

## Original article

### Impact of COVID 19 pandemic on number of destructive ocular surgery (Evisceration) at tertiary care hospital

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#### Abstract

**Background:** 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.

**Methods:** The purpose of this study is to evaluate the influence of COVID 19 pandemic on the number of incidence of evisceration surgery. We included in our retrospective review, all eviscerations performed between January 2018 and December 2021 at the Department of Ophthalmology of BIRDEM General Hospital, Dhaka. Clinical indications were classified into six groups: painful blind eye due to endophthalmitis, absolute glaucoma, Perforating corneal ulcer, severe trauma, phthisis bulbi and cosmetic reasons. All patients seen during the study period with a diagnosis of painful blind eye were identified through review of medical records and included in the study. Incidence was determined for three monthly between January and December 2020 & 2021 and compared to data from prior years (2018,2019) via ANOVA test to evaluate for changes of trend of evisceration surgery after the onset of the pandemic.

**Result:** Evisceration was performed in 58 eyes of 58 patients (54.3% males, age  $42.0 \pm 18.4$  years). The most common indications of evisceration were endophthalmitis, absolute glaucoma, perforating corneal ulcer. Painful blind eye due to endophthalmitis (31.03%) was the most common clinical indication for evisceration, followed by absolute glaucoma (25.86%), Perforating corneal ulcer (15.52%), severe trauma (10.34%) phthisis bulbi (12.07%) & cosmetic reasons (5.17%). The incidence of painful blind eye rose significantly between January to December, 2021 compared to the same time frame in 2018, 2019 and 2020. The rise in evisceration surgery incidence in 2021 was statistically significant ( $P < 0.05$ ) when compared to the years 2018,2019 and 2020. The most common demographic characteristics were age 41-60 years and male gender. Painful blind eye and phthisis bulbi due to endophthalmitis and absolute glaucoma represent the most common indications for ocular evisceration. Reduced number of clinical follow up during COVID 19 pandemic correspond to an increased incidence of painful blind eye.

**Conclusion:** This risk could have been minimized, by maintaining proper follow up, by taking the medication or not discontinuing medication without permission of physician.

**Keywords:** Evisceration, COVID 19 pandemic, Endophthalmitis

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#### Introduction

The novel coronavirus, named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was identified for the first time in December 2019 after a series of acute atypical pneumonia cases occurred in Wuhan, China<sup>1</sup>. The COVID-19 pandemic in Bangladesh is part of the worldwide pandemic of coronavirus disease 2019 (COVID-19) caused by SARS-CoV-2. The virus was confirmed to have spread to Bangladesh in March 2020. The first three known cases were reported on 8 March 2020 by the country's epidemiology institute, IEDCR. Since then, the pandemic has spread day

by day over the whole nation and the number of affected people has been increasing. Bangladesh is the second most affected country in South Asia, after India.<sup>2</sup>

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)<sup>3,4</sup>

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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<sup>5</sup> The use of spherical glass implants during evisceration was firstly described by Mules in 1884<sup>6</sup>.

There have been several studies on the indications for evisceration, but these surveys are not current or were published in developing countries<sup>7-10</sup>. In Bangladesh, no publications have yet been published with regards to the indications of evisceration.

The aim of our study was to determine whether the incidence of evisceration surgery increased significantly in at tertiary care hospital following the delayed and irregular follow up in response to the COVID-19 pandemic .

#### Materials and methods

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

evisceration in Bangladesh. A retrospective review was conducted on patients who underwent evisceration surgery between January 2018 and 31 December 2021 at the Department of Ophthalmology of of BIRDEM General Hospital , Dhaka . For each subject, clinic-pathological data were reviewed, which included patients' demographics, indications for evisceration, B-scan ultrasound reports, operative details.

Immediate clinical indications for evisceration (last diagnosis before anophthalmic surgery) were divided according to the modified classification of de Gottrau et al.<sup>11</sup> into the following groups: painful blind eye due to endophthalmitis (Fig1.a), glaucoma (Fig1.b), phthisis bulbi, cosmetic reasons, acute trauma (Fig1.c) (if evisceration was performed within one month after the injury) Statistical analysis was performed with Statistica 11.0 (StatSoft Inc., Tulsa, OK, USA) software. Comparisons between groups were performed with  $\chi^2$  test .Analysis of variance (ANOVA) was used to determine whether the differences in painful blind eye incidence at different time points were statistically significant.

