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Indications for ocular evisceration and orbital implant related complications in a tertiary eye hospital in Hungary over an 11-year period

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ABSTRACT

Purpose: Our aims were to evaluate the primary and clinical evisceration indications and to analyse orbital implant related complications. **Materials/methods:** We included in our retrospective review all eviscerations between 2006 and 2016 at the Department of Ophthalmology of Semmelweis University, Budapest, Hungary. Primary evisceration indications were classified into six groups: trauma, surgical diseases, infections or inflammations, systemic diseases, tumours and unclassifiable diseases. Clinical immediate evisceration indications were also classified into six groups: painful blind eye due to glaucoma, atrophía/phthisis bulbi, endophthalmitis, cosmetic reasons, acute trauma and expulsive bleeding. **Results:** Evisceration was performed in 46 eyes of 46 patients (54.3% males, age 43.0 ± 18.6 years). The most common primary evisceration indications were trauma (37%), surgical diseases (34.8%), infection or inflammation (10.9%), systemic diseases (6.5%), tumours (8.7%) and unclassifiable diseases (2.2%). Painful blind eye due to glaucoma (34.8%) was the most common clinical indication for evisceration, followed by atrophía/phthisis bulbi (26.1%), endophthalmitis (17.4%), cosmetic reasons (13.0%), acute trauma (6.5%) and expulsive bleeding (2.2%). After evisceration, 91.3% of the patients received orbital implant and during 26.8 ± 28.9 months follow-up implant related complications were found in 14.3% of the cases, including implant extrusion (4.8%), partial wound dehiscence (4.8%), implant exposure (2.4%) and orbital inflammation (2.4%). **Conclusion:** Painful blind eye and atrophía/phthisis bulbi due to ocular trauma and surgical diseases represent the most common indications for ocular evisceration. If malignant intraocular tumours can be excluded, evisceration surgery combined with a silicon-based orbital implant is a safe and effective procedure.

KEYWORDS

evisceration, anophthalmic surgery, orbital implant, complication

INTRODUCTION

Evisceration surgery is the removal of the intraocular contents after excision of the cornea, while preserving the scleral shell. Evisceration surgery can be performed as 'last resort' for many severe end-stage ophthalmic conditions with complete loss of the vision (severe ocular injuries, painful eye due to glaucoma, inflammation/infection, or phthisis bulbi) [1, 2].

The technique of evisceration was first described in 1817. However, the course of the surgery and its indications have continuously changed over the centuries. The first evisceration surgeries were performed by Bear after a case of expulsive bleeding and then by Noyes in a patient with endophthalmitis in 1874 [3]. The use of spherical glass implants during evisceration was firstly described by Mules in 1884 [4].

There have been several studies on the indications for evisceration, but these surveys are not current or were published in developing countries [5–8]. Significant differences can be observed between developing and developed countries regarding the indications of evisceration. In Hungary, no publications have yet been published with regards to the indications of evisceration.

The aim of our study was to analyse the primary and direct clinical indications of evisceration and orbital implantation related complications based on the evaluation of an 11-year-period in Hungary.

MATERIALS AND METHODS

This retrospective study was undertaken at a tertiary eye care centre, in order to analyse the current indications of evisceration in Hungary.

A retrospective review was conducted on patients who underwent evisceration surgery between 1 January 2006 and 31 December 2016 at the Department of Ophthalmology of Semmelweis University, Budapest. For each subject, clinico-pathological data were reviewed, which included patients' demographics, indications for evisceration, B-scan ultrasound reports, operative details and histopathological analyses.

The primary indications for evisceration were divided into seven groups (according to the classification of de Gottrau) [9]: trauma, surgical diseases (treated or not treated), infectious and inflammatory diseases, systemic diseases, periocular tumours and unclassifiable cases due to incomplete documentation).

Immediate clinical indications for evisceration (last diagnosis before anophthalmic surgery) were divided according to the modified classification of de Gottrau et al. [9] into the following groups: painful blind eye due to glaucoma, atrophía/phthisis bulbi, endophthalmitis, cosmetic reasons, acute trauma (if evisceration was performed within one month after the injury) and expulsive bleeding.

Statistical analysis was performed with Statistica 11.0 (StatSoft Inc., Tulsa, OK, USA) software. Comparisons between groups were performed with χ^2 test. A *P*-value lower than 0.05 was considered statistically significant.

