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Original Research Article

Evisceration with acrylic spherical implant: An evaluation

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ABSTRACT

Purpose: The purpose of this study is to assess the acceptance, of non-integrated acrylic implant in terms of cosmesis, patient comfort, socket component as well as the comparison of these parameter between eyes with and without implant.

Materials and Methods: A total of 25 eyes with specific indications for sacrificing the eye were randomly divided with 2 groups of with and without implant. Ocular parameters were taken before and after surgery.

Results: Follow up assessment was done post operatively, at 2nd week, 4th week and 6 months after surgery. In the immediate post operative period, the symptoms of pain, discharge and discomfort were present in all patient belonging to either group. However, on future follow up of 1st week these complaints were significantly less in the group without implant.

At 6 months serous, non infectious discharge was present in 20% of the study population of both the groups. Evaluation of the post operative socket in terms of infection, superior sulcus deformity revealed comparable (with implant 13.3% and without implant 20%) data in terms of post operative infection, all of which were well controlled after administering appropriate antibiotics whereas, superior sulcus deformity was present in 100 %cases without implant compare to only 13% at 6 months follow up.

Assessment of the complications associated with lid showed that in the group without implants ptosis was present in all cases compared to only 13% (2 cases) in the group with implant. At 6 months, lid complications in the group without implants comprised of 2 cases of entropion and 4 cases of ectropion compared to only one case of ectropion in those with implants.

The results in both the group were comparable in terms of occurrence of conjunctival dehiscence and giant papillary conjunctivitis.

Conclusion : The placement of an acrylic spherical implant was associated with cosmesis with a much better amplitude of movements at the cost of a relatively more prolonged convalescence.

1. Introduction

Painful blind eye, intraocular malignancy or disfigurement due to an unsightly eye with no visual potential often compels the surgeon to undertake destructive procedures. The two most commonly performed surgeries are evisceration and enucleation.

The surgical technique of evisceration consists of the removal of entire contents of the globe leaving behind a entire shell, preservation of all extraocular appendages, whereas enucleation included removal of eyeball along with optic nerve as far behind as possible. The surgery accompanied by long suffered complications of post op infection in setting of endophthalmitis or panophthalmitis. Post operative scleral shell shrinkage and poor wound healing of edges are also concern to surgeon as well, the dilemma with the placement of implant.

The removal of the intraocular contents in evisceration are accompanied by 7 cc of volume deficit in the globe. This leads to a disfiguring condition with retraction or ptosis of upper lid, deepening of superior sulcus, laxity of lower lid, enophthalmos and distortion of fornix. [1–5]

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The orbital content volume loss is accompanied by retraction of upper lid owing to inferior displacement of superior muscle complex showing a space or an area of dehiscence between the levator palpebrae superioris and orbital roof causing the rotatory displacements of orbital contents displaces the superior fornix further into the orbit, with sagging of lower lid due to the gravitation of prosthesis and subsequent increase in pressure on the lower eyelid.

To counteract these issues, successful replacement of lost socket volume along with cosmesis and better rehabilitation with artificial eye is desired. This led to development of several materials over the years such as hollow glass sphere, gold, silver, vitallium, platinum, aluminium, cartilage, bone, fat, fascia lata.

Bio-integrated implants such as Hydroxyapatite and Medpore have been on the upsurge in last few decades.

Semi-integrated implants which are partially exposed and integrated with the extraocular muscles were introduced to meet the demand of better mobility of the artificial eye.

The selection of an implant has to be weighted in terms of patient comfort, case of prosthetic fit, cosmetic appearance and cost effectiveness. The present investigation aimed to further asses the acceptance of non integrated acrylic implant.[6–8]

2. Materials and Methods

This research was approved by ethical committee of MLN Medical College, Prayagraj and informed consent was taken from all patients.

Since the study involved mutilating surgery of the eye, 25 patients with specific indications for sacrificing the eye were included, of the 25 study subjects, 21 were cases of panophthalmitis, 2 were of endopthalmitis and 2 were of anterior staphyloma.

