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A prospective study to analyze the cosmetic outcomes of non-integrated primary orbital implants following evisceration

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Abstract

Evisceration is a surgical procedure in which the internal contents of the eye are removed leaving behind the sclera. It is a usual practice to consider an orbital implant at a later date, may be 4-6 weeks after the procedure in a second sitting to correct cosmetically the disfigurement with an orbital implant because of the chance of infections are high and the incidence of implant extrusion increases. Enucleation is a surgical procedure in which the entire globe is removed along with the sclera and a bit of stump of the optic nerve. But in clinical practice evisceration and enucleation overlaps many a time in cases of penetrating ocular trauma and painful blind eyes. Evisceration is absolutely contraindicated in the setting of suspected intraocular malignancy and may be the preferred form of treatment for end-stage endophthalmitis where enucleation is contraindicated. Innovations with scleral modifications during evisceration helps in the placement of an appropriate size orbital implant and the ready availability of orbital implants have overcome the limitation of deferring the use of orbital implants during the primary procedure. Due to its simplicity, efficiency, and good cosmetic results, evisceration have once again gained popularity in the present times with placement of orbital implants in the primary setting itself when compared to enucleation.

Keywords: Conformer, Endophthalmitis, Evisceration, Orbital implants, PMMA, Prosthesis

Introduction

Removal of the eye may be necessary after severe ocular trauma, to control pain in a blind eye, to treat some intraocular malignancies, in endophthalmitis unresponsive to medical therapy, and for cosmetic improvement of a disfigured eye. Both enucleation and evisceration can achieve the desired goals, but several factors must be considered in choosing the most appropriate procedure.(1)

Aim

The aim of this prospective study is to analyze the cosmetic outcomes of patients undergoing evisceration for various indications with placement of orbital implants immediately following the evisceration with a scleral modification by two cut technique and placement of an orbital implant in the primary setting itself and also to follow up these patients for any complications noted in the post operative period for up to 1 year following the procedure.Secondary implant procedures involve a higher likelihood of complications. Silicone implants have been described to have the least amount of complications.(2)

Materials and Methods

14 eyes of 14 patients underwent evisceration under peribulbar local anaesthesia. Following evisceration an appropriate size of orbital implant was implanted and sutured inside the remnant scleral shell in the same sitting after a two cut modification of the sclera to accommodate an ideal sized orbital Polymethylmethacrylate (PMMA) implant. The PMMA orbital implant of varying sizes were randomly tried and the best fit used following the modified two cuts on the intact sclera shell either horizontally or vertically to accommodate the implant inside the sclera shell. The cut ends of the scleral shell and the overlying conjunctiva are sutured with continuous interlocking 6-0 vicryl sutures separately in a cross pattern (one horizontally and the other vertically). At the end of the surgery a conformer of appropriate size is fitted into the socket. A course of steroid antibiotic combination of topical preparation was used for 4 weeks and at the end of 4 weeks an artificial ocular prosthesis of suitable size and adequate match in comparison to the fellow eye color is fitted.

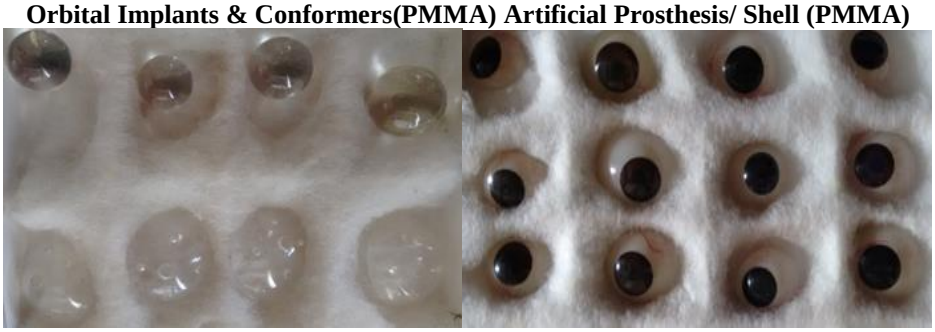
This is the author's technique to minimize the erosion or extrusion of the implant which is similar to the four petal evisceration described by Elbakary MA(3) and a modified evisceration technique with scleral quadrisection by Huang D et al.(4)