RESULTS

In our retrospective study, we assessed 46 eyes of 46 patients who underwent evisceration between 2006 and 2016. There were 25 (54.3%) males and 21 (45.7%) females in the study population. The patient age was 43.0 ± 18.6 years (range: 6–87 years). Age distribution of the subjects is shown in Fig. 1. Annual number of eviscerations between 2006–2016 was 1, 2, 1, 4, 1, 4, 9, 8, 3, 5 and 8.

Mean age at evisceration was 32.9 ± 11.7 years (range: 16–58 years) in the trauma group ($n = 17$), 52.0 ± 20.2 years (range: 25–87 years) in the surgical diseases group ($n = 16$), 42.2 ± 21.0 years (range: 23–65 years) in the infectious and inflammatory diseases group ($n = 5$), 38.8 ± 23.1 years (range:

Fig. 1. Age distribution of patients, eviscerated between January 2006 and December 2016, at the Department of Ophthalmology of Semmelweis University, Budapest, Hungary, at the time of surgery (46 eyes of 46 patients)

6–60 years) in the tumour group ($n = 4$), 54.3 ± 11.6 years (range: 42–65 years) in the systemic diseases group ($n = 3$) and 59 years in the unclassifiable diseases group ($n = 1$).

Regarding sex distribution we did not find any significant difference between subgroups (Fig. 2): trauma ($n = 12/5$; $P = 0.090$), surgical diseases ($n = 9/7$; $P = 0.849$), infection/inflammation ($n = 1/4$; $P = 0.102$), tumour ($n = 1/3$; $P = 0.217$) and systemic diseases ($n = 1/2$; $P = 0.449$).

Primary indications for evisceration in order of decreasing frequency were as follows (Fig. 3): trauma ($n = 17$; 37.0%), surgical diseases ($n = 16$; 34.8%), infection/inflammation ($n = 5$; 10.9%), periocular tumours ($n = 4$; 8.7%), systemic diseases ($n = 3$; 6.5%) and unclassifiable diseases ($n = 1$; 2.2%).

The trauma group included 8 open globe injuries (47.1%) resulting from home accidents, 1 (5.9%) from a traffic accident, 1 (5.9%) from sports accident, 2 (11.8%) from acts of violence and 5 (29.4%) injuries with unknown circumstances.

Fig. 2. Sex distribution of patients with evisceration (46 eyes of 46 patients), between January 2006 and December 2016, at the Department of Ophthalmology of Semmelweis University, Budapest, Hungary, distributed among primary evisceration indications

Fig. 3. Percentages of primary evisceration indications between January 2006 and December 2016, at the Department of Ophthalmology of Semmelweis University, Budapest, Hungary

The surgical diseases group included 5 patients (31.3%) with cataract, 4 (25.0%) with glaucoma and 7 (43.8%) patients with retinal diseases as the primary indication for surgery.

The infection/inflammation group contained 3 patients with keratitis (60.0%), 1 (20.0%) with chronic uveitis and 1 (20.0%) with chorioretinitis as the primary indication for evisceration.

The tumour group included 1 patient (25.0%) with corneal limbal dermoid, 1 patient (25.0%) with palpebral basal cell carcinoma, 1 patient (25.0%) with parasellar meningioma and 1 patient (25.0%) with intraorbital metastatic tumour of uterine leiomyosarcoma being the primary reasons for evisceration.

The systemic diseases group included 2 patients (66.7%) with retinal vein occlusion and 1 patient (33.3%) with proliferative diabetic retinopathy as the primary indication of evisceration.

Immediate clinical causes (last diagnosis before evisceration) in decreasing order were as follows (Fig. 4): painful blind eye secondary to glaucoma ($n = 16$; 34.8%), atrophial/phthisis bulbi ($n = 12$; 26.1%), endophthalmitis ($n = 8$; 17.4%), cosmetic reasons ($n = 6$; 13.0%), acute trauma ($n = 3$; 6.5%) and expulsive bleeding ($n = 1$; 2.2%).

