ONOMY Science

American journal of Ophthalmology-Glaucoma
ISSN 2688-3147

Research Article Open Access

Neuro-psychological effect of destructive eye surgery in Zimbabwe

Mathias M Mukona[1], George Nyandoro[2, 3], Gift Ngwende[4], Rangarirai Masanganise[1]

[1] Ophthalmology department, College of Health Sciences, University of Zimbabwe

[2] Community Medicine department, College of Health Sciences, University of Zimbabwe

[3] Epidemiology and Diseases Control department, Ministry of Health and Child Care (MoHCC), Ministry of Health and Child Care,

[4] Medicine department, College of Health Sciences, University of Zimbabwe

***Corresponding Author: George Nyandoro**, Department of Community Medicine, College of Health Sciences, University of Zimbabwe, E-mail: georgenyandoro@yahoo.com

Citation: Neuro-psychological effect of destructive eye surgery in Zimbabwe: Amer J Opth Glau. 2020; 2(1): 01-08.

Submitted: 23 March 2020; **Approved:** 26 March 2020; **Published:** 28 March 2020

Abstract:

Objectives: To investigate the post-operative eye surgery psychological disturbances and economic implications.

Design and setting:

A cohort of all destructive eye surgical procedures (2008 to 2013) done at a National Central Referral Teaching Hospital, Sekuru Kaguvi Hospital were followed up.

Subjects and methods:

A sampling frame or Patient Line List had N= 450 destructive eye surgical cases. However we managed to conduct only 362 out of 450, targeted population. Patient notes files, telephone interviews and personal interviews were used to collect information which was recorded on each questionnaire. Information collected was used to evaluate the post-operative eye surgery psychological disturbances and socio-economic implications.

Results:

Out of 362, only 184 (50.8%) were males whilst 178(49.2%) were females. The participants' majority were aged, 21 – 30 years, about 27.07% of the participants who had destructive eye surgery. Children under 10 years were the least, about 6.63% of the participants. The age group with low self-esteem was between 31 – 40 years, 27.5% followed by 21 – 30 years, about 20% of the participants. The same age groups reported low family support but for the same age group, there was no impact on their jobs. A total of 124 (36.26%) patients reported phantom eye syndrome, non-painful phantom was 21.1% (69 out 327) whilst painful phantom eye was 17.91% (60 out of 335). Females 37 out of 160 (23.13%) were affected more than males 32 out of 167 (19.16%) for non-painful phantom. For painful phantom eye females were 27 out of 163 (16.56%) and males 33 out of 133 (19.19%). Males were more affected than females.

Conclusion:

Phantom eye syndrome is common post destructive eye surgery. Patients who have undergone exenteration are most affected followed by enucleated and it's least on eviscerated. Non-painful phantom eye is common in females than males whilst painful phantom eye is common among males than females. Destructive eye surgery imposes low self-esteem and low family support. Control measures should be instituted to reduce socio-psychological impact and anatomical disfiguring procedures to reserve them for treating potentially life threatening malignancies or relentlessly progressive conditions unresponsive to other treatments

Keywords: Psychological effect, destructive eye surgery, Phantom eye syndrome

Cite this article: Neuro-psychological effect of destructive eye surgery in Zimbabwe: Amer J Opth Glau. 2020; 2(1): 01-08.

INTRODUCTION

Destructive eye surgery is a procedure that involves removal of part of the globe or the entire eye to save the fellow eye, the life of the patient or for cosmetic reasons.

According to Deacon BS[1] "The loss of an eye can be a very traumatic event in a person's life, not only medically, but also emotional". For many, the face and eyes help represent who they are, and it is common for these patients to feel as if a part of them has been lost. It is the responsibility of ophthalmologists and eye care providers, as they journey with patients through the process of eye removal and artificial eye placement, to provide the best possible functional and cosmetic results. In this way, they can help patients begin to heal medically, and emotionally, as soon as possible.

Destructive eye surgery is important for a number of reasons including indications for the surgery, type and quality of care provided as well as the consequences of surgery[1,2,3]. Indications for surgery comprise infective and non-infective causes; the type and quality of care relates to availability and effectiveness of interventions while consequences of surgery present as physical, emotional, psychological, social and economic effects on the patient, family and community[1,2,3]. Follow up of the patients was done to establish the impact of this surgery in terms of mortality and cure, psychosocial and economic effects after destructive eye procedures, The phantom eye syndrome as a sequelae of destructive eye surgery was explored and characterised by distribution patterns.