The study was conducted from February 2010 to January 2014. All the eviscerated eyes were sent for histopathological examination (HPE). The patient is followed up for 1 year on a regular basis. The patient is taught the technique of the removal and re-fitting of the prosthesis on a day to day basis for maintenance of adequate hygiene. The level of patient satisfaction and the quality of life as realized by the patient and their peer groups were studied based on questioning with a scoring. The cosmetic outcome was also analyzed by the operating surgeon and colleagues in the department for appearance in primary gaze, its range of movements and fitting. The complications of the procedure and those happened after the procedures during the follow-up period of 1 year were also documented. The orbital

implants and the conformers used for all the patients were made of PMMA material.

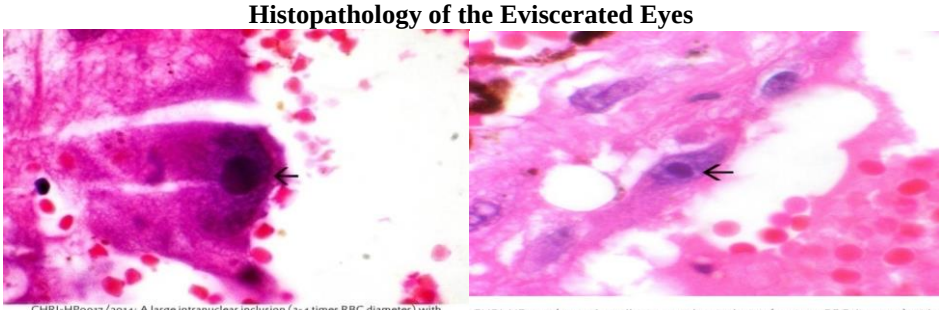
Pre Operative Photographs

Orbital Implants & Conformers(PMMA) Artificial Prosthesis/ Shell (PMMA)



Gross specimens of 2 of theeviscerated eyes sent for histopathology (HPE)

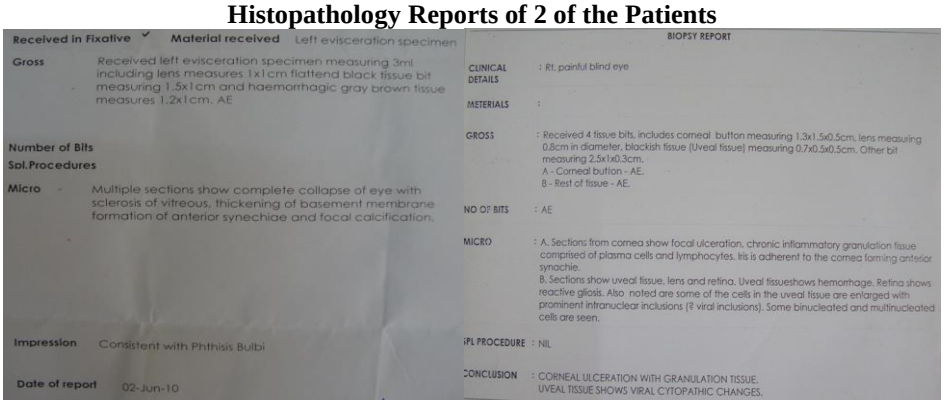
Histopathology of the Eviscerated Eyes



CHRI-HP0917/2014: A large intranuclear inclusion (3-4 times RBC diameter) with enlargement of the cell and nucleus (arrow) (H&E, 1000X)

CHRI-HP0917/2014: A smaller intranuclear inclusion (1.5 times RBC diameter) with no enlargement of the cell and nucleus (arrow) (H&E, 1000X)

Histopathology Reports of 2 of the Patients



Received in Fixative ✓ Material received Left evisceration specimen

Gross Received left evisceration specimen measuring 3ml including lens measures 1x1cm flattend black tissue bit measuring 1.5x1cm and haemorrhagic gray brown tissue measures 1.2x1cm. AE

Number of Bits

Spl.Procedures

Micro Multiple sections show complete collapse of eye with sclerosis of vitreous, thickening of basement membrane formation of anterior synechiae and focal calcification.