Within the group of painful blind eye due to glaucoma ($n = 16$), the primary indication for evisceration was trauma for 6 eyes (37.5%), surgical diseases for 6 eyes (37.5%), systemic diseases for 2 eyes (12.5%), infection/inflammation for 1 eye (6.3%) and unknown aetiology for 1 eye (6.3%). Within the atrophial/phthisis bulbi group ($n = 12$), the primary cause of evisceration was trauma for 4 eyes (30.0%), surgical diseases for 6 eyes (50.0%), systemic disease for 1 eye (8.3%) and infection/inflammation for 1 eye (8.3%).

Fig. 4. Percentages of clinical immediate evisceration indications between January 2006 and December 2016, at the Department of Ophthalmology of Semmelweis University, Budapest, Hungary

Within the endophthalmitis group ($n = 8$), the primary indication was periocular tumour for 4 eyes (50.0%), infection/inflammation for 2 eyes (25.0%), trauma for 1 eye (12.5%) and surgical diseases for 1 eye (12.5%). Within the cosmetic reasons group ($n = 6$), the primary indication for evisceration was trauma for 4 eyes (66.7%), infection/inflammation for 1 eye (16.7%) and surgical disease for 1 eye (16.7%). As for the eye that was eviscerated due to expulsive bleeding, the primary reason was surgical disease.

Histopathological evaluation did not reveal any occult intraocular tumour in any of the tissue samples.

Of the 46 eviscerated patients, 42 (91.3%) received at the time of the evisceration an orbital implant. For all the 42 patients, a silicone-based implant was used. The mean diameter of implants was 18.1 ± 1.3 mm (range: 14–22 mm). Of the patients receiving orbital implant, 6 patients (14.3%) developed complications in association with the orbital implant during the 26.8 ± 28.9 -month-long follow-up: 2 patients (4.8%) had implant extrusion, 2 (4.8%) had wound dehiscence, 1 (2.4%) had conjunctival wound healing disturbance and 1 patient (2.4%) had intraorbital infection/inflammation. Sympathetic ophthalmia was not observed in any of the patients during the follow-up period.

DISCUSSION

In addition to enucleation, evisceration is also a last resort therapeutic tool in ophthalmology for blind and often painful eyes if no other eye preserving therapeutic possibilities are available. It is most often performed following severe ocular trauma, inflammation/infection, or in case of painful blind eye [10]. To our knowledge, our publication is

the first study assessing the indications for bulbar evisceration in a tertiary eye care centre in Hungary.

The ratio of annually performed evisceration and enucleation surgeries may differ in each country, with evisceration being preferred worldwide. The annual evisceration/enucleation ratio is 1.74 [5] in the USA, 1.62 [8] in Jordan and 1.53 [11] in Saudi Arabia, i.e. evisceration is more commonly performed than enucleation. In our institute 509 enucleations and 46 eviscerations were performed between 2006 and 2016 [12], thus, the ratio of evisceration/enucleation was 0.09 in this period with enucleation being more frequent. However, similarly to international trends during the observed years, the number of eviscerations has also increased in our department.

In our study, the mean age of the patients who underwent evisceration was 43.0 years, which is lower than the mean age of 47.1–54.0 years observed in other studies [5–8, 13, 14]. Concerning mean age, there had been no difference previously between developing (47–54 years) [6–8, 14] and developed countries (49–51 years) [5, 13], however, the eviscerations were performed at a younger age in Hungary than in those regions.

Peak incidence of evisceration in Hungary was between 16 and 45 years of age, which means a significantly younger age group compared to the peak incidence at 61–70 years observed in Mexico [7]. Similarly to other reports, our study also detected a slight male predominance (54.3% vs. 45.7%) which may be explained by a higher prevalence of ocular injuries in male patients [5–8, 13, 14].

Considering primary indications, the lowest mean age was found in the trauma group (32.9 years), whereas the highest mean age was seen in the systemic diseases group (54.3 years). Similarly to enucleation surgery (de Gottrau: 79.0% vs. 21.0%) [9]; Cheng: 81.3% vs. 18.7%) [15], trauma as primary indication was more common in males than females (70.6% vs. 29.4%), infection/inflammation (de Gottrau: 71.4% vs. 28.6%) [9] was more frequently found in females compared to male patients (80.0% vs. 20.0%).

