Causes of enucleation in Uganda

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This review is presented for the following reasons:

- (1) It seems important to know the causes of conditions in which less drastic treatment had to be abandoned.
- (2) The pattern of eye diseases in different parts of the world is not easily ascertained, but the causes of enucleations are usually recorded and available, and may give information on the relative frequency of different pathological conditions.
- (3) Few reports on this subject have hitherto been published (Ammann, 1962).

Material

The following data have been collected from Mulago Hospital, Kampala, Uganda. This is the main hospital in Uganda, and is the clinical teaching centre of the Medical School of Makerere University College. The Eye Department has 36 beds, and there are six other smaller eye units in Uganda. Most of our cases come from areas near the hospital, *i.e.* from Buganda, although some come from other regions. Our cases were unselected, and it was our aim to include all enucleations in this part of Uganda for the 5 years 1963 to 1967. Altogether 207 eyes were removed by enucleation, evisceration, or (in a few cases of malignant tumour) exenteration of the orbit. All were treated as inpatients. The indications for enucleation in this series do not differ from what is generally accepted in most clinics.

Findings

RELATIVE FREQUENCY OF ENUCLEATION

The number of enucleations has been calculated as a percentage of all out-patients, inpatients, and eye operations on in-patients in the Eye Department of Mulago Hospital in the 5 years under review. The results are given in Table I (opposite), which also shows comparable figures from Basel and Berlin (Amman, 1962).

Enucleations, expressed as a percentage of in-patients and of operations, are much more frequent in Mulago Hospital than in Basel 1950-54 and 1935-39 and in Berlin 1925-35.

CAUSES OF ENUCLEATION

We are here mainly interested in the *primary* cause, *i.e.* the *aetiology* of the condition leading to removal of the eye. The *immediate* cause, *i.e.* the condition of the eye immediately before enucleation, may be less interesting. In most cases the primary cause was easy to

Table I Cases of enucleation as percentage of patients and operations compared with figures from Basel and Berlin

Cases	Mulago Hospital 1963-67		Basel		Berlin
	Total new cases	Percentage enucleations	1935-39	1950-54	1925-35
Out-patients	105,984	0.2	0.5	0.2	0.5
In-patients	3,837	5.4	4.7	2.0	
Eye operations	2,453	8.4	7.2	3.4	5.6

ascertain *e.g.* trauma or malignant tumour, but in some the aetiology was uncertain, *e.g.* painful blind eye or phthisis bulbi. The cases were classified into seven groups, shown in Table II by sex and in order of frequency. The relative importance of the different reasons for enucleation is shown in Fig. 1.

Table II Causes of enucleation by diagnosis and sex in order of frequency

Diagnosis	Total		Males		Females		Male : female ratio
	No.	per cent.	No.	per cent.	No.	per cent.	
(1) Trauma	105	50.7	67	50.8	38	50.7	1.8 : 1
(2) Corneal disease	38	18.4	20	15.2	18	24.0	1.1 : 1
(3) Painful blind eye	19	9.2	14	10.6	5	6.7	2.8 : 1
(4) Malignant tumour	14	6.7	10	7.6	4	5.4	2.5 : 1
(5) Panophthalmitis	13	6.3	7	5.3	6	8.0	1.2 : 1
(6) Glaucoma	12	5.8	10	7.6	2	2.7	5.0 : 1
(7) Phthisis bulbi	6	2.9	4	3.0	2	2.7	2.0 : 1
Total	207	100.0	132	100.1	75	100.2	1.8 : 1

FIG. 1 Frequency of causes of 207 cases of enucleation in Kampala, Uganda**(1) Trauma**

Here the aetiology is clear, but this group also includes cases of panophthalmitis or painful blind eye at the time of enucleation, if a traumatic aetiology was evident. Trauma was the cause of more than half the enucleations in both males and females. Serious eye injuries appear to be more frequent in Uganda than elsewhere, many being sustained in fighting. The condition of the injured eye becomes worse because most of the patients do not come to the hospital for proper treatment until many days or weeks after the accident.

(2) *Corneal disease*

This group of 38 cases was mainly comprised of perforating corneal ulcers with such complications as iris prolapse, endophthalmitis, or staphyloma. Three main factors contribute to the frequency of corneal ulcers as a cause of enucleations.

- (i) The patients come late for treatment, often several weeks after the onset of the disease and after the ulcer has perforated.
- (ii) Trachoma complicated by entropion and trichiasis is fairly common in this part of Uganda.
- (iii) Corneal resistance to bacterial infection may be reduced in some cases by malnutrition (Kuming and Politzer, 1967; Emiru, 1968).

(4) *Malignant tumour*

This led to removal of the eye in fourteen cases (6.7 per cent.) in which the diagnosis was verified by histological examination. This percentage is considerably lower than reported by Ammann (1962) from Basel, where malignant (and suspected malignant) tumour accounted for 15 to 30 per cent. of all enucleations.

