

Eye Removal Procedures in Nigeria: A Review Article

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Abstract

Procedures for surgical removal of the eye, previously termed destructive eye surgeries, include evisceration, enucleation, and orbital exenteration. The surgical removal of an eye is a difficult but occasionally inevitable decision that ophthalmologists sometimes undertake, as these procedures result in a permanent loss of vision and disfigurement. Eye removal procedures are commonly performed in Nigeria as evidenced by the number of publications from different centers in the country. The aim of this review is to evaluate the indications for these procedures, and identify any variation over time. This is aimed at providing information to the general ophthalmologists when faced with the difficult decision on surgical removal of an eye. A review of all published reports from different parts of the country on the subject was made, and the most common indication for these procedures was retinoblastoma in children, and ocular trauma in adults. Currently, evisceration procedures are more commonly performed when compared with enucleation or exenteration in many centers in Nigeria.

Keywords: Destructive eye surgeries, enucleation, evisceration, exenteration, Nigeria, surgical eye removal

INTRODUCTION

Evisceration, enucleation, and exenteration are various forms of eye removal procedures which are usually performed for severe ophthalmic diseases when vision cannot be salvaged or in life-threatening ocular conditions. They usually result in permanent visual loss and some disfigurement. Evisceration is the surgical removal of the contents of the eye ball, leaving the scleral coat and optic nerve intact,^[1,2] and it is presently performed with the placement of an orbital implant within the scleral coat to replace the lost orbital volume.^[3] Enucleation involves the surgical removal of the entire globe, including the sclera, and is achieved by disinsertion of the extraocular muscles from the sclera and severance of the optic nerve.^[2] Exenteration, in contrast, is the most radical of the three procedures and involves removal of the eyeball and all or part of the contents of the orbit. All the orbital tissues and even parts of adjacent structures such as the bony orbit, muscles, and sinuses may be removed, while the eyelids may be spared or removed depending on the extent of involvement in the disease.^[4]

In many cultures, the removal of an eye, even if blind, is not readily acceptable, and it is decided only when the eye becomes very painful or severely disfigured that removal may be accepted. The goals of these surgical procedures are to

safely and effectively remove the diseased eye with the underlying ocular pathology, and provide reasonable long-term cosmesis. Surgical eye removal procedures, previously termed destructive eye surgeries, are commonly practiced in Nigeria as evidenced by numerous publications on the subject; however, to the best of the authors' knowledge, this is the first review article on the subject in the country. The aim of this study therefore, is to evaluate the indications for surgical eyeball removal in Nigeria and identify any variation in the pattern of these procedures from a review of available published literature. Literature search on eye removal procedures in Nigeria conducted through Index Medicus, Pubmed, AJOL, and Google search generated 21 publications. The information that were extracted included the following: the year of publication, study period and design, number of eyes reported, gender and age of the patients, indications for removal, and type of eye removal procedure performed.

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HISTORICAL PERSPECTIVE

Enucleation was first reported in medical literature in 1500s, and the current technique was described in 1885 by Farrell and Bonnet.^[5] The first routine evisceration was performed in 1874^[3] and, in 1885, Mules^[6] reported orbital volume replacement using the placement of a spherical glass orbital implant following the evisceration. Orbital exenteration was first described and performed by George Bartisch in 1583.^[7] The first publication on eye removal surgery in Nigeria was in 1973 by Olurin,^[8] and this was followed by Amoni^[9] in 1980. Subsequently, there have been several publications from different parts of the country.

STUDY DESIGN

All the studies were hospital-based, non-comparative case series of patients, who had undergone eye removal surgical procedures in various centers in the country with most of the centers being tertiary institutions. All the authors retrospectively reviewed their cases except Amoni^[9] who reported a 2-year prospective study. The study period of the various publications ranged from 2 years^[9] to 29 years [Table 1].^[10]

TYPE OF SURGERY

The earliest studies^[8,9] reported enucleation as the most common surgical eye removal procedure, while later studies reported varying frequencies of the three procedures [Table 1]. This could be partly attributed to the skills and technology available at the time. Evisceration is technically easier to perform in comparison with enucleation, and ensures preservation of the scleral coat with the attached extra ocular muscles thereby maintaining the physiological dynamics of the orbit, and it is, thus, more cosmetically acceptable to the patients.^[11] The number of exenteration procedures reportedly performed in many of the publications was generally low, and this could be attributed to a referral bias in different centers based on the facilities available to manage patients with peculiar ophthalmic conditions.

