TMJ
Original research
Published by OJS
dx.doi.org/10.4314/tmj.v28i2

OPEN ACCESS JOURNAL

Indications for surgical eye removal in Dar-Es-Salaam Tanzania; A one year retrospective study

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Published by OJS
dx.doi.org/10.4314/tmj.v28i2

ABSTRACT

Background:
Surgical removal of the eye is the last alternative to manage several eye conditions. Removal of the eye evokes emotional, mental, behavioral, psychological and economical challenges to the affected individual and the family as well. Understanding of the proper indications for surgical eye removal is of paramount importance for establishing prevention strategies.

Objective: To determine the indications for surgical eye removal at two tertiary eye hospitals in Dar Es Salaam.

Methodology: This was a retrospective descriptive study conducted at two tertiary eye clinics of Muhimbili and Comprehensive Community Based Rehabilitation Hospitals in Dar es Salaam. The study involved review of 248 case notes of patients who had undergone surgery for removal of the eye for a period of 20 months from January 2011 to August 2012. Demographic characteristics, diagnosis and surgical procedure were recorded on a structured questionnaire. Data was analyzed using SPSS version 17 software. Frequency tables were used to summarize data. Chi square test were used to test for statistical significance of an association between variables.

Results: A total of 306 patients had undergone surgical eye removal from January 2011 to August 2012. Two hundred forty eight case notes with complete information (response rate of 245/306 (81%) were included in the analysis. About 61% of case notes included in the analysis were of male patients.The commonest indications for Surgical eye removal were infections (endophthalmitis/panophthalmitis) (35.8%), tumours (24.2%) and trauma (21.4%). Evisceration was the commonest procedure, it was performed to 178(71.8%) patients; it was followed by enucleation (19.4%) and exenteration (8.9%). Two hundred thirty three (94.0%) eyes were blind and 6(2.4%) had visual impairment pre-operatively.

Conclusion: The commonest indications of surgical eye removal at MNH and CCBRT in Dar es Salaam were infections (endophthalmitis/panophthalmitis), tumours and trauma. Earlier diagnosis and management of eye infections and tumours can help in improving post-treatment visual outcome and reduce instances of surgical eye removal. Creation of awareness among the general public and primary health care providers about improving health seeking behavior and timely referral of patients with eye conditions is recommended.

Key words: Indications, surgical eye removal.

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dx.doi.org/10.4314/tmj.v28i2

INTRODUCTION

Surgical eye removal of the human eye is the last treatment option for a variety of end stage eye conditions. An artificial eye or ocular prosthesis may be inserted to replace the removed eye for cosmetic purposes only. Eye removal evokes emotional, mental, behavioral, psychological and economical challenge to the affected individual and the family as well.[1] The commonest known surgical procedures for eye removal include: enucleation, evisceration and exenteration. Enucleation is the removal of the eyeball and optic nerve, leaving the orbital contents in place. Evisceration is the removal of the intraocular contents with or without the cornea while preserving the sclera, optic nerve and orbital fat. In exenteration the entire orbital contents including the eye, extra ocular muscles, fat and connective tissues are removed.[2] Exenteration is cosmetically unacceptable to many patients and is used as the last option management where locally extensive life threatening tumours are involved.

The magnitude and indications for removing the eye vary between high and low resource countries due to prompt access to medical care[3], higher prevalence of some medical conditions[4] and trauma prevalence due to occupational accidents and conflicts[5]

Infections (endophthalmitis/panopthalmitis) and trauma were documented as the major indications for surgical eye removal in Africa; their prevalence's ranged from 31% to 48% for infections and 6% to 20.8% for trauma.[6, 7,] Human Immunodeficiency virus infection has impacted on the indications for surgical removal of the eye due to increased HIV related infections and ocular tumours.

Reduction of the incidences for surgical removal of the eye is possible if the major causes are known and strategies to prevent them are established. We found no documented study on indications for surgical eye removal in Tanzania. In this study we sought to identify the diagnoses that necessitated eye removal, the procedures performed and their relationship to demographic features.

METHODOLOGY

Study Design

Descriptive study was conducted.. Data were collected retrospective to and included patients from 1st January 2011-31st August 2012.