An interesting factor contributing to this difference is the histological diagnosis: seven of our fourteen cases of malignant tumour were retinoblastomas, five were squamous cell carcinomas originating from the limbus and conjunctiva, one was an orbital rhabdomyosarcoma, and one was an orbital squamous cell carcinoma originating from the maxillary sinus. There were no cases of malignant melanoma, which in Ammann's series amounted to 54 per cent. of the enucleations caused by malignant tumour. This supports the observation that intraocular malignant melanoma is rare in Africans (Templeton, 1967).

Squamous cell carcinoma originating from the limbus is frequently seen in our patients. Besides the advanced cases leading to enucleation, we have seen many early precarcinomatous tumours of the limbus and cornea. These tumours are usually pigmented, and are always situated in the palpebral aperture lateral or medial to the cornea. Exposure to sunlight of the partly pigmented conjunctiva and limbus probably plays a role in the aetiology.

(5) *Panophthalmitis*

This caused the removal of the eye in 6.3 per cent. of cases. No external cause was found, and the infection was thought to have spread from the infected ulcers, which are very common in this population especially on the legs and feet.

(6) *Glaucoma*

This included cases of primary glaucoma, those of obviously secondary glaucoma being excluded.

AGE AND SEX DISTRIBUTION

The age and sex distribution of these patients is set out in Table III and Fig. 2 (opposite). The highest number of enucleations occurs in the age group 30 to 40 years. Trauma is an even more frequent cause of enucleation in this age group than in the series as a whole (63 per cent.).

Table III Age and sex distribution of cases of enucleation by diagnosis
In brackets: Percentage in each age group, and sex (male + female)

Diagnosis	Age group (yrs)							
	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70+
Trauma	8 (31%) (5 + 3)	15 (56%) (6 + 9)	19 (59%) (12 + 7)	30 (63%) (21 + 9)	16 (57%) (12 + 4)	9 (53%) (7 + 2)	3 (19%) (3 + 0)	5 (38%) (1 + 4)
Corneal disease	6 (23%) (4 + 2)	4 (15%) (3 + 1)	7 (22%) (3 + 4)	8 (17%) (3 + 5)	4 (14%) (1 + 3)	3 (18%) (2 + 1)	5 (31%) (3 + 2)	1 (8%) (1 + 0)
Painful blind eye	2 (8%) (1 + 1)	4 (15%) (1 + 3)	5 (16%) (5 + 0)	2 (4%) (2 + 0)	3 (11%) (3 + 0)	1 (6%) (0 + 1)	2 (13%) (2 + 0)	0
Malignant tumour	7 (7%) (5 + 2)	0	0	1 (2%) (0 + 1)	1 (4%) (1 + 0)	2 (12%) (2 + 0)	0	3 (23%) (2 + 1)
Panophthalmitis	1 (4%) (0 + 1)	2 (7%) (0 + 2)	0	4 (8%) (4 + 0)	1 (4%) (0 + 1)	2 (12%) (1 + 1)	2 (13%) (1 + 1)	1 (8%) (1 + 0)
Glaucoma	1 (4%) (1 + 0)	1 (4%) (1 + 0)	0	2 (4%) (2 + 0)	2 (7%) (2 + 0)	0	3 (19%) (1 + 2)	3 (23%) (3 + 0)
Phthisis bulbi	1 (4%) (0 + 1)	1 (4%) (0 + 1)	1 (3%) (1 + 0)	1 (2%) (1 + 0)	1 (4%) (1 + 0)	0	1 (6%) (1 + 0)	0
Total	26 (101%) (16 + 10)	27 (101%) (11 + 16)	32 (100%) (21 + 11)	48 (100%) (33 + 15)	28 (101%) (20 + 8)	17 (101%) (12 + 5)	16 (101%) (11 + 5)	13 (100%) (8 + 5)
Male : female ratio	1.6 : 1	0.7 : 1	1.9 : 1	2.2 : 1	2.5 : 1	2.4 : 1	2.2 : 1	1.6 : 1

FIG. 2 Age and sex distribution of 207 cases of enucleation in Kampala, Uganda

There are 1.8 times as many enucleations in males as in females, and there are more male cases in every group, including the malignant tumours and glaucoma.

The predominance of males cannot be explained by a selection of male cases, as the numbers of men and women in the out-patients clinic is about equal.

Summary

The primary causes of 207 enucleations in Kampala, Uganda, are reviewed. The cases are classified in seven aetiological groups. Trauma is the cause of more than half the enucleations, and the next in importance is corneal disease (18.4 per cent.). The male: female ratio is 1.8, and in adults over 20 years of age 2.1.

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