of the Orbit and Their Surgical Removal. J Clin Exp Ophthalmol 5: 321. doi: 10.4172/2155-9570.1000321

The exenteration of the orbit was also performed in removing two melanomas of the choroid and two ameloblastomas. In all cases, preoperative exophthalmus was observed on the affected side. The operations were again followed by actinotherapy. The lymphoepithelioma, which was accompanied by preoperative exophthalmus, was resected by a complete transcranial orbitotomy.

In the group of malign tumors, we performed extended exenteration nine times, exenteration of the orbit six times, a combination of several methods nine times and complete transcranial orbitotomy once. Both anterior orbitotomy and lateral orbitotomy were performed once (Table 5).

Before the operation, no ocular symptoms were detected in four malign neoplasms (14.8%). After the operation, nine patients had no ocular symptomatology (33.3%).

Two patients died (7.4%) within three years and five (18.5%) were still living in 1994. (All these patients have been operated in 1992) Eight persons lived less than five years (29.6%), seven patients lived more than five years (25.9%) and we have enough about five operated on patients (18.5%) (Table 1).

Benign orbital tumors

Out of the total number of 29 benign tumors, most were meningiomas (10) and hemangiomas (9). Osteomata, which caused eye deviation, were present in three cases. Orbital hemangiomas located in the muscle cone, causing stress-related exophthalmos and enophthalmos when at rest, also occurred in three cases. Neuromas and pleomorphic adenomas, which caused deviation of the eye, were present in two cases (Table 2).

The most frequent surgical technique was partial transcranial orbitotomy (17), lateral orbitotomy was performed four times (2 times adenomas of the lacrimal gland, once cavernous hemangioma and once meningioma), complete transcranial orbitotomy three times (osteoma and hemangioma), anterior orbitotomy twice, a combination of several surgical techniques twice and rhinologic technique once (Table 5).

The relatively high occurrence of ocular symptomatology ascertained before the surgery was due to the tumors located in the orbital apex. A long-term compression of the axons of the optic nerve head led to poorer vision and changes in the optic field which persisted after surgery.

Other tumors of the orbit

Other tumors of the orbit were operated in twelve cases. Most of them were granulomas (4), pseudocholesteatomas (3) and dermoid cysts (3). All patients presented preoperative eye deviation (Table 3). These tumors were resected four times by partial transcranial orbitotomy, four times by rhinologic techniques, three times by anterior orbitotomy and once by complete transcranial orbitotomy (Table 5).

Muco- and pyoceles of frontal sinuses and ethmoid cells

Mucopyoceles of the frontal sinuses and ethmoid cells were included in our set because their expansive effect on the tissues of the orbit often raises suspicion of a tumorous process. This often leads to a diagnostic hesitation even though at the present computerized tomography and magnetic resonance imaging are available examination methods.

We operated 32 mucopyoceles in 25 patients. One cele was found in 21 cases, two in two cases, three celes in one patient and four celes in one patient. They were 25 times in the frontal sinuses, four times in the ethmoid sinuses and three times in both anatomic regions. All findings were accompanied by preoperative eye deviation (Table 4).

Surgical methods and their indications

For determining surgical techniques, we took into consideration the location of the tumors or pseudotumors, their size, their spreading into the surrounding structures and related clinical manifestations.

Anterior orbitotomy was indicated when the tumor was located in the anterior part of the orbit and if it was surgically accessible. Lateral orbitotomy was used in tumors located in the upper or lower outer quadrant which did not penetrate into the orbit apex but could not be resected via the anterior approach.

If a malign tumor penetrated into the soft tissues of the orbit or grew from the intraocular region, we decided for exenteration or extended exenteration of the orbit.

Rhinologic surgical methods were applied in operations for mucopyoceles of the frontal sinuses, ethmoid cells and carcinomas growing from the nose or paranasal sinuses into the orbit.

No exenteration of the orbit was performed in any of the patients operated for this carcinoma. The malign tumors were always radically resected from the medial or lower part of the orbit. An appropriate part of the osseous wall and adjacent periorbit were resected but the extraocular muscles were not. The bulb was underlaid by a superacrylic plate shaped on the cranium according to the bottom of the orbit. This support was usually removed after irradiation. The average time of leaving it in place was from 4 to 6 months. The reason for this solution was mainly the local finding, bad prognosis of the carcinomas of the nose and of the paranasal sinuses as well as the somatic and psychic