All the study subjects underwent a detailed preoperative evaluation noting the patient particulars, detailed history of ocular complaints and systemic as well as local ocular examination were carried out. General investigation and those concerning specific culture of conjunctival and corneal swabs of diseased eye were taken as and when required. Xylocaine sensitivity was done in all patients. Frequent instillation of broad spectrum plain antibiotic drop into the conjunctival sac were started at time of admission. Pentazocine injection (Fortwin 30mg) and Promethazine (Phenergan 25 mg) intramuscularly were given 30 min prior to surgery.

2.1. Surgical Procedure

Majority of the patients were operated upon under local anaesthesia, which works excellently in conjunction with sedation and confers greater safety benefits compared to general anaesthesia. 5ml of 2% xylocaine with adrenaline with 250ml of hyaluronidase and 3ml sensocaine given for local anaesthesia via the peribulbar route. Lid sutures were passed in both the upper and lower lid to attain good operating field. 360 degrees conjunctival peritomy was carried out and anterior chamber was entered using Bard Parker Blade No.11 through a limbal incision and extended 360 degree using corneal scissors. After excision of corneal button uveal tissue was separated from sclera and optic nerve over 360 degrees using evisceration scoop.[9]

Thereafter, appropriately size acrylic spherical implant was chosen (12mm,14mm,16mm,18mm) and placed deep into the scleral cup. Wedge shaped scleral incision was made at 6and 12 o'clock position with base upwards. Scleral wound was closed using interrupted 6-0 prolene sutures with buried knots in vertical line. 6-0 silk was use to close the conjunctival wound horizontally in line with palpebral fissure. Pressure dressing was applied after placement of conformer.[10]

1st Post-Op routine check up was carried out at 1 week after discharge and conformer was removed with placement of prosthetic eye. Follow up evaluation was done with emphasis on any complaints by the patients, wound healing, examination of prosthetic bed, shape of socket, fit and movement of eye prosthesis.

Figures 1(a) to 1(h) depict the surgical steps.

3. Results

Out of the 25 patients in the study population, males (52%) outnumbered the females (48%) by a narrow margin. The maximum number of patients that underwent evisceration were in 40 - 60yr age group.

84% of the patients were of panophthalmitis, anterior staphyloma and endophthalmitis comprised 8 % each.

Table 1: hows the age and sex distribution of study group.

Age Group (Years)	Cases (%)		
	Male	Female	Total
10 – 20	02 (8.0)	01 (4.0)	03 (12.0)
20 – 40	01 (4.0)	01 (4.0)	02 (8.0)
40 – 60	04 (16.0)	07 (28.0)	11 (44.0)
>60	06 (24.0)	03 (12.0)	09 (36.0)
Total	13 (52.0)	12 (48.0)	25 (100.0)

15 (60%) patients underwent evisceration with acrylic spherical implant and in the 10 (40%) remain no implant was put.

Sizing of the acrylic spherical implant for each patient was done using a set of spheres of different sizes.

All the 25 (100%) patients were followed for 1st week post-operatively till their discharge and subsequently at 2nd week, 4th week, 6th month post-operatively.

The findings of pain, discomfort and discharge are compared in Table 4. These observation show that insertion of an acrylic spherical implant into the scleral always cause more pain, discomfort and discharge in the post-operative