Impression Consistent with Phthisis Bulbi

Date of report 02-Jun-10

BIOPSY REPORT

CLINICAL DETAILS : Rt. painful blind eye

METERIALS :

GROSS : Received 4 tissue bits, includes corneal button measuring 1.3x1.5x0.5cm, lens measuring 0.8cm in diameter, blackish tissue (Uveal tissue) measuring 0.7x0.5x0.5cm. Other bit measuring 2.5x1x0.3cm.
A - Corneal button - AE.
B - Rest of tissue - AE.

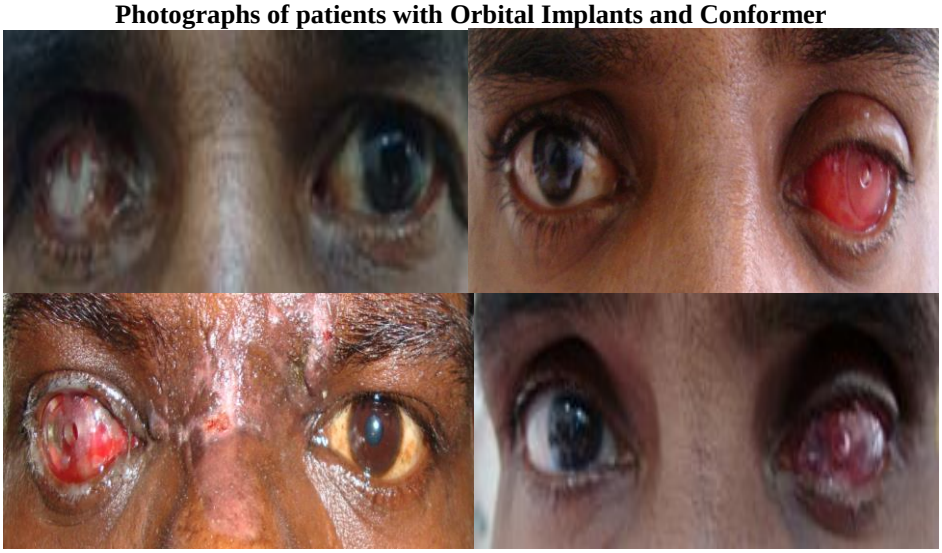
NO OF BITS : AE

MICRO : A. Sections from cornea show focal ulceration, chronic inflammatory granulation tissue comprised of plasma cells and lymphocytes. Iris is adherent to the cornea forming anterior synachie.
B. Sections show uveal tissue, lens and retina. Uveal tissueshows hemorrhage. Retina shows reactive gliosis. Also noted are some of the cells in the uveal tissue are enlarged with prominent intranuclear inclusions (? viral inclusions). Some binucleated and multinucleated cells are seen.

