

Study of the indications and changing trends of enucleation and evisceration in West Malaysia

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Abstract

• **AIM:** To study the demographic pattern and indications for enucleation and evisceration in West Malaysia, and to evaluate the changing trends of the same over the past three decades.

• **METHODS:** In a retrospective hospital based study, case records of all patients who underwent enucleation and evisceration at University of Malaya Medical Centre over a period of 20 years (1985/2004) were reviewed. Age, gender, ethnicity of patients, indications for enucleation and evisceration were evaluated.

• **RESULTS:** Out of 160 patients, enucleation was done in one eye in 85 patients and evisceration was done in one eye in 75 patients during the study period. The mean age of patients was 36.4 years with a range of 6 months to 90 years. In our study, panophthalmitis (26.9%) and retinoblastoma (18.8%) were the most common causes of evisceration and enucleation respectively. Infections of the eye contributed to 72.0% of eviscerations while tumors contributed to 51.8% of enucleations. There was a significant decrease in the removal of eyes over the past three decades in our hospital. The number of removal of eyes for glaucoma and trauma-related causes significantly reduced while removal for infection-related causes and painful blind eyes significantly increased when compared to the figures reported three decades ago from our hospital.

• **CONCLUSION:** Panophthalmitis and intraocular tumors are the major indications for the removal of eyes. Although the frequency of removal of eye has significantly decreased over time in our country, the indications for the same suggest that there is a need of further improvement of eye care services in Malaysia.

• **KEYWORDS:** enucleation; evisceration; panophthalmitis; retinoblastoma; Malaysia

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INTRODUCTION

Removal of the eye by either enucleation or evisceration is a standard surgical treatment modality used for unresponsive end-stage of the disease. It may be necessary in severe ocular trauma with blindness, to relieve pain in a blind eye, to treat some intraocular malignancies, in endophthalmitis unresponsive to medical therapy and for cosmetic improvement of a disfigured blind eye. The indications of eye removal due to various causes have changed during past decades because of improved diagnostic techniques and better management. A previous study in US^[1] showed a decreasing incidence of enucleation during the past decade, but the mean annual age and sex adjusted incidence is still 2.8 per 100 000 population. The last study on removal of the eye in our country was done almost three decades ago^[2] and since then the prevalence and the indications for eye removal have changed. We aimed to study the current prevalence and indications for eye removal in West Malaysia and compared this to the previous study, and to analyze the trends of change in prevalence and indications of eye removal over the past three decades. This would aid us in assessing the efficacy of early diagnostic techniques and improving the better modes of treatment.

PATIENTS AND METHODS

We reviewed the case records of all patients who underwent enucleation and evisceration over a 20 year-period (1985/2004) in University of Malaya Medical Centre, a tertiary eye care referral centre in Kuala Lumpur, Malaysia. The patients' demographic data (age, gender and ethnic distribution) and the indications for eye removal were evaluated. As Malaysia is a multiracial country, the patients

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were of three major ethnic groups comprising the Malays, Chinese and Indians. The surgical method of eye removal was divided into either enucleation or evisceration, and the causes were divided into six major groups: trauma, infection, tumor, glaucoma, painful blind eye and physical eye. The final diagnosis was based on the clinical history, eye examination findings and investigations available in the case records. A total of 160 cases were studied. The current prevalence and indications of eye removal was then compared to an earlier study published from the same centre three decades ago to ascertain the changing trend in eye removal^[2]. Descriptive statistics were used and the data were presented in frequency and proportion. Association between socio-demographic factors and enucleation and evisceration were determined by using Chi-square test and trend analysis was used to compare the time trends. $P < 0.05$ was taken as significant.

RESULTS

Out of the 160 eyes (in 160 patients) removed during the 20 years period (1985/2004), 75 (47%) were eviscerated and 85 (53%) were enucleated. The prevalence of eye removal in this study was 0.13% of all new ophthalmic cases (123 858) seen in the eye clinic; 0.75% of all ophthalmic admissions (21 238) treated in the eye ward; and 0.96% of all eye operations (16 527) performed in the eye OT during the 20-years period (Figure 1).

Males (60%) outnumbered females (40%) in our study. Males had a higher percentage of enucleations (57.3%) than eviscerations (42.7%) whereas females had a higher percentage of eviscerations (53.1%) than enucleations (46.9%). However, there was no significant difference between gender and individual causes of eye removal.

Among the three predominant races in multicultural Malaysia, the Chinese were leading at 49% of all cases of eye removal followed by the Malays (28.9%), the Indians (18.2%) and other minority races (3.9%). Infection (42.9%) and tumors (72.7%) were significant causes for eye removal in the Chinese ($P=0.003$, $P=0.001$) as compared to the other races. In infection-related cases, out of the 24 eyes removed in the Chinese group, 19 were removed following endophthalmitis and 5 following perforated corneal ulcers. In tumor-related causes, out of the 32 eyes removed in the Chinese group, 19 were removed for retinoblastoma (histologically proven) and 13 for malignant melanoma (histologically proven). There was no significant difference noted in any of the ethnic groups for trauma-related, painful blind eye and phthical-related causes of eye removal.