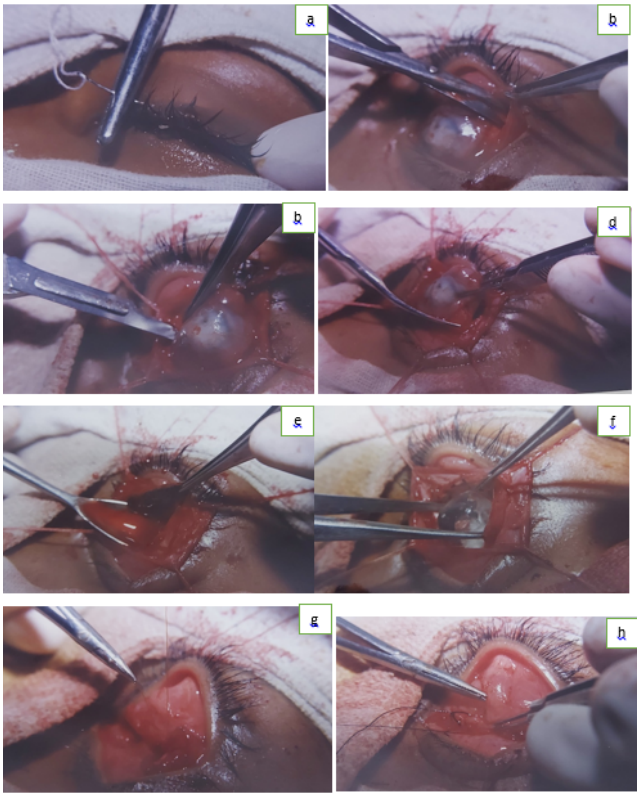

Fig. 1: (a): Lid stitches passed; **(b):** 360 degrees conjunctival peritomy performed; **(c):** Limbal incision made with B.P. blade; **(d):** Corneal button removed; **(e):** Intraocular contents removed with evisceration spoon; **(f):** Acrylic spherical implant placed in scleral shell; **(g):** Scleral shell and Tenon's capsule closed with 6/0 chromic catgut. .suture; **(h):** Conjunctiva closed with continuous 6/0 silk suture.

Table 2: hows the type of implant put in each type of cases with respective percentage values.

	Types o f Cases (%)			
Evisceration	**Panopth - almitis**	**Endophthal -mitis**	**Anterior Staphyloma**	**Total**
With Acrylic Spherical Implant	11 (44.0)	02 (8.0)	02 (8.0)	15 (60.0)
Without Implant	10 (40.0)	-	-	10 (40.0)
Total	21 (84.0)	02 (8.0)	02 (8.0)	25 (100.0)

Table 3: Depicts the size of acrylic spherical implant used.

Age Group (Years)	**Cases (%)**		
	14mm	**16mm**	**18mm**
10 – 20	02 (13.3)	-	-
20 – 40	-	-	01 (6.7)
40 – 60	-	01 (6.6)	06 (40.0)
>60	-	01 (6.7)	04 (26.7)
Total	02 (13.3)	02 (13.3)	11 (73.4)

period.

Table 4:

Evisceration with acrylic spherical implants				
	Types o f Cases (%)			
Symptoms	**3^{rd} Day**	**1^{st} Week**	**4^{th} Week**	**6^{th} Month**
Discomfort	15 (100.0)	11 (73.3)	02 (13.3)	1 (6. 7)
Discharge	15 (100.0)	12 (80.0)	-	3 (20.0)
Pain	15 (100.0)	08 (53.3)	-	-
Evisceration without implants				
	Cases (%)			
Symptoms	**3^{rd} Day**	**1^{st} Week**	**4^{th} Week**	**6^{th} Month**
Discomfort	10 (100.0)	02 (20.0)	-	-
Discharge	10 (100.0)	04 (40.0)	01 (10.0)	02 (20.0)
Pain	10 (100.0)	02 (20.0)	-	-

Post-operative socket was evaluated in terms of in terms of infection, superior sulcus deformity enophthalmic-enophthalmos. In the implant placement group infection was seen in 2(13.3%) cases, superior sulcus deformity in 2(13.3%), enophthalmos in only 1(6.7%) of the cases. These findings were in contrast to the 10 cases who were eviscerated without implant, where 2(20%) cases had infection at 1 week, all 10 cases had superior sulcus deformity and anophthalmic -enophthalmos at 6 months.

Lid complications included ptosis and lid laxity in 2(13.3%) cases each in the implant group. 1 case of ectropion (6.7%) with no entropion encountered. At 6 month, in the group without implants all 10(100%) cases had ptosis, 8(80%) had lower lid laxity, 2(20%) cases had entropion and 4 (40%) had ectropion.

Conjunctival dehiscence was seen in 1 case eventually in cases with implant and 2 cases of without implant which was resutured. Giant papillary conjunctivitis was seen in 20% cases in each group.

The cosmetic results were assessed on the basis of parallel visual axis in primary position of gaze and amplitude of movement of artificial eye.