Study setting

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Tertiary eye clinics of Muhimbili National Hospital (MNH) and Comprehensive Community Based Rehabilitation in Tanzania (CCBRT) in Dar es Salaam were involved. The eye department at MNH provides tertiary eye services to about 100 patients daily while an average of 300 patients are attended daily at CCBRT. A total of 10037, patients were attended between 1st January, 2011 and 31st August 2012 at MNH. The two hospitals were selected for the study as they are the main tertiary referral centers for eye conditions in the city of Dar es Salaam and the rest of the country.

Study population

A total of 328 case notes of children and adults patients of all ages who had undergone surgical removal of the eye at MNH and CCBRT from 1st January 2011to 31st August 2012 were eligible for the study.

Sampling and sample size

We used the following eligibility criteria to select our sample population;

1. All adults and children who had undergone surgical removal of the eye during the study period were eligible for the study.

2. A total of 248 patients whose case notes had complete information were recruited for the study.

Data collection procedures:

All case notes in which eye /eyes had been removed for the period of study were reviewed. Information regarding demographics, visual acuity, and diagnosis were extracted, recorded on a structured questionnaire, then transferred to SPSS version 17 software for analysis. Chi-square test and p-value were used to assess the level of statistical significance of an association between indications for surgical eye removal and other variables like demographic features and surgical procedures. This study was ethically approved by the Ethics Committee of Muhimbili University of Health and Allied Sciences. Permission to conduct the study was obtained from heads of the two hospitals.

RESULTS

A total of 306 (83form MNH and 223 from CCBRT) case notes of patients were identified to have undergone surgical eye removal during the study period. A total of 57 patients' case notes (30 from MNH and 27 from CCBRT) were either missing or had incomplete data and therefore were not included in the analysis.

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Table 1: Demographic features of the study population

Demographic characteristic		Hospital		Total
		MNH	CCBRT	
		No (%)	No(%)	No(%)
Age(years)	0-<5	5(2%)	24(9.7%)	29(11.7%)
	5 to 25	9(3.6%)	42(16.9%)	51(20.6%)
	26-35	6(2.4%)	25(10.1%)	31(12.5%)
	36-45	10(4%)	17(6.9%)	27(10.9%)
	46-55	6(2.4%)	29(11.7%)	35(14.1%)
	>55	16(6.5%)	59(23.8%)	75(30.2%)
	TOTAL	52(21.0%)	196(79.0%)	248(100%)
Sex	Male	33(63.5%)	118(60.2%)	151(60.9%)
	Female	19(36.5%)	78(39.8%)	97(39.1%)
	Total	52(100.0%)	196(100.0%)	248(100%)

Thirty percent of the study participants were aged >55 years while 29(11.7%) were children below 5 years. The male: female ratio was 1.5: 1

Table 2: The distribution of surgical indications for eye removal by sex

INDICATION	SEX		TOTAL	P-VALUE
	Male	Female		
Endophthalmitis/panopthalmitis	53(35.1%)	36(37.2%)	89(35.9%)	
Tumours	33(21.9%)	27(27.7%)	60(24.2%)	
Trauma	38(25.1%)	15(15.5%)	53(21.4%)	
Staphyloma	13(8.6%)	15(15.5%)	28(11.3%)	
Painful blind eye	14(9.3%)	4(4.1%)	18(7.3%)	
TOTAL	151(100.0%)	97(100.0%)	248(100.0%)	**0.0598**

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Overall, endophthalmitis/ panopthalmitis was the leading indication for surgical eye removal that occurred in 89(35.8%) patients. This was followed by tumors and trauma. The proportion of tumours among females was higher than among males while trauma affected more males than females. However, the differences were not statistically significant (p=0.0598).

The types of tumours as indication for surgical eye removal are shown in table 2.

Table 3: The distribution of tumours that indicated removal of the eye by age. n=60

TUMOURS	AGE(YEARS)		TOTAL
	<5	>5	
	No(%)	No(%)	No(%)
Squamous cell carcinoma of the conjunctiva (SCCC)	1(5.0)	27(67.5)	28(46.7))
Retinoblastoma	19(95.0)	5(12.5)	24(40.0)
Others	0(0.0)	8(20.0)	8(13.3)
Total	20(100.0)	40(100.0)	60(100)

The commonest tumour was Squamous Cell Carcinoma of the Conjunctiva (SCCC) which affected patients above 5 years of age. Retinoblastoma was the commonest indication among children below five years (Table 3).