The loss of an eye is such a traumatic experience that induces extensive feelings of inadequacy and incompleteness resulting in emotional and psychological reflexes in the concerned individuals. Some of the psycho social issues induced by this type of surgery include depression 60%, embarrassment13%, initial rejection of the new condition 27%, challenges associated with the use of the artificial eye, socket infection and the general maintenance, care and cleaning of the eye [3,18,26,28].There are also socio-economic effects that result from this type of surgery for example. Previous research has shown that an average of 13% of patients has been affected in their jobs by this type of surgery and the other 87% were not affected. Some have found the costs of prosthesis to be prohibitive as the finance involved would be out of their reach[18,28,29].

The phantom eye syndrome (PES) is a type of pain in the eye and visual hallucinations experienced after the removal of an eye. It has been reported that some patients experience phantom syndrome after the removal of the eye whilst other do not. Phantom eye syndrome has been reported on post eye amputation among few Caucasian communities but in Africa and Zimbabwe in particular, no studies have been done. Major reports and studies world over, are mainly on phantom pain post limb amputations.

METHODOLOGY

We followed the methods of Mathias M Mukona et al 30, Prevalence of Destructive Eye Surgery and their Indications at Sekuru Kaguvi Eye Hospital, Harare: A Review of Surgical Records from 2008 to 2013, Journal of Ophthalmology and Vision Research, https://escientificpublishers.com/prevalence-of-destructive-eye-surgery-and-their-indications-at-sekuru-kaguvi-eye-hospital-harare-a-r:

Study design

A cohort of all destructive eye surgical procedures (2008 to 2013) done at a National Central Referral Teaching Hospital, Sekuru Kaguvi Hospital were followed up. deisgn in which medical records of patients who underwent destructive eye surgery at Sekuru Kaguvi Eye Hospital (SKEH) between January 2008 and December 2013 were reviewed and patients were followed up, in some instances the next of kin in case of death, or guardian (in the case of a minor), this was meant to establish the impact and sequelae of destructive surgery.

Setting

The study was carried out at Sekuru Kaguvi Eye Hospital in Harare. Sekuru Kaguvi Eye Hospital is a national referral centre and teaching hospital for the University of Zimbabwe, College of Health Sciences. It is manned by qualified ophthalmologists, trainee ophthalmologists and ophthalmic nurses.

The hospital also runs outpatient clinics every day of the working week, also attends to emergencies referred from the Parirenyatwa Casualty Department, and conducts surgical operations for day and admitted cases as well as admit serious cases pre and post-operatively. Patient records are archived and can be retrieved from the Medical Records Department of the hospital using File Case numbers.

Period of Study

The review of records and patient follow ups was run over a 4 month period from January 2014 to April 2014. The data collection was conducted through retrieval, abstraction of information and analyses of data from records of eye surgery' patients who were treated at Sekuru Kaguvi Eye Hospital (SKEH) from January 2008 to December 2013. The patient or guardian or in case of death the next of kin were contacted to establish the impact and sequelae of destructive eye surgery.

Study Population

The study population comprised all patients who underwent destructive eye surgery at Sekuru Kaguvi Eye Hospital from 1st January 2008 to 30th December 2013. Case files for patients attended to at Sekuru Kaguvi Eye Hospital contain the record of all care provided to a patient from first contact through all consultations in outpatients clinics, while admitted on the ward and when operated on in theatre.

Inclusion Criteria

To be eligible for recruitment in the study case files for patients who had destructive eye surgery had to be accessible in the Medical Records Department at Parirenyatwa Hospital at the time of the study.

Exclusion Criteria

Case files with incomplete information on patient details, post-surgical care and those not contactable were excluded from the study.

Sampling Technique

All case files were included through physical checks of the Parirenyatwa Main Hospital and Sekuru Kaguvi Eye Hospital Operating Theatre line lists (i.e. sampling frame) a list of names and hospital file case numbers of all patients who had enucleation, evisceration and exenteration of one or both eyes were extracted. Sample size calculations projected that a minimum sample size of at least 73 cases would have to be retrieved for review. And this study included (n=362 out 400) who were only contactable for after surgery interviews.

Sample Size and power calculation

The prevalence of sequelae in patients who have undergone destructive eye surgery was estimated to be around 5%. To estimate this prevalence with 95% confidence to within 5% margin of error, the minimum required sample is given by:

$$N_0 = \frac{Z^2 pq}{d^2}$$

Where, N_0 is the sample size required in this study; z is the normal deviate (1.96 for an alpha of 0.05); p is the destructive eye surgery prevalence in patients expected to be seen at Sekuru Kaguvi Hospital ;q = (1-p); d is the precision (acceptable error) of the estimate

Incorporating these estimates into the equation yields a minimum sample size of 73. That is, the sample should be large enough to include 73 patients who come for eye surgery. we used a sample size of (n=362 out N=400) for maximum power.