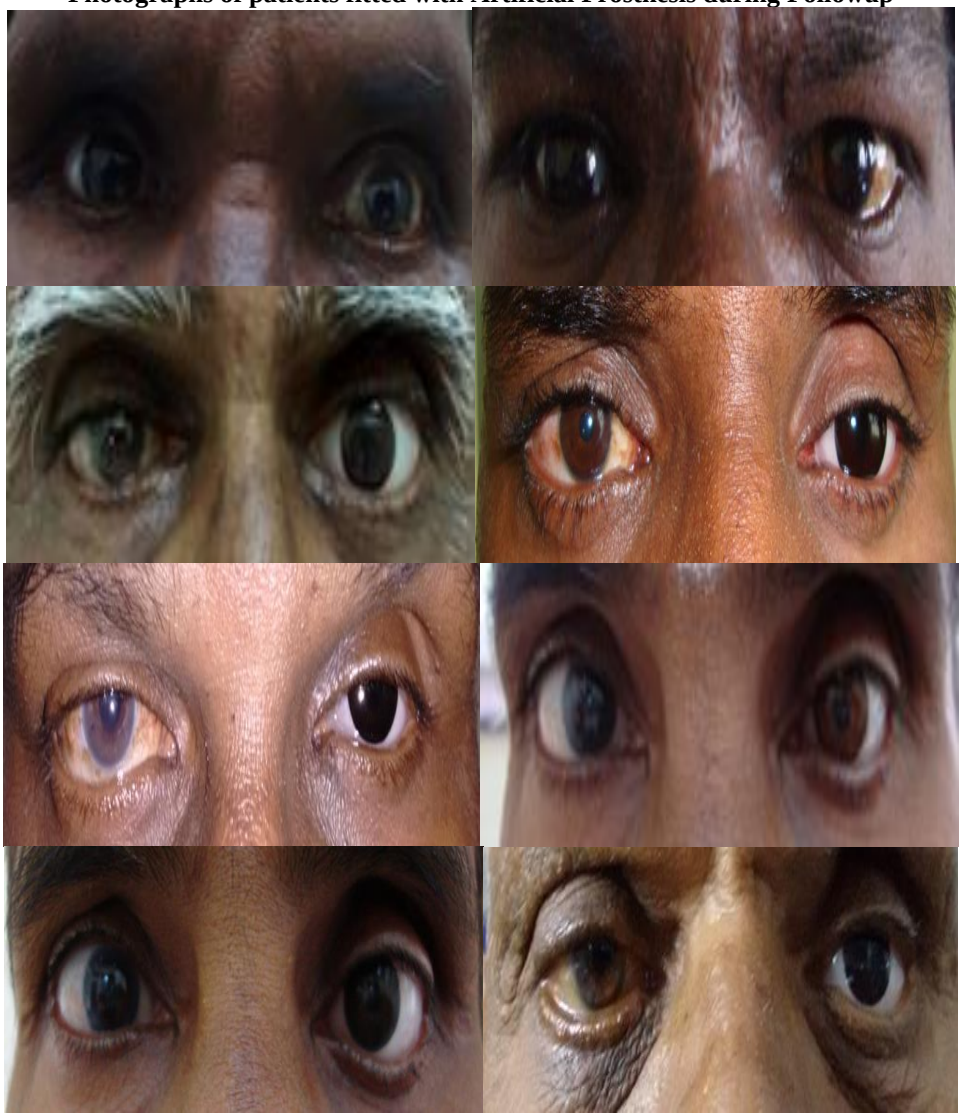
IPL PROCEDURE : NIL

CONCLUSION : CORNEAL ULCERATION WITH GRANULATION TISSUE.
UVEAL TISSUE SHOWS VIRAL CYTOPATHIC CHANGES.

Photographs of patients with Orbital Implants and Conformer



Photographs of patients fitted with Artificial Prosthesis during Followup



Results

In this study, the age of patients who underwent evisceration ranged from 18 to 75 years with a mean age of 50.14 years. There were 10 males and 4 female patients. There were 3 eyes which underwent the procedure for panophthalmitis secondary to uncontrolled endophthalmitis post cataract surgery and 1 eye panophthalmitis which developed secondary to traumatic globe rupture.

Table 1: Causes of evisceration

S. No	Causes for Evisceration	No. of Eyes
1.	Painful blind eye (absolute glaucoma, chronic uveitis)	4
2.	Panophthalmitis secondary to post operativeendophthalmitis	3
3.	Traumatic globe rupture with panophthalmitis	4
4.	Phthisis Bulbi	3
5.	Total	14

Table 2: Cosmetic outcome measurement by surgeon

S. No	Observations	No. of Patients
1.	**Appearance in Primary Gaze**	
A.	Upper eyelid retraction	0
B.	Lagophthalmos	0
C.	Size of cornea well matched	Yes-12, No-2
D.	Color of conjunctiva & iris well matched with that of fellow eye	Yes-11, No-3
2.	**Range of Ocular Motility**	
A.	Good horizontal motility limited vertical motility	11
B.	Limited horizontal & vertical motility	2
C.	No movement at all	1

Table 3: Histopathology Report (HPE)

S. No	Histopathology Report	No. of Eyes
1.	Consistent with Phthisis Bulbi	3
2.	Infectious etiology identified	5
3.	Non specific chronic inflammation	6
4.	Malignancy	0
5.	Total	14

Table 4: Patient satisfaction scale at the end of 1 month after use of the artificial prosthesis

S. No	Appearance to self	No. of Eyes	%
1.	Not at all happy with the cosmetic outcome	1	7.14
2.	Somewhat happy and expects much better	3	21.42
3.	Happy but expects still better	2	14.29
4.	Very happy and feels it suits best	8	57.15

