Open Access

Original Article

Four Petal Evisceration Inphthisical Eyes

Murtaza Sameen, Muhammad Shahid, Muhammad Awais Muhammad Adnan, Teyyeb Azeem, Hussnain Abbas*

Department of Ophthalmology, Armed Forces Institute of Ophthalmology/National Institute of Medical Sciences (NUMS) Rawalpindi Pakistan, *Department of Ophthalmology, Pakistan Naval Ship Hafeez, Hospital, Islamabad, Pakistan

ABSTRACT

Objective: Four Petal Evisceration Inphthisical Eyes.
Study Design: Retrospective Study.
Place And Duration of Study: Armed Forces Institute Of Ophthalmology, Rawalpindi Pakistan, from Jan 2022 to Apr 2022.
Methodology: A total of 20 subjects underwent evisceration with four petal technique. The record was collected from record room and data was analyzed. After 360° conjunctival peritomy, a larger orbital implant was placed for good cosmesis and to achieve maximum ocular motility. Axial length (AL) of normal eye was measured and compared with AL of atrophic eye. An orbital implant 3mm smaller than the axial length of the normal eye was placed. Implant was closed with 4 coverings to prevent extrusion. SPSS version 22.0 was used for data analysis.
Results: Out of n=20 patients with atrophia bulbi, females 11(55%) and males 9(45%). About 12(60%) were right eyes and 08(40%) were left eyes. Mean SD age of patient was 35.1±17.01 years. An implant of 18mm, 20mm and 22mm were used after calculation of axial length. Axial length of normal eye was used for the selection of size of implant. However, follow up was done from 4-18 months respectively.
Conclusion: Evisceration with four petals remains the procedure of choice due to better cosmesis and good motility.

Keywords: Evisceration, Four petal, Orbital implant, Phthisical eyes.

How to Cite This Article: *Sameen M, Shahid M, Awais M, Adnan M, Azeem T, Abbas H. Four Petal Evisceration Inphthisical Eyes. Pak Armed Forces Med J 2023; 73(Suppl-2): S389-392. DOI: https://doi.org/10.51253/pafmj.v73iSUPPL-2.8718.*

INTRODUCTION

Over a long time there is a dispute between evisceration and enucleation. Previously, enucleation was commonly the method of choice for most of the eye surgeons in various diseases such as sympathetic ophthalmia.[1] It has been observed in the literature review and also suggested by the ocularist that the more the anatomy of the orbit is preserved the more superior results we can get in terms of cosmesis , orbital volume and motility.[2,3] Sclerotomies to increase orbital volume have been previously described in many studies. Many modifications have been done in the recent past that result in increased sclera volume and allows placement of larger orbital implants.[3,4] Larger orbital implants not only provide good cosmesis but also reduce the incidence of volume deficit and increases the motility of eye. In cases of phthisis bulbi, painful blind eyes and microphthalmos, evisceration has been the choice of surgery to provide larger room for orbital implant.[4,5] The standard technique for evisceration is four petal technique with less chances of extrusion and postevisceration socket syndrome.[6] In eyes with phthisis, the eyeball shrinks and all the internal structures also reduce in size due to decreased intraocular pressure secondary to ciliary shutdown. Due to phthisis bulbi, cosmetic disfigurement results, which needs to be corrected with the procedure like evisceration.[7] Previously, eviscerations were not frequently done due to placement of smaller orbital implant that causes superior sulcus deformity and ptosis. To avoid such problems there is a need for larger orbital implants that can overcome superior sulcus deformity and post evisceration socket syndrome.[8,12] Sales-Sanz and Sanz-Lopez, introduced a four petal evisceration technique to accommodate large orbital implants for better cosmesis and adequate eye movement after evisceration.[8] It is also seen in the literature that there are better cosmetic outcomes with four petal evisceration as compared to simple evisceration.[4,8] This article aims to share results of patients who underwent evisceration at Armed Forces Institute Of Ophthalmology from June 2019 to December 2021.