Data Collection

Data were collected during follow up of patients who would have undergone destructive eye surgery.

For follow up, the last recorded contact details of former patients were obtained from case files and used for telephonic and physical contact. A standard questionnaire developed for the follow up interviews were used for collecting information from those former patients who are contactable by either means. Besides information on socio-demographic, clinical care, outcomes and sequelae relating to destructive eye surgery abstracted from patient case files, information from follow up of patients regarding vital status, disease cure, co-morbidities and psychological well-being was collected and entered directly on spread- sheet file on computer. Outcomes for the study included:

- Vital status – alive or dead (when, where and cause),
- Disease cure – cured, recurrent,
- Co-morbidities – controlled, cured, deteriorating,
- Psychological well-being – individual level (pain, depression), family (acceptance, discrimination), Societal (acceptance, discrimination), Occupational (acceptance, discrimination).

Data analysis

Descriptive statistics were used to describe the epidemiology of sequelae. Categorical variables were summarised using frequencies and percentage and continuous non-normal variables using median (and Interquartile ranges). Distributions in occurrence of sequelae over the study period were displayed using graphs.

Chi-square test was used to examine associations between demographic, socio-socio-economic, physiological factors and the occurrence of sequelae. A Receiver Operating Characteristic curve was used to correctly classify patients with phantom eye syndrome into those who are likely to have non-painful phantom syndrome and those who are unlikely to have non-painful phantom syndrome (but visual sensations) on the basis of headache and post-operative visual sensations (flashes of bright light).Flashes of bright light as a predictor of painful phantom eye syndrome compared to headaches ,had areas under ROC curve and their 95% confidence interval (95% CI) and P-values were considered for statistical significance. Data was exported from EpiInfo version 7 (CDC, 1999), data cleaning and analysis were performed using STATA 12 and SPSS 16.

Ethics

We sought ethical approval from the University of Zimbabwe and Parirenyatwa Hospital Joint Research Ethics Committee (JREC) and Medical Research Council of Zimbabwe (MRCZ). Patient data was de-identified using participant number. Informed patient written consent was sought from patients were assured that their identity will not be disclosed and their participation was voluntarily, participants were free to discontinue participation in the study at any stage.

Results

Out of 362, only 184 (50.8%) were males whilst 178(49.2%) were females. The participants' majority were aged, 21 – 30 years, about 27.07% of the participants who had destructive eye surgery. Children under 10 years were the least, about 6.63% of the participants. The age group with low self-esteem was between 31 – 40 years, 27.5% followed by 21 – 30 years, about 20% of the participants. The same age groups reported low family support but for the same age group, there was no impact on their jobs. Total of 124 out of 342 (36.26%) reported phantom eye syndrome. Non painful phantom 69 out of 327 (21.10%) and painful 60 out of 335 (16.6%). Phantom eye syndrome was most common in exenterated patients, 51.85% (70 out of 135) than enucleated patients , 28.57 % (14 out of 49), and least on eviscerated patients 25.32% (40 out of 158), table 1. Neither females nor males reported having sought medical care for phantom eye syndrome-related problems.

Table 1: Phantom eye syndrome by type of destructive eye surgery

Type of destructive surgery	**Phantom eye syndrome eye**		**Total**
	No, n (%)	Yes, n (%)	Total, n (%)
Enucleation	35(71.43)	14(28.57)	49(100)
Evisceration	118(74.68)	40(25.32)	158(100)
Exenteration	65(48.15)	70(51.85)	135(100)
Total	218(63.74)	124(36.26)	342(100)

Females 37(23.13%) were affected more than males 32 (19.16%) for non-painful phantom. For painful phantom eye females were 27(16.56%) and males 33(19.19%). Males were more affected than females (table 2).

Table 2: Sex distribution of phantom eye, painful and non-painful

	Non-pain		
Sex	No, n (%)	Yes, n (%)	Total, n (%)
Female	123(76.87)	37(23.13)	160(100)
Male	135(80.84)	32(19.16)	167(100)
Total	258(78.90)	69(21.10)	327(100)
	Pain		
sex	No, n (%)	Yes, n (%)	Total, n (%)
Female	136(83.44)	27(16.56)	163(100)
Male	139(80.81)	33(19.19)	172(100)
Total	275(82.09)	60(17.91)	335(100)