S. No	Appearance by peers	No. of Eyes	%
1.	Tells not very good and does not fit	3	21.42
2.	Somewhat okay but asks to try better	2	14.29
3.	Says okay but may try still another for best fit	2	14.29
4.	Not able to differentiate and says looks natural	7	50

S. No	Level of comfort with prosthesis	No. of Eyes	%
1.	Very uncomfortable, ill-fitting and hurting even in primary gaze	0	0
2.	Uncomfortable, ill-fitting & hurts on eye movements but not in primary gaze	1	7.14
3.	Comfortable but hurts at times of ocular movement	4	28.57
4.	Very comfortable and does not hurt at anytime	9	64.29

S. No	Prosthesis removal and re-fitting	No. of eyes	%
1.	Feels not at all easy and fears to do by self	1	7.14
2.	Feels easy but depends on others sometimes	2	14.29
3.	Feels very easy and does it by self always	11	78.57

S. No	Quality of life realization by self and peers	No. of Eyes	%
1.	Feels no change has happened even after cosmetic outlook has changed	0	0
2.	Feels some changes has happened ever since the cosmetic outlook has improved	4	28.57
3.	Feels lot of changes has happened ever since the cosmetic outlook has improved	10	71.43

Table 5: Complications

S. No	Complications after surgery with 1 year follow up period	No. of Patients
1.	Re-surgery (wound gaping, re-suturing) within 6 months	1
2.	Orbital implant extrusion from scleral wound gaping after 6 months	1
3.	Post operative infections	0
4.	Recurrent pain in the prosthesis fitted eye	1
5.	Sympathetic ophthalmia till 1 year in the follow up period	0

Discussion

Evisceration is a destructive surgical procedure done as a last resort to save a patient from spread of infection from the orbital cavity to the cranial cavity just like enucleation which is done to prevent spread of malignancy from the orbital cavity to the cranial cavity. One of the common indications for evisceration in the present day is panophthalmitis and ruptured globe. There are lots of studies supporting evisceration with primary orbital implant placement with good cosmetic outcomes and lower rates of complications and hence avoids a second intervention especially in endophthalmitis progressing to panophthalmitis irrespective of all the medical interventions.[5,6,7] Recent findings indicate enucleation and evisceration are performed for blind eyes with endophthalmitis and both porous and nonporous implants may be placed primarily with acceptable outcomes in these patients.[8] Loss of an eye or a disfigured eye has a far-reaching impact on an individual's psyche. It also affects one's social and professional life equally. Cosmetic rehabilitation with custom made prosthetic devices gives such individuals professional and social acceptance and alleviates problems.[9]

There are two main types of orbital implants, integrated and non-integrated. Integrated implants (hydroxyapatite-HA, porous polyethylene & composites) are those which receives a blood supply from the body that allows for the integration of the prosthesis within the orbital tissue; and non-integrated (polymethylmethacrylate–PMMA/acrylic and silicone), where the implant remains separate.[10] The HA implant

is expensive and needs to be wrapped, while porous implants show the best prosthesis motility and a minimum rate of implants extrusion.[11] PMMA implants are a cheaper alternative.

Conclusion

The use of orbital implants in the same setting of evisceration (primary implantation) has been found to be advantageous to produce not only the benefits of a better cosmetic outcome but also negates the need for a second procedure post evisceration to place an implant at a later date. The complications of primary implantation are also very minimal. The use of HPE in all eviscerated specimens helps in at least finding out the cause of such painful blind eyes in patients who have lost their vision and eyes in childhood. The reduced post operative pain, achievement of significant range of ocular movements, better quality of life and good cosmetic outcomes have become possible with the present orbital implants and prosthesis for these individuals to lead a normal life. There is no definitive evidence to pin-point which one is the best orbital implant among the various available implants till date. Evisceration procedures results in psychological trauma and physical disability to the patient, hence the procedure should assure that the patient will return to a good productive life. The procedure must be performed in a way to provide the best conditions for a perfect prosthesis, which looks similar to the fellow eye, follow its movements, be comfortable and aesthetically pleasing.[12]

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