The age of patients ranged from 6 months to 90 years with a mean age of 36.4 years. Patients aged 30 years and below constituted 44.4% of all the cases. There were three age-group

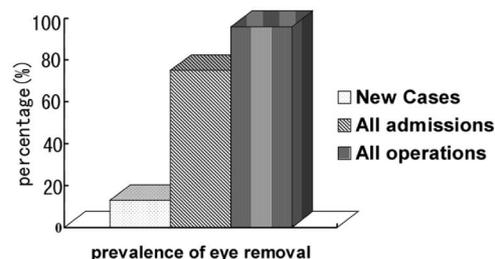


Figure 1 Prevalence of removal of eyes in relation to the number of outpatients, admissions and operations in 1985/2004

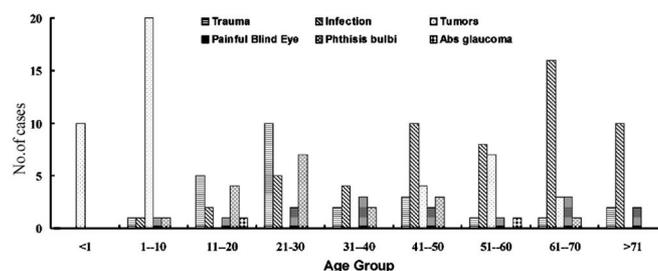


Figure 2 Distribution of different causes according to age group

ranges that were significantly ($P=0.021$) affected in this study; 1-10 years (24 eyes-15%), 21-30 years (24 eyes-15%) and 61-70 years (24 eyes-15%). In the first age group (1-10 years), enucleation was the main method of removal (95.8%); in the second age group (21-30 years), enucleation formed slightly more than half (54.2%) of all the eyes removed; and in the third age group (61-70 years), evisceration was the main method of removal (79.2%). The differences of method of removal between these three groups were statistically significant ($P=0.000$). Males and females were equally affected in the first age group (50% each); males formed the highest number in the second age group (83.3%); whereas females formed the highest number in the third age group (70.8%). The tumor-related causes were the main indication of removal in the first age group (45.5%; $P=0.000$), the trauma-related causes were the main indication of removal in the second age group (40.0%; $P=0.001$) and the infection-related causes were the main indication of removal in the third age group (28.6%; $P=0.000$, Figure 2).

In the present study, the most common indication of eye removal was infection (56 eyes, 35%), followed by tumor (44 eyes, 27.5%) (Table 1). The primary cause of enucleation was the tumor-related (44 eyes, $P=0.000$) and the primary cause of evisceration was the infection-related (54 eyes, $P=0.000$, Table 2). The total number of eye removals decreased significantly ($P=0.008$) over the three decades in our hospital (Table 3). This indicates a definitely

Table 1 Causes for removal of eyes during 1985/2004

Diagnosis	n	%
Panophthalmitis	43	26.9
Corneal ulcer	13	8.1
Retinoblastoma	30	18.8
Malignant melanoma	14	8.8
Trauma	25	15.6
Phthisical eye	18	11.2
Painful blind eye	15	9.4
Absolute glaucoma	2	1.3

Table 2 Diseases for enucleation and evisceration during 1985/2004

Disease	Enucleation (n=85)		Evisceration (n=75)	
	n	(%)	n	(%)
Infection	2	(2.4)	54	(72.0)
Tumour	44	(51.8)	0	(0)
Trauma	12	(14.1)	13	(17.3)
Phthisical eye	15	(17.6)	3	(4.0)
Painful blind eye	12	(14.1)	3	(4.0)
Absolute glaucoma	0	(0)	2	(2.6)

Table 3 Eyes removed over a decade in relation to the total number of eye operations performed

Time period	Operations performed	Eye removal n(%)
1968/1976	3982	2.9 %
1985/1994	7394	1.2 %
1995/2004	9133	0.8%

decreasing trend in removal of the eye from 1968 until today.

Time trends in removing eyes for different causes showed that the number of removal for glaucoma and the trauma-related causes had dropped significantly during 1985/2004 period compared to 1968-1976 period ($P=0.001$). However, the number of removal for infection-related causes and painful blind eye had increased significantly over the same period ($P=0.000$, $P=0.007$). There were no real changes in eye removals for tumor and phthisical eyes (Table 4).

