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ORIGINAL ARTICLE

POSTOPERATIVE COMPLICATIONS OF ORBITAL TUMOR REMOVAL SURGERY IN SARDJITO GENERAL HOSPITAL

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ABSTRACT

Introduction: *Orbital tumor removal surgery represent a small but significant portion of ophthalmologic surgery, and few reports of the associated complications are available.*

Methods: *Descriptive retrospective study was carried out 138 patients who undergone orbital tumor removal surgery during July 2021-March 2023. Surgery approach and postoperative complications were collected from medical record.*

Results: *Of approximately 138 patients, 12 (6%) patients had postoperative complications. Five (5%) of 75 patients who undergone anterior orbitotomy had postoperative complications. One percent had lagophthalmos, 1% had ptosis, 2% had decreased vision, and 1% had ocular movement disorders. Lateral orbitotomy was done in 21 patients. Three (12%) patients had postoperative complications. Four percent had ptosis, 4% had decreased vision, and 4% had ocular movement disorders. Four (60%) of 6 patients who undergone medial orbitotomy had ptosis (16%) and decreased vision (50%). Posterior orbitotomy was done in 8 patients. One (12,5%) patient had complication of ptosis.*

Conclusion: *Anterior orbitotomy was the most common surgery approach for orbital tumor removal. The most common postoperative complications were ptosis and decreased vision. Informed consent is an important aspect to improve patient's knowledge of postoperative complications.*

Keywords: *orbital tumor, proptosis, orbital neoplasm, complication, orbitotomy*

INTRODUCTION

Tumors lied the orbital cavity could be a space-occupying lesions because of the anatomical structures of the orbit. It is a complex regions that contains various structures, including the ocular globe, extraocular muscles, periocular fat, vessels, nerves, glands, and connective tissues. It is surrounded by paranasal sinuses and cranial cavity (Montano, 2018).

Orbital tumors can be classified as primary and secondary tumors. Primary tumors derived from the orbital tissues, and secondary tumors involved the orbital cavity by contiguity or distant metastases from other sites of the body (Montano, 2018).

Symptoms caused by orbital tumor are varied depending on the location and the severity. The most frequent symptoms include proptosis, followed by diplopia, decreased visual acuity, trigeminal hypoesthesia, headache, and retrobulbar pain.

There are several choices to manage the orbital tumor, depending on the location and severity of the tumor. Orbital tumor removal surgery is one of the treatment choices, and has become the main modality for both sampling (biopsy) for diagnostic purposes and management. The surgical approach depends on the location or extension of the tumor. The transorbital approach could be done from anterior, posterior, medial, or lateral. Orbital exenteration could be done for orbital malignancies in an attempt to become cure of cancer with tumor free margins (Cockerham, 2001).

The complications reported after orbital tumor removal surgery were varied including decreased visual acuity, cerebrospinal fluid leak, facial nerve palsy, third nerve palsy, enophthalmos, and ptosis (Montano, 2018). Giulio (2005) reported 0.44% cases of postoperative blindness following orbital surgery. The most significant factor associated is the location (Purgason, 1992). But there are few reports available about the postoperative orbital tumor removal complications and the contributing factors.

The purpose of this study is to determine the complications following orbital tumor removal surgery.

METHODS

We retrospectively reviewed the clinical and outcome data of patients who underwent orbital tumor removal surgery between July 2021 and March 2023 at the Dr. Sardjito General Hospital, Yogyakarta, Indonesia.

The inclusion criteria applied were the orbital tumor diagnosed with clinical manifestations and imaging with CT scan or MRI, who underwent surgery and histopathology examination.

As a protocol, we perform a clinical evaluation on 1 day before surgery and day 7 after surgery. The data collected included age, gender, the surgical approach, the pathology report, and any postoperative complications. The complications we observed were decreased visual acuity, ocular movement disorder, and ptosis.

A decreased visual acuity defined as the postoperative visual acuity decreases more than 2 lines as measured by the Snellen chart compared to the initial visual acuity measured before surgery. Complication of ocular movement disorder is defined as when there is postoperative ocular movement disorder or an increase in the degree of ocular movement disorders when compared to before surgery. Ptosis is defined as when ptosis occurs after surgery and there was no ptosis before surgery.

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The clinical characteristics, demographics, tumor origin, type of surgery, complications and histopathological results were analyzed using simple descriptive statistics (mean, percentage, and frequency) and presented in tabular form.

RESULTS

We recruited 138 eyes from 138 subjects during the study time period. Fifty six (40%) subjects were male and 82 (60%) subjects were female. The mean age was 44 year old, with 21 (15%) subjects being children and 117 (85%) subjects were adult. The children defined as the age between 0 and 18 year old, according to the World Health Organization (WHO) criteria.

The initial symptoms were proptosis (83%), decrease visual acuity (10%), chemosis (2%), lagophthalmos (2%), periorbital pain (1%), and there were no ptosis and ocular movement disorder as the initial symptoms. The majority of the orbital tumors were malignant (51%). The characteristic data of the subjects were showed in table 1.

The most common approach for orbital tumor removal surgery was anterior orbitotomy (54%), followed by subtotal exenteration (23%), lateral orbitotomy (15%), posterior orbitotomy (5%), and medial orbitotomy (2%).

From 138 eyes, there were 6% of postoperative complications. They were decreased visual acuity (3%), ptosis (2%), and ocular movement disorder (1%).

