Orbital exenteration: A retrospective study over six years in Vietnam

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Summary

Objective: Orbital exenteration aims to achieve local control of the severe orbital diseases when other treatments are failed. Through this study, the aims of author is to analyse their experience of orbital exenteration, including histopathology, indications, treatment, outcomes, and complications. *Subject and method:* The information was collected in this retrospective study in order to detect all patients who underwent orbital exenteration between 1 January 2010 and 01 January 2016 inclusive, at the Vietnam National Institute of Ophthalmology. *Result:* 45 cases with orbital exenteration were identified. The mean age of the patients (male: 21, female: 24) was 48.9 years. There were eight different tumours were found, of which retinoblastoma (9), melanoma (9), sebaceous gland carcinoma (SGC) (8), basal cell carcinoma (BCC) (6), and squamous cell (SCC) carcinoma (5) were the most common. BCC, SCC and SGC, accounted for 15 in 18 cases with orbital invasion from skin cancer, having previously failed tumour resection. The most common complication was numbness (19). Chronic socket discharge with the absence of a fistula was the second one. 21/23 of orbit was healed by spontaneous granulation and epithelialisation. *Conclusion:* Retinoblastoma and skin cancer were the most common tumour. A large rate of these orbital exenterations performed previous failed local tumour excision. Orbital reconstruction by spontaneous granulation and epithelialisation allows the detection of recurrent tumour at early-stage. Numbness was considered to be the most common complication of orbital exenteration.

Keywords: Clinical characteristics, orbital exenteration, orbital lesion.

1. Background

Orbital exenteration, a surgery performed from 16th century, was the first described by Bartisch in 1583 [9]. Orbital exenteration is defined as the surgical excision of the ocular globe, orbital soft tissues, and ocular adnexa. This reservative procedure is mainly to treat life-threatening malignant tumours or the retractable ones with other treatment. Lesser indications for exenteration are for potentially life-threatening infections that cannot be controlled by other means and for the management of intractable pain or structural deformity, congenital or acquired [2]. Orbital exenteration includes: Total surgery and subtotal surgery. In total exenteration, entire orbital content, accompanied by eyelid, is removed. If the bones of the orbit are involved with malignancy, orbital wall resection should be performed. In subtotal exenteration, eyelids and/or conjunctiva are preserved for cosmetic reasons. The orbits were reconstructed after surgery. In the literature, there were limited retrospective studies of patients who were performed orbital exenteration. In Vietnam, orbital exenteration is also performed to treat the malignant orbital disease. Yet, there has not been any study about this surgery. Therefore, we conducted the study to find out the clinical

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characteristics, treatment, outcomes and complications of orbital exenteration surgery in Vietnam.

2. Subject and method

Vietnam National Institute of Ophthalmology, the biggest eye hospital, receives all orbital exenteration patients in Vietnam. Therefore, we conducted this study to review our experience and analyses of 45 cases of orbital exenteration over a 6-year period from 1 January 2010 to 01 January 2016, at the Vietnam National Institute of Ophthalmology. The information was collected in this retrospective study in order to detect all patients who underwent orbital exenteration. We analysed to find out the epidermis, previous therapy, location and extension of malignant and benign tumour, diagnosis, indications, method in the treatment, and histological diagnosis, the adjunctive treatments after surgery (such as radiotherapy, chemotherapy), the technique of orbital reconstruction and postoperative complications. If any surgical notes were unavailable, this data would not be used to analyse.

3. Result

From 1 January 2010 to 31 December 2015, a total of 45 patients (male: 21, female: 24) with a mean age of 48.9 years (range: 1 - 83 years) who underwent orbital extenteration were included in this study (Table 1). 22 cases were right orbits and the figure for left orbits was 23. Preoperative visual acuity was not available in 7 patients. Of the remaining patients, three (7.9%) had a Snellen visual acuity of 6/12 or better. Snellen visual acuity in the eye without exenteration (18/38 eye) was 6/12 or better.

Table 1. Histological diagnosis and location of lesions of patients underwent orbital exenteration

Location / Histopathology	Eyelids	Globe	Orbit	Conjunctiva	Sum
	n	n	n	n	n
Retinoblastoma	0	9	0	0	9
Melanoma	4	0	0	5	9
Sebaceous gland carcinoma	7	0	0	1	8
Basal cell carcinoma	6	0	0	0	6
Squamous cell carcinoma	2	0	1	2	5
Adenocystic carcinoma	0	0	2	0	2
Rhabdomyosarcoma	0	0	1	0	1
Lymphoma	0	0	1	0	1
Non-malignant tumor	0	0	4	0	4
Sum	***19***	***9***	***5***	***8***	***45***

In eight different types of malignant tumours, the most common types were retinoblastoma (22.0%), melanoma (22.0%) and sebaceous gland carcinoma (19.5%), then basal cell carcinoma (14.6%), and squamous cell carcinoma (12.2%). There were only 4 cases in 3 remaining types of tumour. The eyelid tumours were the most commonly encountered lesion location (46.3%). Malignant globe tumour justified for 9 cases, the orbit and conjunctiva were 13 cases.