Table 5:

LID complications				
Evisceration with acrylic spherical implants				
	Cases (%)			
Symptoms	**3^{rd} Day**	**1^{st} Week**	**4^{th} Week**	**6^{th} Month**
Lid Swelling	15 (100.0)	8 (53.3)	-	-
Ptosis	-	-	1 (6.7)	2 (13.3)
Lower Lid Laxity	-	-	1 (6.7)	2 (13.3)
Entropion	-	-	-	-
Ectropion	-	-	-	1 (6.7)
LID complications				
Evisceration without implants				
	Cases (%)			
Symptoms	**3^{rd} Day**	**1^{st} Week**	**4^{th} Week**	**6^{th} Month**
Lid Swelling	10 (100.0)	2 (20.0)	-	-
Ptosis	-	2 (20.0)	6 (60.0)	10 (100.0)
Lower Lid Laxity	-	2 (20.0)	4 (40.0)	8 (80.0)
Entropion	-	-	1 (10.0)	2 (20.0)
Ectropion	-	-	1 (10.0)	4 (40.0)

Table 6: hows the comparison of the movement which shows relatively less amplitude of movement in subjects without implant.

Artificial eye amplitude		
Movement of Artificial Eye	**Evisceration With Acrylic Spherical Implant**	**Evisceration Without Implant**
Adduction	40°	20°
Abduction	35°	20°
Elevation	10°	5°
Depression	15°	5°

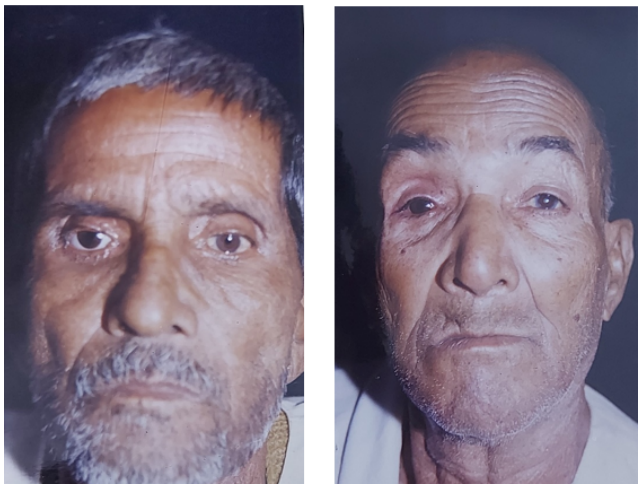

Fig. 2: Picture showing the post-operative cosmesis results after implant placement.

4. Discussion

Removal of an eye for ocular diseases such as a painful blind eye, a severely traumatised eye, eyes containing life threatening tumours such as melanoma, panophthalmitis was first described in 1583 by George Bartisch. The" Extirpation of eye procedure " underwent little modification for 265 years. The first scleral implant was placed in 1939 by Burch. The use of an orbital implant was a major breakthrough in anophthalmic socket surgery. In our study we attempted to study the acceptance of acrylic implant. Individualization of the implant size is essential for optimal volume replacement in order to achieve desired aesthetic results. With the concept of an addition of 2 ml volume of prosthesis itself, we determined the appropriate size of the implant by the formula AL-2, where axial length of the contralateral eye (AL, mm) was measured by A scan prior to surgery. This allows for adequate space for prosthesis placement in the future.

The search for a well oriented orbital implant which gives an excellent appearance and good motility has covered a gamut of autogenous and alloplastic materials and implant design. Hughes in 1955 introduced acrylic plates for correcting enophthalmos following removal of intraocular contents.

Acryclic spherical implant is well tolerated by the eye and causes little tissue reaction. Our findings of pain, discomfort in the immediate post operative period was consistent with that of Sorley Arnold 1972.

Socket related complications were substantially higher in the group without implant. These findings were in conformity with the loss of orbital soft tissue volume deficit and disinsertion of levator aponeurosis following surgery

(Kronish JW,1990). The cosmetic result in terms of the amplitude and range of movements of the artificial eye with implant placement is much better for four gazes as compared to those without implant placement as seen in our study.

Hence in conclusion we would like to state that though the initial post operative convalescent period is more prolonged and troublesome but the overall cosmetic appearance of the socket was much better in cases with implant placement. Near natural appearance of the artificial eye was restored in a good fashion and well fitted prosthesis made quick darting movement in synchrony with the natural eye.

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6. Conflict of Interest

The authors declare they have no conflict of interest.

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