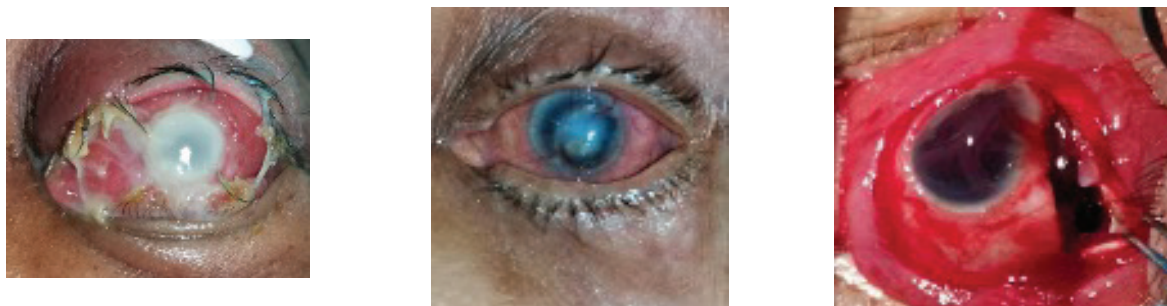


Fig 1: a) Endophthalmitis      b) Absolute glaucoma      c) Severe trauma

#### Surgical technique

All patients provided fully informed written consent for surgery including an explanation of the possible postoperative complications. All surgeries were performed under general anesthesia. a retrobulbar injection of 5 ml of 50:50 Bupivacaine HCL with lidocaine and 1:100,000 adrenaline were administered

360° peritomy was created, and a stab incision was made in the sclera about 1 to 2 mm from the surgical limbus with a no. 11 blade scalpel. The incision was continued circumferentially around the limbus with Wescott scissors. An evisceration spoon was used to separate the uveal tissue from the scleral shell, and the globe contents were removed. The optic disc was cauterized and the inside of the scleral shell was cleaned and debrided. Anterior relaxing incisions were made in the sclera nasally and temporally,

avoiding the medial and lateral rectus muscles. An appropriately sized silicone sphere implant that allowed scleral closure without undue tension was inserted primarily (as with enucleation) in All cases. The scleral shell was closed with 5-0 polyglactin (Vicryl, Ethicon Inc.) in a horizontal mattress sutures. The anterior Tenon's capsule and conjunctiva were closed in layers with 5-0 and 6-0 polyglactin (Vicryl, Ethicon Inc.) sutures, respectively. The entire globe (enucleation) or intraocular contents (evisceration) were sent for histopathological examination in all cases.

A medium or large conformer was inserted, and antibiotic ointment was placed on the ocular surface. Two frost sutures (4-0 silk) were applied over a bolster for 2 weeks and an eye patch was applied for 1 week. Intraoperatively, the patients received an intravenous broad-spectrum antibiotic and were discharged on oral antibiotics for 10 days. The conformer was maintained for 6 to 8 weeks.

**Results**

In our retrospective study, we assessed 58 eyes of 58 patients who underwent evisceration between 2018 and 2021. There were 31 (53.4%) males and 27 (46.6%) females in the study population. The patient age was 42.0±18.4 years (range: 10 – 90 years). The patients' demographics are summarized in Table 1.

**Table 1 Patients' demographic data**

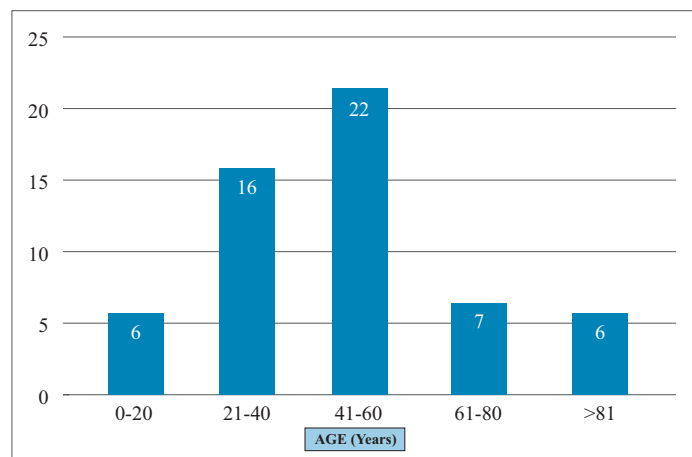
Demographic variables			Percentage
Age		10 –90	
Gender	Male	31	53.4%
	Female	27	46.6%
Laterality	Right eye	23	39.7%
	Left eye	35	60.3%