From 75 subjects underwent anterior orbitotomy, 5 (4%) subjects had complications of decreased visual acuity (2%), ptosis (1%), and ocular movement disorder (1%). From 21 subjects underwent lateral orbitotomy, there were complications of decreased visual acuity (4%), ptosis (4%), and ocular movement disorder (4%). Four (60%) of 6 subjects who undergone medial orbitotomy had ptosis (16%) and decreased visual acuity (50%). Posterior orbitotomy was done in 8 patients and 1 (12,5%) subject had complication of ptosis.

Table 1. Characteristics Data of the Subjects

Subject's Characteristics		n (%)
Gender	Male	56 (40%)
	Female	82 (60%)
Age	Children (0-18)	21 (15%)
	Adult (>18)	117 (48%)
Initial Symptoms	Proptosis	135 (83%)
	Decreased visual acuity	17 (10%)
	Ocular movement disorder	0 (0%)
	Ptosis	0 (0%)
Surgery Approach	Anterior Orbitotomy	75 (54%)
	Lateral Orbitotomy	21 (15%)
	Medial Orbitotomy	3 (2%)
	Posterior Orbitotomy	7 (5%)
	Subtotal Exenteration	32 (23%)

Histopathology	Benign	66 (47%)
	Malignant	71 (53%)
Complications	Decreased visual acuity	5 (3%)
	Ptosis	4 (2%)
	Ocular movement disorder	2 (1%)

Table 2. Postoperative Complications Based on the Surgical Approach

Surgical Approach	Complications	n (%)
Anterior Orbitotomy	Decreased visual acuity	2 (2%)
n=75 (54%)	Ptosis	1 (1%)
	Ocular movement disorder	1 (1%)
Lateral Orbitotomy	Decreased visual acuity	1 (4%)
n=21 (15%)	Ptosis	1 (4%)
	Ocular movement disorder	1 (4%)
Medial Orbitotomy	Decreased visual acuity	3 (50%)
n=6 (2%)	Ptosis	1 (16%)
	Ocular movement disorder	0 (0%)
Posterior Orbitotomy	Decreased visual acuity	0 (0%)
n=8 (5%)	Ptosis	1 (12,5%)
	Ocular movement disorder	0 (0%)

DISCUSSION

The orbital wall is composed of ossified bones forming the lateral, medial, superior and inferior walls, which could not increase in volume. Surgery of the orbital tumor removal is challenging and requires more knowledge about the anatomy of the orbit and ocular adnexa to get functional improvements and prevent some postoperative complications.

The surgery approaches are based on the location of the orbital tumors. The incision site is located on the closest tumor location. If the lesions were in the anterior two thirds of the orbit, the approach that can be used is anterior orbitotomy. The lateral orbitotomy is useful for retrobulbar lesions. The medial orbitotomy is effective in the management of small, medial orbital tumors such as cavernous hemangiomas and schwannomas. The retrobulbar tumors adjacent to the intracranial were usually removed with posterior orbitotomy from craniotomy access. Subtotal exenterations were undergone as an option for some malignant tumors which has spread to most of the surrounding orbital tissue (Cockerham, 2001).

In this study, we used 4 types of surgical approaches. They are lateral, anterior, medial, and posterior orbitotomy. The most performed approach was anterior orbitotomy, which indicates that the most tumor locations in this study were in the anterior two thirds of the orbit.

The most frequent postoperative complications in this study was decreased visual acuity (3%). It occurred most frequently (50%) after medial orbitotomy approach, but Bonolavanta (2005) and Jacobs *et al* (2018) did not find significant differences between the approaches to cause vision loss. The medial orbitotomy approach was done for tumors located in the medial

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wall. The orbital optic nerve lies on medial to the orbital apex. Tumors located in the medial wall could directly compress and displace the optic nerve. The medial orbitotomy approach was usually done to decompress the optic nerve and relieve papilledema. But the approach might be directly injure the optic nerve from mechanical, thermal, and electrical, or it could indirectly injure the vascular causing ischemic optic neuropathy or central retinal artery occlusion (Kansakar *et al.,* 2019)

In this study, ptosis occurred more frequently after posterior orbitotomy approach that mostly done with craniotomy access. This approach technique could injure the frontal bone, and after surgery, a permanent defect often remains in the orbital roof, bringing orbital contents into direct contact with meningeal tissue at the base of the frontal lobe. The ptosis is presumably because of the compromise of the levator palpebrae muscle (Desai *et al.,* 2015).

Ptosis could occur after another orbitotomy tumor removal approach. It could be caused by myotoxic effects of lidocaince and epinephrine, or by direct injury to the levator palpebra muscle. A study reported that degeneration of human muscles occurred 18 hours after injection of lidocaine and epinephrine, increasing the myotoxic effects (Yagiela *et al.,* 1981).

Ocular movement disorder is the least postoperative complications in this study. It most frequently occurred after lateral orbitotomy (4%). It could be due to direct or indirect injury to the extraocular muscles during the tumor removal surgery. It could also be due to neurogenic causes, such as compression of the oculomotor, trocheal, or abducen cranial nerves that innervated extraocular muscles.

CONCLUSION

Orbital tumors have various signs and symptoms depending on the location and volume of the mass. Postoperative complications are low but they can occur and be avoided. A detailed and comprehensive explanation of postoperative complications should be done before the surgery and it could help patients to accept complications that might occur.

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