INDICATIONS FOR EYE REMOVAL

The indications for eye removal procedures remain essentially the same globally, but with local variations depending on the prevailing pattern of ocular diseases in different regions.^[12] Generally, the indications for surgical eye removal by evisceration include improving cosmetic appearance in cases such as staphyloma, mild phthisis bulbi, and traumatized eyeball with no potential for vision; relieving pain in patients with painful blind eyes from known non-malignant tumors; and a few cases of imminent globe rupture from conditions such as keratomalacia and descemetocoele, while the indications for enucleation include cases of intraocular tumors, severe phthisis bulbi, severely traumatized eyeball, patients with painful blind eyes

with suspicion of malignancy, and, prevention of sympathetic ophthalmitis. Exenteration, in contrast, is usually indicated in malignancies of the orbit either primary, secondary spread from the globe or ocular adnexa, or metastatic.^[2,13] The indications for these procedures varied in the published reports because they were dependent on the facilities available in different centers and these determined the pattern of referral of patients to the centers, and possibly, the skill and expertise of the surgeon. These indications include trauma, tumors, infections, painful blind eye, chronic uveitis, spontaneous intraocular hemorrhage, and anterior staphyloma. The most frequent indication, however, is trauma as reported in 11 of the reports,^[6,14-23] followed by infections in six reports^[24-29] and, tumors in three reports [Table 1].^[10,30,31] The largest trauma series was reported by Olurin,^[8] accounting for 50.1% of the cases, while the least number was reported by Majekodunmi^[30] (7.9% of the cases) Trauma resulted mostly from occupational and household activities,^[8,20,30] and less commonly from communal clashes,^[18] assault, road traffic accidents, agricultural injuries, chemical injuries, and gunshot injuries.^[9,15,16,28] Most of the cases of trauma resulting in eye removal procedures in the published reports were open globe injuries.^[15,16,18,29,24]

Corneal disease was very prominent in two of the published reports,^[8,9] and it was the most common indication for enucleation in a study.^[9] Keratitis as a complication of measles, malnutrition, and use of traditional eye medications can result in corneal melting, scarring, descemetocoele, or staphyloma. Staphyloma and phthisis bulbi are common indications for cosmetic eyeball removal in almost all the studies. Staphyloma usually resulted from corneal ulcers following measles keratitis in children,^[9,30] and, trachoma^[9] and use of traditional eye medications^[15,25,28] in adults. In earlier reports,^[9,26,30] measles keratitis was noted to be a significant cause of surgical eye removal, however, it became a less common indication in later studies.^[14,18,20,26,30,31] Some studies^[32-34] in the West African sub-region reported that the most common indication for removal of the eye was infection, followed by trauma. The high rate of infection in their reports was attributed to poor socioeconomic status, use of traditional eye medications, and low level of education.^[32-34]

NUMBER OF EYES REPORTED

A wide variation exists in the number of operated eyes from one center to another, ranging from 29 eyes^[14] to 477 eyes [Table 1].^[8] Some of the factors identified in the published reports as affecting the number of eyes operated, included, non-acceptance of the procedure by the patients or their relations, financial constraints,^[16] and non-availability of ophthalmic surgeon with required skill to perform the procedure.^[15,17] Enock *et al.*^[15] reported an increase in the number of procedures effected over the years in their series, while Nwosu^[27] reported a reduction in the number of cases in his center which he attributed to the reduction in the

Table 1: Summary of the findings in 21 publications on surgical eye removal procedures in Nigeria