Correspondence: Dr Murtaza Sameen, Department of Ophthalmology, Armed Forces Institute of Ophthalmology, Rawalpindi Pakistan
Received: 16 May 2022; revision received: 11 Feb 2023; accepted: 22 Feb 2023

METHODOLOGY

This retrospective study was conducted at Armed Forces Institute of Ophthalmology (AFIO), Rawalpindi Pakistan, from January 2022 to April 2022 after approval from hospital ethical review committee (266/ERC/AFIO).

Inclusion Criteria: Patients of either gender with phthisis bulbi and painful blind eyes which underwent

evisceration with four petal technique were included in this study.

Exclusion Criteria: Patients who underwent evisceration with dermis fat graft or with ptosis surgery were excluded from this study.

The data was collected from hospital record room. Medical documents of subjects who underwent four petal evisceration techniques were collected. In four petal evisceration technique after doing conjunctival periotomy 360°, sclerotomies between the recti muscles were done from limbus upto the optic nerve so that larger orbital implant can be placed. The size of the implant was calculated after performing A-scan of normal eye and diseased eye. A reduction of 3mm was done from AL of normal eye (i.e. 24–3mm=21mm) and the implant of 21mm was placed followed by 4 layers of support (i.e. sclera sutured in two layers, posterior tenon, anterior tenon,and conjunctiva). In the end extra support was provided by central temporary tarsorrhaphy done withprolene 5-0.

SPSS version 22.0 was used for calculation of data. Mean±SD was calculated for continuous variable. Frequency and percentage was calculated for categoricalvariables.

RESULTS

After a follow up of 18 months, subjects n=20 with atrophia bulbi in one eye from June 2019 and December 2021 which underwent evisceration with four petal technique were included. Eleven (55%) were females, while 9(45%) were male. Right eye were 12(60%) and left were 08(40%). The age of patients ranged from 5-58 years with a mean age of 35.1±17.01 years (Table).

Table: Demographic features of Patients

Variables	Frequency(%)
Age (Mean±SD)	**35.1±17.01 years**
Gender	**n=20**
Male	09(45%)
Female	11(55%)
Mean AL Of Atrophic Eyes	17.97±1.52 mm
Mean AL of Nomal Eyes	24.65±2.11 mm

AL= Axial length

AL of atrophic eyes ranged from 16.23-20.01 mm with a mean of 17.97±1.52 mm. While AL of the normal fellow eyes ranged from 22.08-26.54 mm with a mean of 24.65±2.11 mm. The implant used was 3mm smaller than AL of normal eye by a mean of 2.77±0.84 mm. An implant of 20mm diameter was used in 8(40%) cases, 18mm was used in 6(30%) cases, and 22mm was used in 6(30%) cases. The follow-up period ranged from 04-18 months with a mean of 22.22±10.1 months. Exposure of implant was noted in 1(5%) case secondary to orbital infection. Volume deficiency with enophthalmos of 2mm or more, and or deep superior sulcus was recorded in 1(5%) case due to displacement of implant inferiorly.