	Ocular symptoms			Surviving			
	Number	Before surgery	After surgery	For three years	For five years	More than five years	No evidence
Baso- and spinocellular carcinoma	10	10	10a	1b	4	3	2
Carcinoma of the paranasal sinuses and the nose	8	4	1a	1+1c	4	2	0
Adenoid cystic carcinoma of the lacrimal gland	3	3	3	2	0	0	1
Lymphoepitelioma	1	1	0	0	0	1	0
Melanoma of the choroid	2	2	2a	0	0	0	2
Ameloblastoma	2	2	2a	2	0	0	0
Hemangiopericytom of the lacrimal gland	1	1	0	0	0	1	0
Total	27	23	18	7	8	7	5

Table 1: Malign tumors of the orbit. The state after exenteration of the orbit (a), died of other disease (b), died within three years (c). Preoperative visual acuity in baso- and spinocellular carcinomas, melanomas of the choroid and ameloblastomas. VA=0.5-0.1. In the others VA was 1.0.

		Ocular symptoms		
	Number	Before surgery	After surgery	Recurrence
Meningioma	10	10	10	2
Hemangioma	9	7	4	1
Osteoma	3	2	0	0
Glioma n.II	3	3	3	0
Pleomorphic adenoma of the lacrimal gland	2	2	0	0
Neuroma	2	2	2	0
Total	29	26	19	3

Table 2: Benign tumors of the orbit. Preoperative visual acuity in meningiomas, gliomas of the optic nerve and neuromas.VA=0.5-0.1. In the others VA was 1.0.

		Ocular symptoms		
	Number	Before surgery	After surgery	Recurrence
Granuloma	4	3	1	1
Papiloma of the paranasal sinuses	1	0	0	0
Pseudocholesteatoma	3	2	0	0
Dermoid cyst	3	3	1	0
Epidermoid cyst	1	1	0	0
Total	12	9	2	1

Table 3: Other tumors of the orbit. Preoperative visual acuity was 1.0.

		Ocular symptoms		
	Number	Before surgery	After surgery	Recurrence
Mucocele	4	0	0	0
Pyocele	25	11	2	0
Mucopyocele	3	2	0	0
Total	32	13	2	0

Table 4: Muco- and pyoceles of frontal sinuses and ethmoid cells. Preoperative visual acuity was 1.0.

		Type of tumor			
	Number	Malign	Benign	Another	Mucopyoceles
Anterior orbitotomy	6	1	2	3	0
Lateral orbitotomy	5	1	4	0	0
Exenteration of the orbit	6	6	0	0	0
Extended exenteration of the orbit	9	9	0	0	0
Rhinologic surgical methods	33	0	1	4	28
Transcranial orbitotomy-partial	21	0	17	4	0
Transcranial orbitotomy-total	5	1	3	1	0
Combination of several surgical procedures	15	9	2	0	4
Total	100	27	29	12	32

Table 5: Surgical methods.

load accompanying the operated patients for the rest of their lives, the length of which is difficult to estimate.

As far as the problems of taking down the roof of the orbit in transcranial orbitotomy, the following can be said: if the neoplasm was located in the orbit apex, then its roof was resected osteoclastically only over the site of the location of the tumor. The defect in the roof was not covered with an implant. However, if the tumor filled the orbit from the apex towards the rim and the bulb did not show any clinical signs of damage, the tumor was then resected after the whole roof and a part of the lateral wall was taken down. Then this osseous part was put back and fixed.

A combination of several surgical methods was applied in processes infiltrating the surrounding walls of the orbit-the paranasal sinuses, their skeleton, the lacrimal sack, the hard meninx. In some complicated operations, the participation of as many as three specialists was necessary.

Discussion

Tumors and pseudotumors of the orbit have a special importance. They endanger not only the sight but frequently the very life of the patient as well.

Individual specific reports do not show a big difference in representation and frequency of the occurrence of the orbit tumors. However, even rarer tumorous diseases are sometimes diagnosed [1-7]. It is in particular ameloblastoma, pseudocholesteatoma and hemangiopericytoma of the lacrimal gland that are represented in our clinical study.

The choice of the surgical method for a removal of the orbital tumors is a very important decision for the future of the patient. The progress in examination methods makes the choice of the surgical technique easier. It enables the acquisition of relatively accurate information about the location size, demarcation of the expansion, the relation to the surrounding structures and often even about the morphological substrate [5,8-12]. Our surgical methods were identical to procedures of other authors [13-15].

The eight surgical methods that were used in therapy tumorous orbit processes indicate the fact that none of the surgical techniques performed in the past have universal validity. A certain prerequisite for obtaining good curative results is also endonasal, endo-, micro- and cryoscopic and laser surgery [16,17].