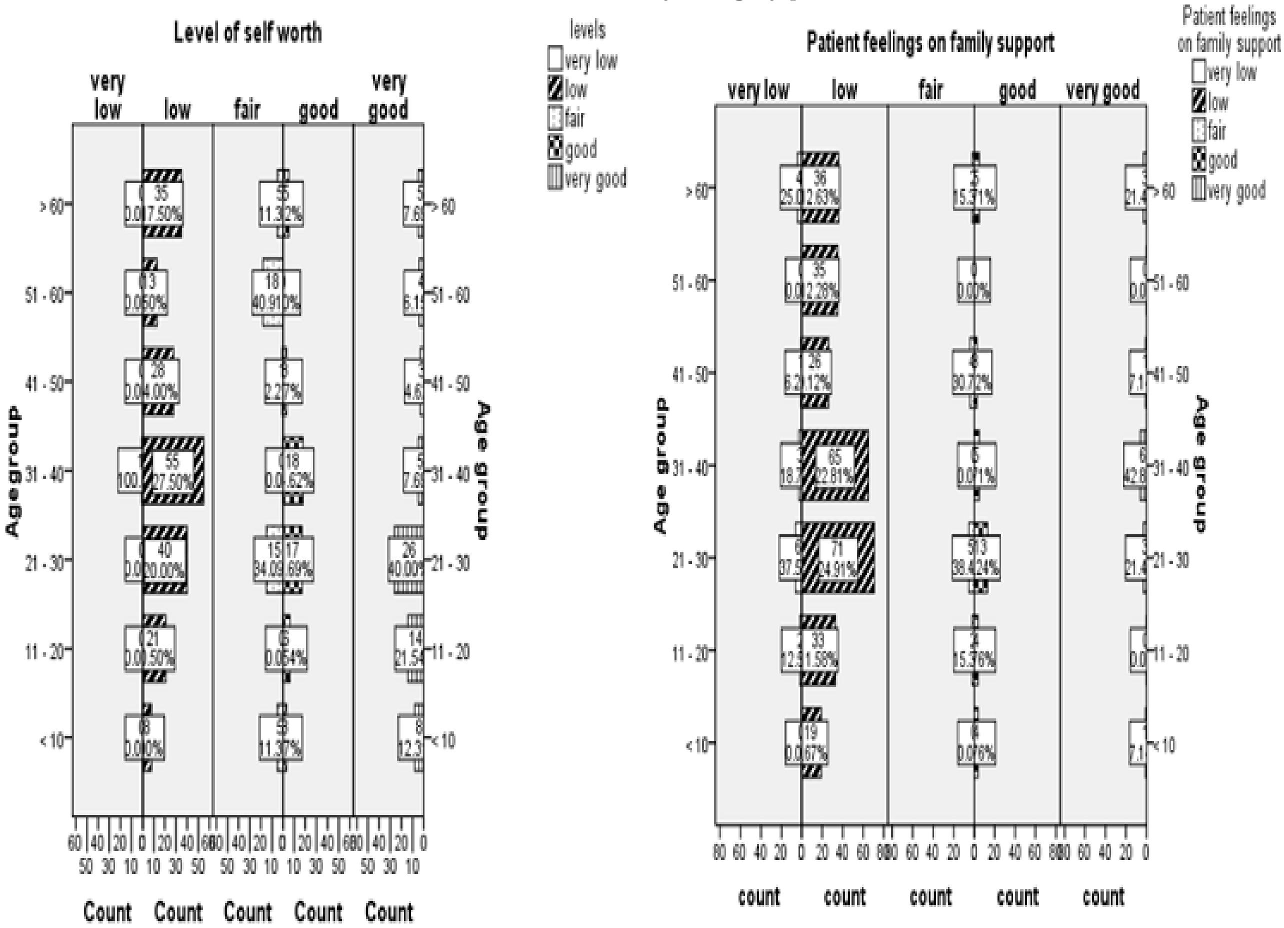
Prevalence of quality of life (psychosocial quality) - self-worth

Psychosocial value, a quality of life indicator was assessed through self-worth levels among individual eye surgery patients after hospital discharge .The WHO, 5-point Likert scale was used to rate patient feelings about the impact of destructive eye surgery on their self-esteem. The 31 – 40 and 21 – 30 age groups had the highest prevalence of low self-esteem, 27.5% and 20% respectively (level of self-worth, Figure 1). There was a statistically significant association between prevalence of self-worth and age among destructive eye surgery (Likelihood Ratio = 118.904, $P < 0.001$).

Prevalence of quality of life (psychosocial quality) - family support

Patient feelings about the level or quality of family support were measured on the WHO 5-point Likert scale. Low family support was reported by the 21 – 30 and 31 – 40 years age groups, 25% and 23% respectively (patient feelings on family support, Figure 1). There was a statistically significant association between feelings of family support and age group (Likelihood Ratio = 43.455, P = 0.009).