DISCUSSION

Although removal of the eye has been a common practice for end-stage eye diseases in the past, there has been a decreasing trend in this choice of surgery over the last three decades. The frequency of removal of eyes in the present study is slightly higher than that of the figure reported from Iceland, but much lower than that of the figures reported from other countries (Table 5). The possible reason for the lowered figure in the present study when compared to the previous study [2] reported from the same hospital could be improvement of eye care facilities all over Malaysia in the management of eye diseases, thus preventing enucleation

Table 4 Causes in removal of eye over the past three decades

Causes	n(%)	
	1968/1976 Narasimha & Chandran ^[2]	1985/2004 present study
Trauma	36 (31.6)	25 (15.6)
Absolute glaucoma	28 (24.3)	2 (1.3)
Tumour	24(20.9)	44(27.5)
Infection	17(14.8)	56(35.0)
Phthisical eye	7(6.1)	18(11.3)
Painful blind eye	3(2.6)	18(11.3)

Table 5 Comparative frequency of removal of eyes in different countries

Country	Period	Eyes removed	
		n	yr
Israel ^[3]	1960/1989 (30)	463	15.4
Iceland ^[4]	1964/1992 (29)	200	6.9
Poland ^[5]	1982/2002 (20)	367	18.4
Malaysia ^[2]	1968/1976 (9)	115	12.8
India ^[6]	1995/1999 (3.5)	150	42.8
Present Study	1985/2004 (20)	160	8.0

and evisceration.

The predominance of male patients undergoing enucleation (57.3%) as observed in our study is similar to that reported from Switzerland (57.7%) [7] and Turkey (70.8%) [8]. However, we did not find any significant association between gender and individual causes of eye removal. Malaysia being a multi-racial country with three major races (Malays, Chinese and Indians) living together, it is interesting to note that Chinese had the highest percentage of eye removal among the three races. Infection and tumor-related causes were significantly highest among Chinese too. In infection, out of 24 eyes removed in this racial group, 19 eyes were for panophthalmitis due to postoperative infection after ocular surgery, exogenous penetrating ocular injuries and endogenous causes while another 5 eyes were removed for perforated corneal ulcers. In tumor related causes, out of 32 eyes removed in the Chinese, 19 eyes were for histologically proven retinoblastoma and another 13 eyes were for histologically proven malignant melanoma. It is not known why Chinese have the highest incidence of eye removal in our centre and why causes like infection and tumor are predominantly in this group (may be coincidental finding). There are three major centres in and around Kuala Lumpur (one university hospital, one federal territory hospital and one state hospital) performing enucleation and evisceration procedures, in addition to 12 other state hospitals in the whole country. Therefore, a multicentre trial, if carried out in the country, may probably help in confirming our observations.

Reports from US [9] and Switzerland [7] revealed that enucleation was more often done in elderly aged (fifth and sixth decade) people. However, in addition to this, we found that enucleation was also more often done in the first decade of life in Malaysia; most probably because of retinoblastoma. Similar to our observation, two Asian studies [6, 8] had also reported the highest incidence of enucleation in children. In sharp contrast to studies in western literature that showed trauma and tumor as the major indications of eye removal in the elderly age group [9-11], we found the infection related causes as a major indication for eye removal in the age group of 61-70 years. This is probably because well-developed geriatric care is still in its infancy stage in our country. It is also worrying to note that almost half of the eye removals were performed in young patients below the age of 30 who were in their prime life and this could contribute to the economic loss and burden for the country.

The comparison with other studies is difficult mainly because the definitions of the groups are not always similar, for example in some studies the term 'enucleation' encompasses both actual enucleation and evisceration carried out while in other centers, they solely studied either enucleation or evisceration procedure individually. Tumor was found to be the predominant cause of enucleation in our study and this finding is similar to the results of various studies published earlier [6,8,11]. However, many other studies found trauma as the predominant cause of enucleation instead [5,7,9]. For evisceration, infection followed by trauma were found to be the predominant causes in our study and this echoed similar findings on evisceration in north India [12].

Looking at the change in the trend of eye removal over the past three decades, glaucoma and trauma-related causes formed the top two indications for removal of the eye in 1968/1976, which has been replaced by infection and tumor related-causes in the present study (Table 4). There has been a significant drop in the percentage of removal of eye due to glaucoma and trauma-related causes, and it is similar to the one reported from Israel[3]. The possible explanation for this may be the improvement of ophthalmic care in our country, availability of a larger number of trained ophthalmologists in recent years, better instrumentation, earlier detection of glaucoma and appropriate therapy; and prompt intervention and better management of ocular trauma cases.

However, a significant rising trend was observed for eye removals due to infection and painful blind eye. This trend is worrying because despite a better infrastructure and availability of trained ophthalmologists, many patients still present for treatment in late stage of disease; many more still seek other methods of treatment such as traditional herbal therapy, and many are ignorant of symptoms and signs of eye disease. A better health education especially pertaining to eye care health and dissemination of information about eye diseases is needed in our country.

This is the first study that analyzed the indications and changes of eye removal trends over the past three decades in this part of the world. Although the frequency of eye removals is decreasing just like in other western studies, the indication of eye removal varies slightly in this part of the world. Overall, the incidence of eye removal has decreased over time primarily because of improved ophthalmic care in this country over the past three decades.

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