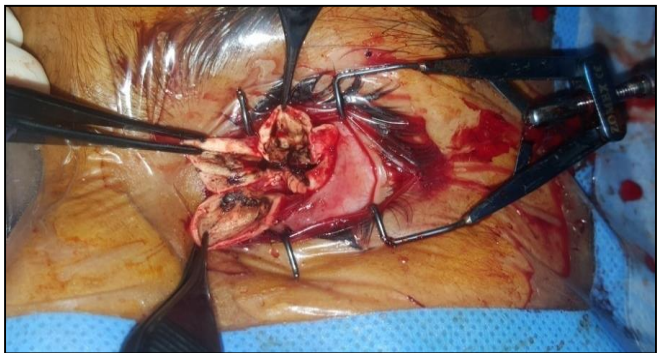

Figure: Four Petals after sclerotomies

DISCUSSION

Adequate orbital volume replacement is important after orbital reconstruction procedures. In 1990, Perry was the first to describe the use of bio-integrable implant after evisceration or enucleation to replace the orbital volume upto 65%.[8] Different materials are available in the market for orbital volume replacement. According to Yousuf *et al.* evisceration is a safer and quicker method than enucleation and they preferred evisceration over enucleation.[9-12] Benefits of evisceration are superior than enucleation that include tissue preservation, superior cosmetic results, higher prosthetic motility and reduced chances of intraorbital infection and extrusion of orbital implants.[10,11] We in our study also found evisceration a better option with good cosmetic results. In a national survey donein the united states by Shah *et al.* it was observed that evisceration is a preferable method of choice for the newly appointed oculoplastic surgeons as compared to their senior oculoplastic surgeons.[8,13] Selection of implant size is another big question in orbital volume replacement procedures. Standard implants are used by most of the surgeons, selected according to the age of the patient. Others use set of sizing implants for selection of appropriate implant for specific individuals.[13,14] Inappropriate implants results in several complications. Larger implants may results in extrusion and difficult fitting of prosthesis where as smaller implants cause superior sulcus deformity, less prosthesis motility and ptosis. In our study, there was extrusion of implant in one case (05%) and deep superior sulcus

was also noted in one case (05%). Kaltreider and Lucarelli proposed a formula for orbital volume replacement. They told to calculate the axial length (AL) of both eyes and subtract 3mm from the AL of normal eye for evisceration.[8,18] We also calculated the size of orbital implant according to the above- mentioned formula and found the results to be adequate. Viswanathan *et al.* in their study found exposure rate of about 14% after evisceration. This is contrary to our study as we had only one exposure (i-e 5%). Wang *et al.* had 11.4% complication of orbital implant exposure as they used a corneal preservation technique with only one sclerotomy performed upto the optic disc.[8,14-18] This is also contrary to our method of evisceration as we did four petal technique in which we did four sclerotomies between recti muscles upto the optic disc and we protected orbital implant with four coverings(i-e sclera sutured in two layers, posterior tenon, anterior tenon and conjunctiva along with central temporary tarsorrhaphy was done to provide some extra support). Huang *et al.* also used four petal technique so that larger implants can be implanted and sclera can be closed without scleral tension.[18] We also used larger implant and closed sclera with 5-0 vicryl suture. The diameter of implant was 3mm smaller than AL of normal eye by a mean of 2.77±0.84 mm. In literature, most of the surgeons prefer evisceration due to better cosmetic results and long term socket stability.[18,19] We also did follow up of our patients from 4-18 months with a mean of 22.22±10.1 months, only one patient had extrusion of implant and one presented with deep superior sulcus due to inferior displacement of implant. Many surgeons also use motility pegs to increase motility after 06 months of evisceration but we did not use any pegs in our cases. Retrospective analysis not only provides good patient care but also helps in analysis of surgical outcome and reduces complication rate.

ACKNOWLEDGMENTS

Special thanks to Staff of Operation Record Room of AFIO for helping us.

LIMITATION OF STUDY

We did not include eyes with ocular injuries in which evisceration was done. And we also did not include eyes with dermis fat implant.

CONCLUSION

Evisceration with four petal technique provides better cosmesis and good eye motility due to placement of larger orbital implants especially in phthisis bulbi eyes with fewer post operative complications.

Conflict of Intrest: None.

Author's Contribution

Following authors have made substantial contributions to the manuscript as under:

MS & MS: Supervision, Conception, Study design, analysis and Interperitation of data, Critically reviewed manuscript & approval for the final version to be published.

MA & MA: Critically reviewed, Drafted manuscript & approval for the final version to be published.

TA & HA: Data colllection, Entry and analysis of data, preparation of rough draft & approval for the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