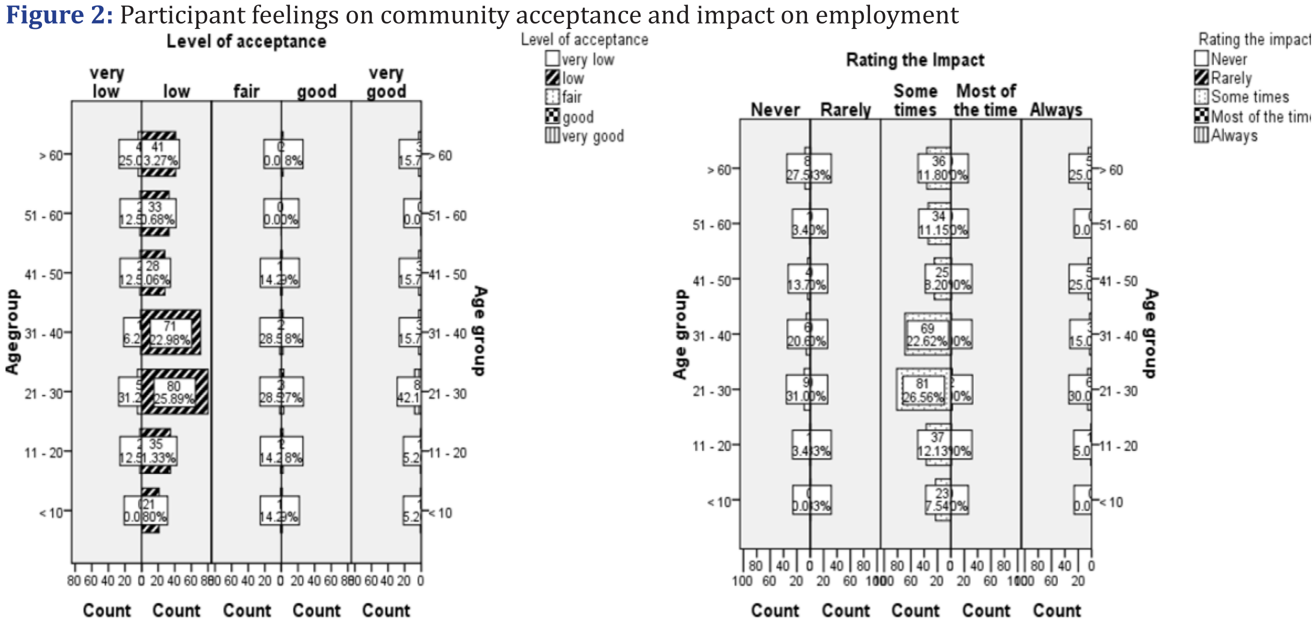
Figure 1: Self-worth and family support among destructive eye surgery patients



Quality of life (psychosocial quality) - community acceptance

Eye surgery patients rated their feelings about the impact of eye surgery on levels of acceptance in their communities. The highest proportions reporting low acceptance were 21 – 30 and 31 – 40 years age groups, 25.89% and 22.98% respectively (feelings / level of acceptance, figure 2). There was no statistically significant relationship between feelings about community acceptance and age group (Likelihood Ratio = 20.759, P = 0.653).

Figure 2: Participant feelings on community acceptance and impact on employment



Cite this article: Neuro-psychological effect of destructive eye surgery in Zimbabwe: Amer J Opth Glau. 2020; 2(1): 01-08.