The indications of anophthalmic surgery (evisceration) according to age are shown in Tables 2

**Table 2: Indications for Evisceration surgery according to age**

Indication of surgery	<20 years	21-40 year	41-60 years	61-80 years	>81 years
Endophthalmitis	1	5	7	3	2
Absolute glaucoma	1	4	8	1	1
Perforating corneal ulcer	1	3	2	2	1
Severe Trauma	1	1	2	1	2
Phtisis bulbi	2	1	3	0	0
Cosmetic reasons	0	2	1	0	0

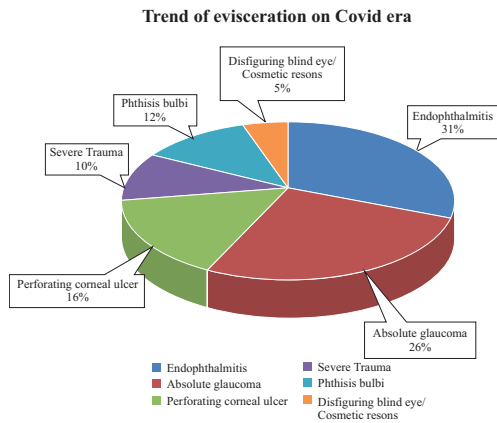
The patient age was 42.0±18.4 years (range: 10-90 years). Age distribution of the subjects is shown Fig.2



**Fig 2 :** Demographic distribution of patients according to age.

**Table 3 : Trend of evisceration on COVID era**

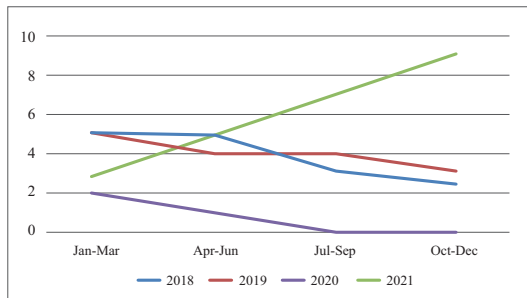
	2018	2019	2020	2021	Total	Percentage
Endophthalmitis	3	5	1	9	18	31.03%
Absolute glaucoma	2	4	1	8	15\	25.86%
Perforating corneal ulcer	2	3	0	4	9	15.52%
Severe Trauma	3	1	0	2	6	10.34%
Phtisis bulbi	3	2	1	1	7	12.07%
Disfiguring blind eye / Cosmetic reasons	2	1	0	0	3	5.17%
Total number of cases	15	16	3	24	58	



**Fig 3:** Trend of evisceration on COVID era

**Table 4:** The incidence of evisceration surgery per three month between 2018, 2019, 2020 & 2021.

	Jan - March	April - June	Jul - Sep	Oct - Dec	P - Value
2018	5	5	3	2	0.073
2019	5	4	4	3	0.081
2020	2	1	0	0	0.097
2021	3	5	7	9	0.051



**Fig 4:** The incidence of evisceration surgery per three month between 2018, 2019, 2020 and overlaid by incidence of those throughout 2021.