REFERENCES

1. Holmes CJ, Laughlin A, Farooq T, Awad J, Murray A, Scott R, et al. Outcomes of ocular evisceration and enucleation in the British Armed Forces from Iraq and Afghanistan. Eye (Lond) 2019; 33(11): 1748-1755. https://doi: 10.1038/s41433-019-0480-5.
2. Brundridge W, Reed D, Santamaria J, Mehta A, Valentin F, Davies B, et al. Open globe trauma in a Military Hospital: A review of the ocular trauma score to help predict enucleation or evisceration. Graefes Arch Clin Exp Ophthalmol 2019; 257(8): 1789-1793. https://doi: 10.1007/s00417-019-04356-5.
3. Al-Dahmash SA, Bakry SS, Almadhi NH, Alashgar LM: Indications for enucleation and evisceration in a tertiary eye hospital in Riyadh over a 10-year period. Ann Saudi Med 2017; 37(4): 313–316.
4. Manandhar A. Sympathetic ophthalmia: enucleation or evisceration? Nepal J Ophthalmol 2011; 3(2): 181-187. https://doi: 10.3126/nepjoph.v3i2.5274.
5. Zheng C, Wu AY. Enucleation versus evisceration in ocular trauma: a retrospective review and study of current literature. Orbit 2013; 32(6): 356-361. https://doi: 10.3109/01676830.2013.764452.
6. Reed D, Papp A, Brundridge W, Mehta A, Santamaria J, Valentin F, et al. Evisceration versus enucleation following ocular trauma, a retrospective analysis at a level one trauma center. Mil Med 2020; 185(3-4): 409-412. https://doi: 10.1093/milmed/usz278.
7. Ranno S, Serafino M, Nucci P. Four petal evisceration versus standard technique: A retrospective study. Eur J Ophthalmol 2021; 31(4): 2156-2159. https://doi: 10.1177/1120672120950160.
8. Elbakary MA. Four petals evisceration for atrophia bulbi. Middle East Afr J Ophthalmol 2015; 22(2): 226-229. https://doi: 10.4103/0974-9233.150645.
9. Yousuf SJ, Jones LS, Kidwell ED. Jr Enucleation and evisceration: 20 years of experience. Orbit 2012; 31: 211–215.
10. Dave TV, Das AV, Mohapatra S, Bansal O, Ganguly A. Outcomes and complications of evisceration with primary implant: an electronic medical record driven analytics of 1800 cases. Orbit 2021; 16(1): 1-9. https://doi: 10.1080/01676830.2021.
11. Keilani C, Baus A, Tick S, Sahel JA, Boumendil J. Effectiveness and safety comparison of three eye and orbital reconstruction techniques in facial plastic surgery. Ann Chir Plast Esthet 2019; 64(4): 351-361. https://doi: 10.1016/j.anplas.2019.01.003.
12. Moore NA, Fu R, Clark J, Prendes M, Nunery WR, Burgett RA, et al. Anterior vestibule salvaging technique to limit silicone orbital implant extrusion following evisceration. Orbit 2019; 38(4): 318-321. https://doi: 10.1080/01676830.2018.1537288.

13. Shah RD, Singa RM, Aakalu VK, Setabutr P. Evisceration and enucleation: A national survey of practice patterns in the United States. Ophthalmic Surg Lasers Imaging 2012; 43: 425-430
14. Tóth G, Pluzsik MT, Csákány B, Sándor GL, Lukáts O, Nagy ZZ, et al. Clinical Review of ocular traumas resulting in enucleation or evisceration in a tertiary eye care center in Hungary. J Ophthalmol 2021; 2021(1): 5588977. https://doi: 10.1155/2021 /5588977.
15. Shukla B., Agrawal R., Shukla D., Seen S. Systematic analysis of ocular trauma by a new proposed ocular trauma classification. Indian J of Ophthalmol 2017; 65(8): 719–722. https://doi: 10.4103 /ijo.ijo_241_17.
16. Zheng PF, You QS, Li Q. Injectable silicone rubber for ocular implantation after evisceration. PLoS One 2018; 13(3): e0193448. https://doi: 10.1371/journal.pone.0193448.
17. Rodríguez Á, Peña S, Cavieres I. Ocular trauma by kinetic impact projectiles during civil unrest in Chile. Eye (Lond). 2021; 35(6): 1666-1672. https://doi: 10.1038 /s41433-020-01146-w.
18. Kaltreider SA, Lucarelli MJ. A simple algorithm for selection of implant size for enucleation and evisceration: A prospective study. Ophthal Plast Reconstr Surg 2002; 18(1): 336-341.
19. SanzMS,LopezA. Four-Petal Evisceration: A New Technique. OphthalPlast&Reconstr Surg. 2007; 23(5): 389-392. https://doi:10.1097/IOPOb013e318142cc4c.