Table 4: Indications for surgical eye removal by age

INDICATION	AGE (YEARS)						
	0-<5	5 -25	26-35	36-45	46-55	>55	TOTAL
	No(%)	No(%)	No(%)	No(%)	No(%)	No(%)	No(%)
Endo/Pan-Ophthalmitis	3(3.5)	18(20.2)	13(14.6)	7(7.9)	16(17.9)	32(35.9)	89(100)
Painful blind eye	0(0.0)	5(27.8)	1(5.6)	1(5.6)	1(5.6)	10(55.6)	18(100)
Staphyloma	4(14.3)	7(25.0)	4(14.3)	2(7.1)	2(7.1)	9(32.1)	28(100)
Trauma	1(1.9)	13(24.5)	11(20.8)	8(15.1)	6(11.3)	14(26.4)	53(100)
Tumours	21(35.0)	8(13.3)	2(3.3)	9(15.0)	10(16.7)	10(16.7)	60(100)
TOTAL	29(11.7)	51(20.6)	31(12.5)	27(10.9)	35(14.1)	75(30.2)	248(100)

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dx.doi.org/10.4314/tmj.v28i2

About a third (75/248, 30.2%) of patients aged more than 55 years had undergone surgical eye removal. The association between surgical eye removal and age was statistically significant ($p<0.05$).

Table 5: The distribution of performed surgical procedures by surgical indication

INDICATION	SURGIAL PROCEDURE			TOTAL
	Evisceration	Enucleation	Exenteration	
	No (%)	No(%)	No(%)	No(%)
Endophthalmitis	81(91.0)	8(8.9)	0(0.0)	89(100)
Tumours	0(0.0)	44(73.3)	16(26.7)	60(100.0)
Trauma	42(79.2)	9(17.0)	2(3.8)	53(100.0)
Staphyloma	26(92.9)	2(7.1)	0(0.0)	28(100.0)
Painful blind eye	16(88.9)	2(11.1)	0(0.0)	18(100.0)
TOTAL	165(66.5)	65(26.2)	18(7.2)	248(100)

The commonest surgical procedure was evisceration (165/248, 66.5%) which was performed for most indications. Exenteration was the least performed procedure and was exclusively performed for tumours. (Table 5).

The distribution of performed surgical procedures by age showed that enucleation was commonly (20/48, 41.7%) performed in children aged <5, exenteration was commoner (6/22, 27.3%) among the age group 36-45 years and evisceration was performed mainly in those aged >55 (65/178, 36.5%). Surgical procedures were equally distributed across sexes

Out of 248 surgically removed eyes, 233(94.0%) were blind preoperatively. Only (4%) had normal vision or were visually impaired preoperatively. The indication for removal of 7/10 eyes with normal or impaired vision were tumours. Endophthalmitis accounted for most (87/233, 87.2%) blind eyes.

DISCUSSION

Our findings showed that infectious diseases including endophthamitis and panopthahlmitis were the main indications for removing the eye in both sexes and at both tertiary centres. The leading role of

infections as indications for eye removal has been described in a number of studies conducted in Africa and the trend does not seem to have changed in the past thirty years. [6, 7, 8]

The primary causes for endophthalmitis and panopthahlmitis were corneal ulceration and post-traumatic eye infections. There were only two cases of post surgical endophthalmitis. The current series of patients are residents of urban and periurban areas. Patients in urban /periurban areas tend to start self medication using over the counter eye drops some of which may contain steroids which may worsen the infectious condition.[9] Inadequate knowledge among primary health facilities staff on proper diagnosis and management of eye conditions including corneal ulcers can lead to mismanagement by using steroids [10] or inadequate dosage and consequently leading to corneal perforation, endophthalmitis /panopthalmitis. Even when clinical diagnosis is reached, secondary health facilities lack the diagnostic facilities to perform corneal scraps and culture and sensitivity for specific microbial diagnosis. These cause a delay in initiating appropriate treatment which may result into worsening the condition, poor response to treatment and eventual removal of the eye.