Prevalence of quality of life - impact on employment and performance

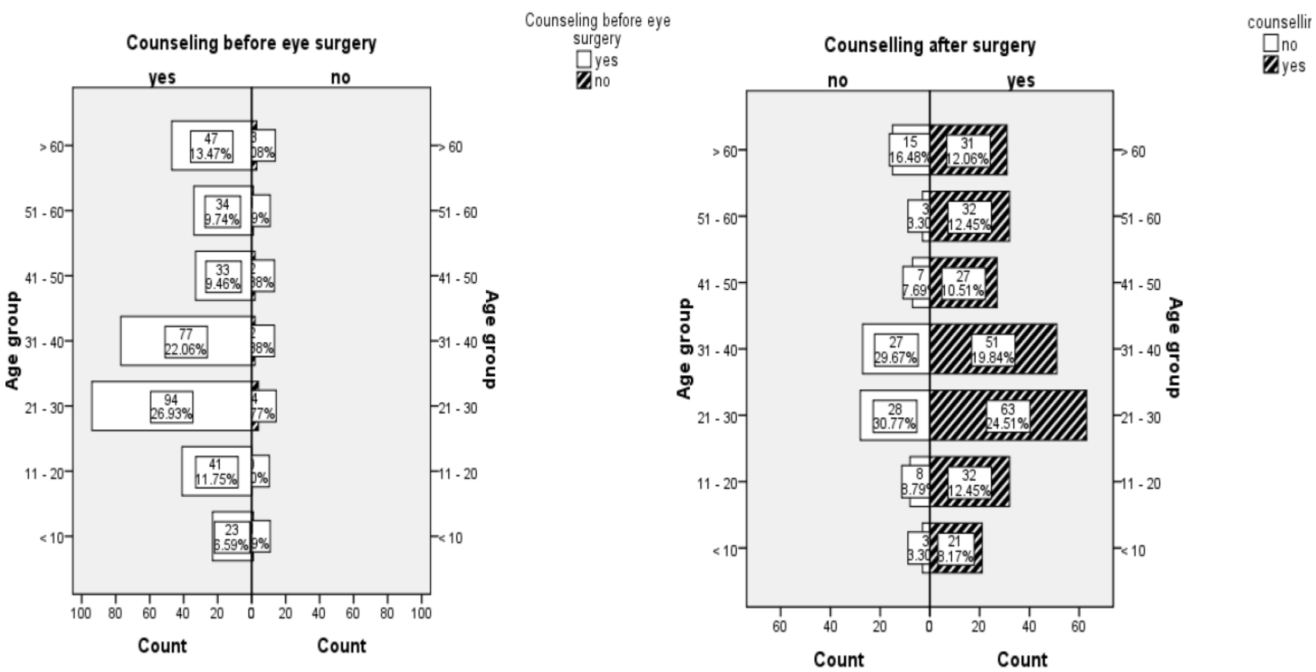
Nearly 30% of 21 – 30 year-olds reported "Always" losing their employment after destructive eye surgery - these rated impact, as always affected. Nevertheless another 30% of the same age group, rated impact as never affected (rating the impact, figure 2).

Prevalence of patient counselling before and after surgery

The highest proportions of patients that reported being counselled before surgery was in the 21 – 30 and 31 – 40 year age groups, 26.93% and 22.06% respectively (counselling before eye surgery, figure 3). There was no statistically significant association between age group and prevalence of counselling before surgery (Likelihood Ratio = 4.519, P = 0.607).

The highest proportions of patients that reported being counselled after surgery was in the 21 – 30, 31 – 40 and above 60 years reported, 30.77%, 29.67% and 16.48% respectively (counselling after eye surgery, figure 3). There was a statistically significant association between age group and prevalence of counselling after surgery (Likelihood Ratio = 15.715, P = 0.015).

Figure 3: Counselling before and after eye surgery



Prevalence of phantom eye syndrome

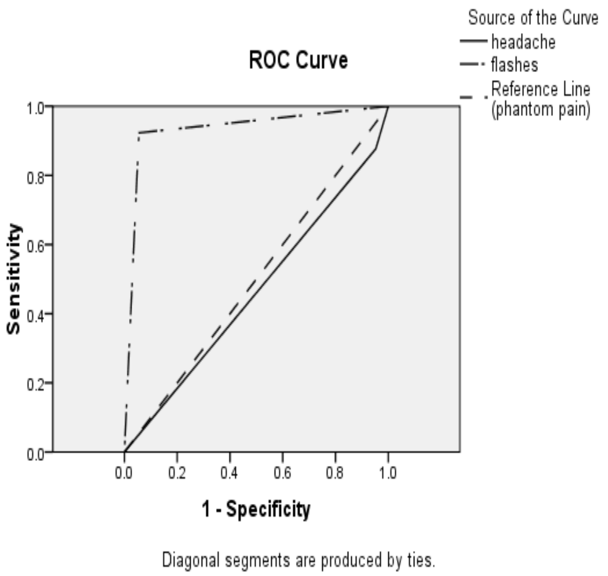
The prevalence of phantom eye syndrome was 36.26% (124 out of 342) non-painful phantom 21.1% (69 out 327) and painful 17.91% (60 out of 335). The prevalence of non-painful phantom eye syndrome was higher among females than males (37(23.13%) vs. 32 (19.16%)) but lower for painful phantom eye syndrome (27(16.56%) vs. 33(19.19%)). Phantom eye syndrome was most common in exenterated patients, 51.85% (70 out of 135) than enucleated patients , 28.57 % (14 out of 49), and least on eviscerated patients 25.32% (40 out of 158). Neither females nor males reported having sought medical care for phantom eye syndrome-related problems.