Table 2. Previous therapy

Therapy		Sum (n = 45)		
		n	%	%
Tumour excision	Local excision	26	58.7	66.7
	Local excision and chemotherapy	2	4.4	
	Local excision and radiation therapy	1	2.2	
	Local excision and eyelid reconstruction	1	2.2	
Chemotherapy		1	2.2	2.2
Other	None	6	13.3	31.1
	Unknown/not documented	4	8.9	
	Other therapy	4	8.9	
Sum		***45***	***100***	

The previous therapy in the treatment of 45 investigated patients included 30 cases with tumour excision, 1 with chemotherapy and 14 with other therapy. In thirty patients with local tumour excision, twenty-six patients had simple local excision, two had a combination of surgery and chemotherapy, one performed both local excision and radiation therapy and one had a combination of surgery and eyelid reconstruction.

Table 3. Orbital exenteration according to histopathology

Methods / Histopathology	Subtotal orbita exenteration		Total orbital exenteration		Sum (n = 45)	
	n	%	n	%	n	%
Retinoblastoma	7	15.6	2	4.4	9	20.0
Melanoma	1	2.2	8	17.8	9	20.0
Sebaceous gland carcinoma	2	4.4	6	13.3	8	17.8
Basal cell carcinoma	0	0	6	13.3	6	13.3
Squamous cell carcinoma	1	2.2	4	8.9	5	11.1
Adenocystic carcinoma	0	0	2	4.4	2	4.4
Lymphoma	0	0	1	2.2	1	2.2

Rhabdomyosarcoma	1	0	0	0	1	2.2
Non-malignant disease	2	4.4	2	4.4	4	8.9
Sum	***14***	***31.1***	***31***	***68.9***	***45***	***100***

In 45 patients undergoing orbital exenteration (including non-malignant patients), 14 required a subtotal exenteration and a remaining 31 performed total orbital exenteration. One of the 45 cases required extensive orbital exenteration for malignant disease (removed apart of orbital wall) to ensure tumour clearance during surgery. Malignant skin tumours were mainly suffered from total orbital exenteration (24/28 cases), whereas, the orbital retinoblastoma patients were primarily underwent subtotal orbital exenteration (7/9 cases).

Table 4. Orbital reconstruction methods

Methods	**Sum (n = 23)**	
	n	**%**
Granulation and epithelialization	21	91.2
Granulation, epithelialization and secondary full-thickness skin graft	1	4.4
Granulation, epithelialization and secondary flaps	1	4.4
Sum	***23***	***100***

The information relating the procedure of orbital reconstruction of twenty-two cases was not available. In the remaining 23 cases, 21 had orbital reconstruction by granulation and epithelialization, one was reconstructed by a full thickness skin graft and the last one was performed secondary flap after failing of granulation and epithelisation.

Table 5. Complications and co-morbidity experienced in the twenty-three patients undergoing exenteration for neoplasm

Complication/comorbidity		**Total orbital exenteration**	**Subtotal orbital exenteration**	**p**
		n	**n**	
None		7	5	0.15
Numbness	Ipsilateral upper quadrant face	10	2	0.02
	Ipsilateral half of face	4	3	0.62
Chronic discharge		6	1	0.25
Chronic pain		1	0	
Sino-orbital fistula		1	0	

We collected 23 exenterated patients who are still alive. Among these patients, 12 cases did not present any complications, 11 cases had one or more complications. The most common postoperative complication was numbness occurring in 19/23 patients. Seven patients were suffered chronic discharge in socket without a fistula. Sino-orbital fistula was seen in only one

patient in whom the orbit was healed by spontaneous granulation and epithelialization and the patient was so satisfied with this result because his maxillary sinusitis was improved.

4. Discussion

Exenteration is considered the only alternative to preserve the patient's life. Completely eliminated tumour considered as a mainstone should take overweight cosmetic reasons. Sometimes, the orbital wall was resected to ensure clearance of tumour after orbital exenteration. Orbital exenteration was mainly indicated for malignant diseases. Rahman et al found that 63/68 cases were performed orbital exenteration because of malignant tumour [7]. We found a similar ratio in our series of 41 of 45 cases requiring exenteration for malignant disease.