Human immunodeficiency virus (HIV) infection is another factor for poor post-treatment outcome. . A study in Dar es Salaam reported that 60% of patients presented for treatment of corneal ulcers at MNH were HIV positive. Patients presented with severe and complicated corneal disease responded poorly to treatment.[11] It is probable that some of the of patients who undergone surgical eye removal in this series were HIV infected.

We did not investigate the use of harmful traditional eye medication (HTEM) in thist study. However, the use of HTEM was reported among patients in Nigeria (37.5%) and India (47.7%) before presenting to hospital[9].[12.] The use of HTEM is associated with fungal infection, further injury to the cornea and delay in presentation to hospital.[13] In our study, infectious conditions affected more than a third of elderly patients above 55 years. This conform to other studies,[6] and is probably related to reduced immunity with advancing age, tendency to abide to cultural norms like the use of traditional medications and poor access to health care among the elderly. There is a need to improve eye health education for patients to mitigate the use of harmful traditional eye medications and increase access to eye care.

The high proportion (60/245, 24.25%) of tumours as an indication for removal of the eye in the present study is in contrast to previous studies in Africa that used data collected before 2007 (5.2%-13%).[6,7,8,9] However, this proportion is in a similar range (20%-20.2%) to studies that included data collected between 2008-2011 in their series. [2, 8] The higher prevalence is due to an increase of SCC related to HIV

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dx.doi.org/10.4314/tmj.v28i2

infection. Similar to other studies in Africa, the other common tumor is retinoblastoma that accounted for 40% of the tumors in this study. Retinoblastoma comprised 50% of all tumours in the studies in Uganda[5] and Southern Nigeria.[8]

Similar to studies in developing countries [2, 14, 15] and as opposed to studies in the developed countries, the commonest procedure performed was evisceration (71.7%) followed by enucleation (21.7%) and exenteration (6.5%). This variation is based on the fact that the commonest indications for eye removal in our study were endophthalmitis/panopthalmitis that are managed by evisceration. Conditions where the eye has been damaged beyond repair, disfigured or blind and painful are also managed by evisceration or enucleation. However, evisceration is preferred due to its better cosmetic results.[16] In the developed world the commonest indication for surgical eye romoval are tumours that are managed by enucleation and exenteration.[17]

In low resource countries where other modern modalities for treatment of retinoblastoma are not available, removal of the affected eye provides cure and prolongs life. Additionally where modern imaging techniques are not available, enucleation allows confirmatory histological diagnosis and assessment of extent of spread of the tumour through the optic nerve.[18]This is necessary for planning further management including radiotherapy and chemotherapy in case the optic nerve shows extra ocular spread of retinoblastoma. Therefore enucleation was high among children below five years who are commonly affected by retinoblastoma.[18]

Enucleation was also performed for invasive SCCC. In the present study, exenteration was used sorely for advanced tumours involving extra ocular tissues. It was commonly performed for advanced SCCC among patients aged between 36-45 due to the relationship with HIV infection. The necessity to perform exenteration for advanced tumours in developing countries is mainly due to late presentation of patients to health facilities [19]. At times even when patients present early, some of them refuse enucleation, seek for alternative treatment and eventually come back with advanced tumours when exenteration is inevitable [2]. Similar to other studies [2, 20, 21] in different parts of the world, our study found more males undergoing eye removal than females. The male gender has been associated with outdoor activities that predispose them to trauma, infectious keratitis and subsequent endophthalmitis [22]

Limitations: Being a retrospective study, case notes that were missing or had incomplete information were excluded from the study. Missing records could reduce the magnitude of some variables of interest. However, the number of missing records is unlikely to grossly change the results.

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dx.doi.org/10.4314/tmj.v28i2

Conclusions.

The commonest indications for surgical eye removal in Dar-Es-Salaam are infections signifying late presentation to health facilities and low capacity to manage microbial keratitis and trauma. The incidence of tumours as an indication for surgical eye removal has increased in relation to HIV infection. Evisceration and enucleation are the main procedures performed. Efforts at improving health education on the importance of early health seeking behavior and primary eye care among the community should be emphasized.

Financial and non-financial competing interests

The authors have no proprietary interest in any materials mentioned in this article.

Acknowledgement

This study was made possible by financial support from the Muhimbili University of Health and Allied Sciences.

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