Today, orbital surgery has become a matter of interdisciplinary cooperation. With regard to its specificity and relevance, it should be performed at specialized work-places denoted as orbital centers.

The size of the published set, our methodological techniques and the obtained clinical results are comparable with data in literature [3,16,18,19].

Only adult patients with indications for a surgical intervention were included into the set. It is obvious that inflammation lesions, lymphoma and leukemia lesions would enlarge this set. We consider our set representative enough even though it was introduced nearly 20 years ago.

Conclusion

In our set, there were 59 primary orbital tumors, 41 secondary tumors and metastases were not identified. It is critical for the successful surgical treatment of tumors and pseudotumors of the orbit to have exact diagnoses, a choice of convenient surgical methods and appropriate interdisciplinary cooperation. With regard to the small recurrence rate in all tumorous diseases and to the time of survival in malign neoplasms, the curative methods we used were considered as purposeful and contributing.

References

1. Ainbinder DJ, Faulkner AR, Haik BG (1991) Review of orbital tumors. Curr Opinion Ophthalmol 2: 281-287.
2. Kocks W, Mohr C, Richter HJ, Roosen K, Kalff R, et al. (1988) [Granular cell tumor of the orbit]. Neurochirurgia (Stuttg) 31: 213-215.
3. Lieb WE, Wolfgang E (1992) Orbital tumors. Curr Opinion Ophthalmol 3: 341-346.

4. Shore JW, Bilyk JR (1991) Clinical presentation, diagnosis and treatment of eyelid tumors. Curr Opinion Ophthalmol 2: 579-589.

5. Tijl JWM, Koornneef L (1991) Diagnosis and management of orbital tumors. Curr Opinion Ophthalmol 2: 629-623.

6. Shields JA, Shields CL, Scartozzi R (2004) Survey of 1264 patients with orbital tumors and simulating lesions: The 2002 Montgomery Lecture, part 1. Ophthalmology 111: 997-1008.

7. Ohtsuka K, Hashimoto M, Suzuki Y (2005) A review of 244 orbital tumors in Japanese patients during a 21-year period: origins and locations. Jpn J Ophthalmol 49: 49-55.

8. Margalit N, Ezer H, Fliss DM, Naftaliev E, Nossek E, et al. (2007) Orbital tumors treated using transcranial approaches: surgical technique and neuroophthalmological results in 41 patients. Neurosurg Focus 23: E11.

9. Croce A, Moretti A, D'Agostino L, Zingariello P (2008) Orbital exenteration in elderly patients: personal experience. Acta Otorhinolaryngol Ital 28: 193-199.

10. Soysal HG (2010) Orbital exenteration: a 10-year experience of a general oncology hospital. Orbit 29: 135-139.

11. Rizvi SA, Gupta Y, Gupta M (2010) Surgical treatment and histopathological analysis of proptosis. Nepal J Ophthalmol 2: 31-34.

12. Benazzou S, Arkha Y, Boulaadas M, Essakalli L, Kzadri M (2011) [Orbital exenteration]. Rev Stomatol Chir Maxillofac 112: 69-74.

13. Cerný E, Zelený M, Voldrich Z (1984) [Personal experience in the treatment of malignant tumors of the nose and paranasal sinuses]. Cesk Otolaryngol 33: 281-287.

14. Schürmann K (1981) Optic nerve compression by Meningiomas. In: Samil M, Jannetta FJ (eds.) The cranial nerve. Springer, Berlin, Germany.

15. Otradovec J (1986) Diseases of the orbit (in czech). Avicenum, Praha, 312.

16. Kennedy DW, Josephson JS, Zinreich SJ, Mattox DE, Goldsmith MM (1989) Endoscopic sinus surgery for mucoceles: a viable alternative. Laryngoscope 99: 885-895.

17. Purdy EP, Bullock JD (1991) Eyelid tumors. Curr Opinion Ophthalmol 2: 271-280.

18. Holz FG, Tetz M, Born IA, Völcker HE (1992) [Adenoid cystic carcinoma of the lacrimal gland]. Klin Monbl Augenheilkd 201: 42-47.

19. Delfini R, Missori P, Iannetti G, Ciappetta P, Cantore G (1993) Mucoceles of the paranasal sinuses with intracranial and intraorbital extension: report of 28 cases. Neurosurgery 32: 901-906.

Citation: Lešták J, Voldřich Z, Kovář D, Houšťava L, Pašta J, et al. (2014) Tumors and Pseudotumors of the Orbit and Their Surgical Removal. J Clin Exp Ophthalmol 5: 321. doi: 10.4172/2155-9570.1000321