Histopathology plays a vital role in indications, surgical methods, prognosis and postoperative co-morbidity. In our series, retinoblastoma and melanoma were the most common neoplasms, followed by SGC the eyelids, BCC, and then SCC. These five tumours accounted for 82.2% of cases requiring exenteration. In my study, the rate of BCC (14.6%) was significantly lower than in other large studies. Rathbun et al reported BCC was the most common tumour with 14 cases in their series of 48 cases (29%) [8] and the rate in Rahman's study was 28 of 69 (40.5%) cases [7]. Interestingly, 15/18 (83.3%) cases of skin cancer including BCC, SCC, SGC, exenterated for orbital invasion, had experienced previous failed surgery elsewhere. This figure was similar as that was approved by Rahman et al with 62.3% [7]. On the eyelid, sebaceous gland carcinoma often grows slowly and may mimic a benign disease, such as a chalazion. Among the eight patients in this study, no patient had previous missed chalazion surgery. By biopsy, all patients were confirmed without previous surgery elsewhere. The percentage of death from 3 to 40% has been reported [4]. Early diagnosis and eradicated surgery can prevent following orbital exenteration as well as decrease destructive surgery. In our study, the percentage of death caused by sebaceous gland carcinoma was 25% (two patients) from metastatic disease and the other patient with metastatic disease was having palliative treatment.

Eradication of local tumour excision was still mainstone for local malignant tumour. It gains both effectiveness of treatment for local manignant tumour and cosmetic pleasure. In our study, we also found that the majority of patients underwent orbital exenteration suffered one or more previous preservative surgery-local tumour excision (58.7%). This result was significant higher than that of Rahman's study (43.8%) [7].

The method of surgery is the essential factor which determines the way of orbital reconstruction, the healing process, postoperative complications and prognosis life expectancy. Almost authors try to perform subtotal orbital exenteration and avoid total orbital exenteration for cosmetic reasons and improvement of healing time. In our study, the total orbital exenteration group was found more than the subtotal orbital exenteration group (p=0.02). The percentage of total exenteration (68.9%) was significant higher than that in study of Gunalp (55.2%) and Maheshwari (13%) [1], [3]. Our patients went to hospital too late when the malignant eyelid tumour invaded into surrounding tissue of orbit, so we couldn't manage conservatively.

The method of orbital reconstruction determined the way of healing of the orbital defection that includes: Spontaneous granulation and epithelialization, skin graft and flap. Spontaneous granulation and epithelialisation may delay healing time by 2 - 3 months. The advantages of changing a wound dressing should be balance with the possible advantages of healing by spontaneous granulation and epithelialization, an easier, quicker procedure.

When the granulation process is complete, the orbit is covered by thin layer, which gives us opportunity to detect recurrence at an early stage. This result provides a similar colour with the surrounding skin when the wound was completely healed. In recent practice, frequent wound dressing is performed by trained nurses who keep the wound covered with a moist gauze bandage during the healing phase. The packing is changed every week until the orbit is completely healed. We found that the rate of using spontaneous granulation and epithelialisation in this study was 91.2%. Rahman used the method of healing by spontaneous granulation and epithelialization for 43 cases (67.2%) [7]. Nemet performed healing by spontaneous granulation and epithelialization for 24 cases (63.2%) [6]. However, Nassab did not use this method of reconstruction [5].

There are some concerned postoperative complications. Numbness in the face is the most uncomfortable symptom, ipsilateral upper quadrant numbness of the face was seen in 12 cases (52.2%). Chronic discharge, seen with 30.4%, usually appeared in the location that the epithelization was not complete. This complication makes patients uncomfortable to hygiene. In our series, there was only one fistula (4.8%) generated from perforated sinuses occurring intraoperatively. This fistula was allowed to develop permanent fistula formation by leading spontaneous granulation and epithelialisation of the orbit. Our patients felt very pleased to have this fistula due to improvement in maxillary sinusitis, so we did not close this fistula. The rate of fistula in our study is lower than other large studies, 15/64 (23.4%) cases [7].

5. Conclusion

The number of orbit underwent orbital exenteration increased frequently over the past six years, retinoblastoma and skin cancer were the most common tumor. A large rate of these orbital exenterations performed previous failed local tumour excision. Exenteration is a reservative procedure that should, therefore, be decrease mandatorily by aggressive removal at the time of primary surgery. Orbital reconstruction by spontaneous granulation and epithelialisation allows the detection of recurrent tumour at early-stage. Numbness was considered to be the most common complication of orbital exenteration.

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