Author(s)	Year of publication	Study design	Study period in years	Peak age	Mean age in years	M:F	Number of eyes	Number of eyes eviscerated	Number of eyes enucleated	Number of exenteration procedures	Main reasons for eye removal
Olurin	1974	Retrospective	10	<10 years	NS	2.1:1	477	145	317	15	Trauma
Amoni	1980	Prospective	2	3 rd decade	NS	1.8:1	136	13	119	4	Cornical disease
Majekodunmi [†]	1989	Retrospective	10	<30 years	14.5	2:1	101	NA	101	NA	Tumors
Baiyeroro and Ajibode	1996	Retrospective	5	<10 years	NS	3:1	100	48	31	21	Infection
Ezegwui <i>et al.</i> [*]	2002	Retrospective	29	<5 years	NS	1.3:1	82	NA	82	NA	Retinoblastoma
Nwosu	2005	Retrospective	7	7 th decade	40.8	1.4:1	56	41	13	2	Infection
Bodunde <i>et al.</i>	2005	Retrospective	4	3 rd decade	29.69	3.1:1	29	18	8	3	Trauma
Ademola-Popoola and Owoeye ^{††}	2005	Retrospective	10	<20 years	NS	2.8:1	92	79	13	-	Trauma
Mpyet <i>et al.</i> ^{**}	2005	Retrospective	5	10 years	7.7	1.5:1	67	42	15	10	Trauma
Eze <i>et al.</i>	2007	Retrospective	13	21-30 years	31.8	2:1	106	59	35	12	Trauma
Adeoye and Onakpoya	2007	Retrospective	10	<10 years	NS	2.1:1	92	18	53	21	Trauma
Enock <i>et al.</i>	2008	Retrospective	10	8 th decade	NS	1:1	42	34	8	-	Trauma
Etebu and Adio	2008	Retrospective	11	<28 years	36.7	47:182.6:1	82	63	15	4	Trauma
Mpyet <i>et al.</i> ^{***}	2008	Retrospective	5	25 years	40.2	3:1	103	91	8	4	Trauma
Chinda <i>et al.</i>	2010	Retrospective	10	0-10 years	NS	1.6:1	278	152	67	59	Tumors
Olatunji <i>et al.</i>	2011	Retrospective	7	1-10 years	29.5	2:1	67	55	11	1	Trauma
Otulana and Majekodunmi	2013	Retrospective	8	>60 years	45.6	1.7:1	64	38	18	8	Infection
Okoye <i>et al.</i>	2013	Retrospective	10	6 th decade	47.6	1.1:1	226	194	27	5	Infection
Monsudi <i>et al.</i>	2013	Retrospective	8	<10 years	35.51	2.1:1	37	30	4	3	Infection
Ibanga <i>et al.</i>	2013	Retrospective	10	1 st decade	31.5	1.6:1	137	87	41	9	Infection
Musa <i>et al.</i>	2016	Retrospective	10	<10 years	30.1	2:1	186	102	55	29	Trauma

NS = not stated, NA = not applicable. [†]Enucleation procedures reported. ^{††}Evisceration and enucleation procedures reported. * Children aged 15 years or less reported. ** Children (18 years or less) reported. *** Adults patients (> 18 years) reported.

frequency of gunshot injuries in the locality. Eye removal surgery constituted as high as 15.8% of all the ophthalmic surgical procedures in a study^[8] and as low as 4.9% in another study.^[25] Tahri *et al.*^[35] noted a general decline in the number of surgical eye removal procedures, and opined that this could be due to the improvement in diagnostic and treatment modalities of ocular tumors through radiation and laser treatment, cryotherapy, and chemotherapy.

GENDER

There was a higher male preponderance in almost all the studies [Table 1]. This could be attributed to males being engaged in occupations and activities which expose them to the risk of ocular injuries,^[8,16,18,19,22] and secondly, the cultural practice in some areas in the country that restrict females from freely accessing health care services.^[9]

AGE

Two of the studies involved participants aged 15 years or less^[10] and 18 years or less,^[23] while one study^[19] was conducted among adult patients only. The peak age for the surgical eye removal procedures in the other studies was in children less than 10 years of age in eight studies,^[8,17,18,22,25,26,29,31] while four studies^[15,24,27,28] reported a peak age for the procedure in those aged 50 years and above [Table 1]. The high prevalence reported among those who are less than 10 years was attributed to retinoblastoma, the most common primary intraocular malignancy in children, while another peak reported among patients in the third decade of life was attributed to the higher frequency of trauma in this age group.^[14,16,19]

CONCLUSION

In conclusion, surgical eye removal procedures are commonly performed in Nigeria. The most common indication is trauma followed by infection, and more males are affected. Measles keratitis is presently a less common indication for surgical eye removal. Retinoblastoma remains the most common indication of eye removal in children. Evisceration is currently more often performed than enucleation or exenteration.

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Conflicts of interest

There are no conflicts of interest.

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