Most common primary indications for evisceration in our study were injuries (37.0%), surgical diseases (34.8%) and infection/inflammation (10.9%). These results show similar trends to the aetiological factors detected in developed countries. The publications of Yousuf (USA) [5] and Kostick (USA) [13] also described trauma as the most common primary cause for evisceration (29.0%). Comparing our results to those of developing countries, we can observe that infection/inflammation is the most common cause for evisceration there [Jordan: 52.4% [8]; Mexico: 47.4% [7]], followed by ocular injuries (Jordan: 33.3% [8]; Mexico: 23.1% [7]). This phenomenon may be explained by a possible higher prevalence of infections/inflammations in developing countries with warmer climate, as well as the unavailability of modern ophthalmic treatment options and the lack of surgical tools in developing countries.

The most common clinical immediate evisceration indications were painful blind eye secondary to glaucoma (34.0%), atrophial/phthisis bulbi (26.1%) and endophthalmitis (17.4%). In Saudi Arabia [6], on the other hand,

the most frequent clinical immediate cause prior to evisceration surgery was endophthalmitis (45.5%), being glaucoma only the third most common (7.5%) cause, similarly to primary indications observed in other developing countries. However, similarly to the Hungarian data, the second most common clinical diagnosis prior to surgery in Saudi Arabia [6] was atrophial/phthisis bulbi (20.3%).

Sympathetic ophthalmia is an autoimmune disorder associated with granulomatous inflammation when the injured or operated 'sympathising' eye causes a vision-threatening inflammation in the other otherwise healthy 'sympathised' eye. Following severe traumas, significant damage to the eye and in case of complete loss of vision most ophthalmologists prefer enucleation over evisceration in order to avoid the development of sympathetic ophthalmia. This practice among ophthalmologists is based on the international literature [16]. Frost [17] reported few cases of sympathetic ophthalmia following evisceration surgery in his case series in 1887, Green [18] described four cases of sympathetic ophthalmia after evisceration in 1974. In these four cases, evisceration was performed 7–24 days after ocular injury, therefore, it cannot be stated that sympathetic ophthalmia was the direct consequence of injury or surgery. We do not know either whether sympathetic ophthalmia could have been avoided by performing enucleation in these cases. Recent studies with larger sample size did not report any sympathetic ophthalmia after evisceration performed due to trauma, we did not observe any case in our present sample, either [10, 19, 20].

Suspected intraocular malignant tumour is the only absolute contraindication of evisceration. If an intraocular malignant tumour is suspected, enucleation should be performed instead of evisceration in all cases. With the use of modern ultrasound imaging, misdiagnosing intraocular malignancies has become less frequent nowadays. In addition, removed tissue samples must be sent for histopathological examination after every evisceration to rule out any possible malignancy [3]. During the 11 years of the research, at our department no case of intraocular malignant tumour was detected in the samples removed during evisceration.

Evisceration causes less damage to the orbital anatomical structures compared to enucleation, so it may be performed under peri- and retrobulbar anaesthesia and is better tolerated by patients [5]. Moreover, evisceration is recommended instead of enucleation to prevent intracranial spread of infection in case of severe endophthalmitis [21].

Better aesthetic rehabilitation and implant motility can be achieved postoperatively with evisceration compared to enucleation [7]. The rate of complications due to orbital implants (14.3%) was somewhat lower in our sample than those reported in the literature (16.2–28.6%) [6, 8]. The incidence of implant extrusion (4.8% vs. 1.7–7.1%) [6–8], conjunctival wound healing disturbances (2.4% vs. 4.0–11.0%) [4, 5, 9] and orbital infection/inflammation (2.4% vs. 7.0%) [5] were found to be slightly lower than those previously reported in other countries.

CONCLUSIONS

In summary, the most common indications for evisceration surgery in a tertiary eye hospital in Hungary were ocular injuries, painful blind eye secondary to surgical diseases, and atrophial/phthisis bulbi. Sympathetic ophthalmia did not occur after evisceration. After ruling out any intraocular malignant tumour, evisceration surgery combined with the placement of a silicon-based orbital implant is an effective and safe therapeutic possibility in most of the cases indicating anophthalmic surgery.

Ethical approval: The study was performed in accordance with the Declaration of Helsinki Guidelines for Human Research.

Authors' contribution: GT designed and conducted the survey. GLS, BC, ZA and MTP conducted the survey and analysed the data. OL planned the survey and reviewed the manuscript. NS and ZZN designed the survey, edited and reviewed the manuscript. All authors agree with the final version of the manuscript and agree to be accountable for all aspects of the work.

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