**Discussion**

Evisceration is the last resort of therapeutic tool in ophthalmology for blind and often painful eyes if no other eye preserving therapeutic options are available. It is most often performed following inflammation/infection, severe ocular trauma or in case of painful blind eye<sup>12</sup>. To our knowledge, our publication is the first study assessing the indications for bulbar evisceration in a tertiary eye care centre in Dkaka. The ratio of annually performed evisceration and enucleation surgeries may differ in each country, with evisceration being preferred worldwide. Evisceration is more commonly performed than enucleation. In our institute 58 eviscerations were performed between 2018 and 2021. 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 42.0 years, which is lower than the mean

age of 47.1–54.0 years observed in other studies<sup>7-10,15,16</sup>. Concerning mean age, there had been no difference previously between developing (47–54 years)<sup>8-10,16</sup> and developed countries (49–51 years)<sup>7,15</sup>, however, the eviscerations were performed at a young adult age in Dhaka than in those regions. Peak incidence of evisceration in Dhaka was between 41 and 60 years of age, which means a significantly young adult age group compared to the peak incidence at 61–70 years observed in Mexico<sup>9</sup>. Similarly to other reports, our study also detected a slight male predominance (53.4%, 46.6%) which may be explained by a higher prevalence of ocular injuries in male patients<sup>7-10,15,16</sup>. 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).

Most common primary indications for evisceration in our study were painful blind eye due to endophthalmitis (31.03%) followed by glaucoma (25.86%), Perforating corneal ulcer (15.52%), severe trauma (10.34%) atrophia/phthisis bulbi (12.07%), cosmetic reasons (5.17%). These results show similar trends to the aetiological factors detected in developed countries. The publications of Yousuf (USA)<sup>7</sup> and Kostick (USA)<sup>15</sup> 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 (endophthalmitis) is the most common cause for evisceration there [Jordan: 52.4%<sup>10</sup>; Mexico: 47.4%<sup>9</sup>, followed by ocular injuries (Jordan: 33.3%<sup>10</sup>; Mexico: 23.1%<sup>9</sup>). This phenomenon may be explained by a possible higher prevalence of infections/inflammations in developing countries with delate visit, as well as lack of maintain proper follow up in COVID 19 pandemic.

Chaudhry et al<sup>8</sup> reported that the most frequent clinical immediate cause prior to evisceration surgery was endophthalmitis (24%), Phthisis bulbi (1.07%) cause, similarly to primary indications endophthalmitis (31.03%) observed in our study. Dado et al<sup>16</sup>, on the other hand, the most frequent clinical immediate cause prior to evisceration surgery was endophthalmitis (54%), being trauma only (14.3%) cause, similarly to primary indications observed in other developing countries.

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<sup>18</sup>. Frost<sup>19</sup> reported few cases of sympathetic ophthalmia following evisceration surgery in his case series in 1887, Green<sup>20</sup> 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<sup>12,21,22</sup>.

Additionally, the rapid decline in painful blind eye incidence observed in 2020 may be attributable to "crisis fatigue" and resultant decreased evisceration surgery months after the onset of the pandemic. In 2020, Decrease in painful blind eye incidence correlates with the low public compliance seen in the July–September and Oct–December study. A similar phenomenon may be present in 2019 in which evisceration surgery incidence decreased in July–sep and Oct–Dec despite still being increased relative to prior years. Peak painful blind eye incidence corresponded to a period of relatively low incidence of evisceration surgery of COVID-19 area (Fig. 4).

In 2018, 2019, 2020, decline in evisceration surgery rate in July to December following an initial rise in April to June, corresponding to the peak painful blind eye incidence we observed in January to March. In 2021 evisceration surgery rates were lowest in January to April and rose steadily until December, with the low COVID-19 incidence in July to December corresponding to peak observed evisceration surgery incidence in October to December. The rise in evisceration surgery incidence in 2021 was statistically significant ( $P < 0.05$ ) when compared to the years 2018 and 2019. This reciprocal relationship may suggest that low COVID 19 rates in each period correspond with increased evisceration surgery rate.

**Limitations:** Single center study within a limited time frame; therefore, results cannot be generalized.

#### Conclusion

Evisceration remains a popular and effective surgery. The most common demographic characteristics were age 41–60 years and male gender. Painful blind eye and phthisis bulbi due to endophthalmitis and absolute glaucoma represent the most common indications for ocular evisceration. Irregular, delayed and reduced number of clinical follow ups during covid 19 pandemic (specially during the period of lockdown) correspond to an increased incidence of painful blind eye. This risk could have been minimized, by maintaining proper follow up, by taking the medication regularly or not discontinuing medication without permission of physician.

#### Conflict of interest

The authors declare that they have no conflict of interest.

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