Receiver operating characteristic (ROC) analysis of likelihood of phantom eye

We constructed a Receiver Operating Characteristic curve to correctly classify patients with phantom eye syndrome into those who are likely to have pain and those who are unlikely to have pain (but visual sensations) on the basis of headache and post-operative visual sensations (flashes). Flashes of light were a statistically significant predictor of painful phantom eye syndrome compared to headaches (Area = 0.934; 95% CI: 0.893 – 0.975, P < 0.001; Area = 0.462; 95% CI: 0.381 – 0.544, P = 0.345), figure 4.

Cite this article: Neuro-psychological effect of destructive eye surgery in Zimbabwe: Amer J Opth Glau. 2020; 2(1): 01-08.

Figure 4: Receiver operating characteristic (ROC) analysis for determinants of phantom pain



Discussion

This study is the first to show the impact and sequelae over an extended period of time in Zimbabwe. The distribution of destructive eye surgeries, impact and indications, from rural and urban were assessed by age, gender, marital status.

After destructive eye surgery ,some patients reported phantom eye syndrome and the prevalence were as follows; phantom eye syndrome was 36.26% (124 out of 342) non-painful phantom 21.1% (69 out 327) and painful 17.91% (60 out of 335). And we found that flashes of light were common predictor than headache for phantom eye syndrome. Females 37(23.13%) were affected more than males 32 (19.16%) for non-painful phantom. For painful phantom eye females were 27(16.56%) and males 33(19.19%). Males were more affected than females (table 2). And also there was a statistically significant association between impact on post-surgery quality of life and different types of destructive eye surgery .Control measures should be instituted to reduce socio-psychological impact and anatomical disfiguring procedures to reserve them for treating potentially life threatening malignancies or relentlessly progressive conditions unresponsive to other treatments[28]. Destructive eye surgery is a disfiguring procedure requiring preoperative and post-operating counselling by a multidisciplinary team for instance; consisting of an ocularist, orbital surgeon, specialist wound care nurse, and a clinical psychologist that is for orbital exenteration[28].However in this study only 73.85 % (out of 348 responses) confirmed yes for both ,counselling before and counselling after destructive eye surgery. There was an unmate need of 26.15% in terms of patient counselling.

Conclusion

The occurrence of phantom eye syndrome was 36.26% (124 out of 342) non-painful phantom 21.1% (69 out 327) and painful 17.91% (60 out of 335). Females 37 out of 160 (23.13%) were affected more than males 32 out of 167 (19.16%) for non-painful phantom. For painful phantom eye females were 27 out of 163 (16.56%) and males 33 out of 133 (19.19%). Males were more affected than females. Flashes of bright light was a statistically significant predictor of non-painful phantom eye syndrome compared to headaches, thus the likelihood of patient who comes presenting with flushes of bright light to be diagnosed a non-phantom eye syndrome is very high. . Phantom eye syndrome is very common post destructive eye surgery, it may be usually painful or non-painful. Flashes of light were a common indicator and predictor of phantom eye syndrome than headache. Phantom eye syndrome was most common in exenterated patients, 51.85% (70 out of 135) than enucleated patients , 28.57 % (14 out of 49), and least on eviscerated patients 25.32% (40 out of 158). Neither females nor males reported having sought medical care for phantom eye syndrome-related problems.

Destructive eye surgery results in unemployment, lack of acceptance in communities and low family support. Self-worth is common in middle aged patients Control measures should be instituted to reduce socio-psychological impact and anatomical disfiguring procedures to reserve them for treating potentially life threatening malignancies or relentlessly progressive conditions unresponsive to other treatments.

References

1. Deacon BS. Orbital implants and ocular prostheses: A comprehensive review. Journal of ophthalmic medical technology.

2. Morgan-Warren PJ, Mehta P, Ahluwalia HS. Visual Function and Quality of life in patients who had undergone eye removal surgery:

A patient Survey 2013 Oct;32 (5):285-293
3. Ji Min Ahn, Sang Yeul Lee, Jin Sook yo.Health related Quality of Life and emotional status of Anophthalmic Patients in Korea. American Journal of Ophthalmology.2010 June;149(6):1005-1011.
4. Patel DV, Ku JYF, Johnson R et al. Eye (2009). Laser scanning in vivo confocal microscopy and quantitative aesthesiometry reveal decreased corneal innervation and sensation in keratoconus. 2008; (23):586-592
5. The 2005 ASOPRS Foundation Lecture. Idiopathic orbital inflammation: a pathogenetic construct and treatment strategy.
6. Vemuqanti GK, Jalali S, Honavar SG, et al. Enucleation in a tertiary eye care centre in India: Prevalence, current indications and clinicopathological correlation. Eye(lond)2001 Dec;(pt 6):760-5
7. Yanoff M. and Duker J S. Ophthalmology. In:Wiggs J L, Miller D, Editors. Enucleation, Evisceration, and Exenteration. USA: Mosby Elsevier Inc,2009:p. 1474.
8. Eballe A O, Dohvoma V A, Koki G A.et al.Clinical Ophthalmology. Indications for destructive eye surgeries at the Yaounde Gynaeco-Obstetric and Paediatric Hospital.2011;2011(5):561-565
9. Senqupta S, Krishnakumar S, Biswas J,et al. Fifteen year trends in indications for enucleation from a tertiary care centre in south India:Indian J Ophthalmol.2012 May-June;60(3):179-182.
10. Stiebel H, Sela M, Pe ér J. Changing indications for enucleations in Hadassah University Hospital, 1960-1989. Ophthalmic Epidemiol:1995 Dec;2(3):123-7
11. Gaton DD, Ehrlich R, Muzmacher L, et al. Enucleation and Eviscerations in a large medical centre between the years 1981 and 2007. Harefuah.2008 Oct;147(10):758-62,840
12. Rasmussen ML. Acta Ophthalmologica.The Eye Amputated.2010;88(2):1-26
13. Vittorino M, Serrano F, Suarez F. Enucleation and evisceration: 370 cases review. Results and complications Arch Soc ESP Oftalmol.2007 28;(8):495-599.
14. Nwosu SN. Destructive ophthalmic surgical procedures in Onitsha, Nigeria. Niger Postgrad Med J 2005;12(1):53-56.
15. Gyasi ME, Amoaku WM, Adjuik M. Causes and incidence of destructive eye procedures in north eastern Ghana. Ghana Med J. 2009;43(3):122-126.
16. Masanganise R, Magava A,Orbital exenterations and squamous cell carcinoma of the conjunctiva at Sekuru Kaguvi Eye Unit, Zimbabwe. Central Afr J Med. 2001 Aug;47(8):196-199
17. Kawome MM, Masanganise R:Post- destructive eye surgery associated depression at Sekuru Kaguvi Hospital Eye Unit, Zimbabwe:Pilot study.
18. Dijkstra PU, Geertzen JH , Stewart R, et al. Phantom pain and risk factors: a multivariate analysis. J Pain symptom manage : 2002 Dec; 24(6):578-585.
19. Gerding H, Vo O, Husstedt IW et al. Phantom Pain after Enucleation. Ophthalmoge.2003 Nov; 100(11):943-9
20. Imtiaz Ali Shah. Painful Phantom Eye. Pakistan Journal ,1994 Oct;10(4):77-78
21. Phan LT, Hwang TN, McCulley TJ. Evisceration in the modern Age. Middle east Afr J Ophthalmol.2012 Jan-Mar;19(1):24-33.
22. Awan KJ. Modified Intra Scleral enucleation: Its advantages, limitations and complications. J Ocul Therapy and Surgery 1982;1:243
23. Halbert J, Crotty M, Cameron ID. Evidence for the optimal management of acute and chronic phantom pain:a systematic review. The clinical journal of Pain, 2002; 18(2):84-92.
24. Manchinkanti L, Singh V(2004). Managing Phantom Pain. Pain Physician; 7: 365-375.
25. Clarke A, Rumsey N, Collin JRO, Wyn-Williams M. Psychological distress associated with disfiguring eye condition. Eye 2003; 17: 35-40.
26. N. Rumsey, A. Clarke, P. White Journal of Wound Care, Vol. 12, Iss. 7, 02 Jul 2003, pp 247 – 252.
27. Ayanniyi A Emotional ,psychosocial and economic of anophthalmos and Artificial eye use.Journal of visual science.2008 Volume 7 Number 1.
28. I .Rahman ,A.E Cook, B Leatherbarrow ,Orbital exenteration: a 13 year Manchester experience,Br J Ophthalmol 2005;89:1335-1340. doi:10.1136/bjo.2004.062471
29. Adeoye AO, Onakpoya OH. Indications for eye removal in IIeIfe,Nigeria.African Journal of Medical Science 2007; 36(4):371-375
30. Mukona, M.M. and Nyandoro, G., 2018. Prevalence of Destructive Eye Surgery and Their Indications at Sekuru Kaguvi Eye Hospital, Harare: A Review of Surgical Records from 2008 to 2013. Journal of Ophthalmology and Vision Research, 1(1), p.2.

Cite this article: Neuro-psychological effect of destructive eye surgery in Zimbabwe: Amer J Opth Glau. 2020; 2(1): 01-08.