



Primary dermis fat graft implantation in orbit after evisceration.

Sandeep K, Sudhakar N A, KV Chidananada, K C Aishwarya, Privila E, Zeeshan Sayani,

Sudhir M Naik

KVG Medical College, Sullia, Karnataka India

Abstract

Background:

Orbital implants allow for Cosmesis and volume replacement of an eviscerated eye. Dermis fat graft is a viable alternative to alloplastic implants as a primary orbital implant following ocular evisceration.

Aim/Objectives:

To provide evidence for dermal fat graft as a safe and stable orbital volume replacement following ocular evisceration.

Methodology:

A prospective, interventional, non-comparative case series of patients who had an primary autologous dermis graft after evisceration. All the patients fulfilling the criteria were identified. At 6 weeks post-operatively, patients received an ocular prosthesis.

The volume of the dermis-fat grafted globe was measured at 1 month and 9 months post-operatively by plain magnetic resonance imaging of the orbit.

Results:

Ten patients underwent ocular evisceration and dermis fat graft implant. Nine patients completed the study. Out of 10 patients 60% (6) were males and 40% (4) were females.

Suture abscess was noted in 20% patients, hair growth in the dermis in 10%, sub conjunctival cysts in 10% patients. Cosmetic outcome showed very good result in 50% patients with good prosthetic motility in 60%.

Conclusion:

This case series shows that the use of a dermis graft is a safe and effective new technique to facilitate orbital rehabilitation. It is hypothesised that the extra surface area produced with a dermis graft preserves the fornices and allows a larger implant.

Introduction:

Smith and Petrelli first described the use of autogenous dermis fat grafts as a secondary implant following extrusion.¹ As a primary implant, the use of dermis fat graft has been described following ocular enucleation.² DFG orbital implant is an effective means of replacing orbital volume and affording motility of the ocular prosthesis. It is associated with low morbidity and a satisfactory cosmetic result.³ Moreover the complications associated with alloplastic implants like migration or extrusion are avoided.⁴ The DFG is composed of dermis and appended subcutaneous fat, after removal of the epidermis. The dermis is believed to enhance vascularisation and decrease the incidence of fat atrophy. It also acts as a barrier against fatty augmentation.

The site most frequently used to harvest the graft is the gluteal area, but other areas such as the abdomen and the periumbilical can also be used to harvest such a graft.⁷ This study examines dermis fat graft implants in eviscerated orbits.

The radiological outcome of the dermis fat graft is traced over time so that an elaborate understanding of fat absorption can be obtained.

Methods:

Informed consent was obtained from all patients prior to entry in the study.

Inclusion criteria included patients who had a painful blind eye from infective causes or terminal glaucoma who were indicated for evisceration. Exclusion criteria included patients with known ocular malignancy, previous abdominal surgery, or prior evisceration and implant. Patients were recruited between October 2013 and October 2014.

All procedures were performed under local anesthesia. Evisceration was performed commencing with a 360° peritomy followed by a limbal incision with a 15° blade.⁵ The cornea was excised using corneal scissors. The uvea was separated from the sclera with the help of an evisceration spatula and contents are scooped out using the evisceration curette. The extraocular muscles i.e. rectus muscles are pulled out one by one with the help of a muscle hook and a 3-0 silk suture is passed near the insertion of each muscle.

The muscle is then cut with the help of tenotomy scissors leaving behind a small stump carrying the suture. The superior and inferior oblique muscles are hooked out and cut near the globe. Using curved scissors the sclera is excised leaving behind only a 3mm frill around optic nerve.

The dermis fat graft was harvested from the gluteal region. The dermis was excised with the diameter of the fat ball measuring 20 mm, and underlying fat to a depth of 25 mm to obtain a cylindrical shape. Following hemostasis, the gluteal wound was closed with 5-0 prolene sutures. The dermis was trimmed to fit the scleral opening and the fat portion of the dermis-fat graft was placed into the scleral shell. The dermis was sutured to the sclera by using 6-0 vicryl sutures. The conjunctiva was closed with 6-0 vicryl sutures, and a conformer was placed over the conjunctiva into the fornices. The ocular wound was dressed with a pad and bandage for 3 days post operatively. The gluteal wound from where the dermis fat graft was harvested was examined and the sutures were removed 1 week postoperatively. At 6 weeks postoperatively, the patient received an ocular prosthesis.

Results:

Ten patients were recruited into the study and nine patients completed the study. A summary of patients demographics and indications for evisceration are presented in the Table

All patients had comorbidities; one patient had sepsis following pneumonia, five had diabetes mellitus, two had hypertension, two had ischemic heart disease. Clinical examination showed good integration of the bulbar conjunctiva to the dermis in all patients. Dermis graft vascularisation occurred within 14 days and by 21 days the graft was covered with conjunctival epithelium. The most common complication being suture abscess in 2 patients. Hair growth from the dermis seen in one patient, and sub-conjunctival cysts in one patient.

No pyogenic granuloma was noted. All patients were followed up for 1 year after the procedure. No adverse effects occurred in the long term. No conjunctival scarring, shallow fornices, or post-enucleation socket syndrome were noted 1 year after the procedure. Following the initial ocular prosthesis fitting, no patients required a second fitting at the time of this manuscript Submission.

The functional outcome is assessed by noting the prosthetic motility by Kestenbaum’s limbus method. The normal value was taken 10mm. The motility was graded as follows:

PROSTHETIC MOTILITY	GRADE:
1)6-8 mm	Very good
2)4-6 mm	Good
3)2-4 mm	Fair.

60% patients showed very good prosthetic motility, 30% showed good motility and 10% showed fair motility.

DEMOGRAPHICS	NO. OF PATIENTS (UNLESS OTHERWISE STATED)
AGE (YEARS)	
<i>Mean</i>	53
<i>Range</i>	45-60
SEX	
<i>Male</i>	6
<i>Female</i>	4
LATERALITY	
<i>Left</i>	7
<i>Right</i>	3
INDICATION FOR EVISCERATION	
<i>End-stage glaucoma</i>	4
<i>Panophthalmitis</i>	2
<i>Pseudophakic bullous keratopathy</i>	2
<i>Bleeding anterior staphyloma</i>	2

Table 1: Summary of patient demographics and indications for evisceration.

COMPLICATIONS AFTER DFG	NO. OF PATIENTS.
SUTURE ABSCESS	2
HAIR GROWTH FROM THE DERMIS	1
SUB-CONJUNCTIVAL CYSTS	1

Table 2: COMPLICATIONS FOLLOWING DERMOFAT GRAFT (DFG):

Discussion:

The use of dermis fat graft to reconstruct an anophthalmic socket was first described by Smith and Petrelli in 1978.¹ The use of dermis fat graft as a primary orbital implant after enucleation has been previously reported. The autogenous dermis fat graft orbital implant is alternative for volume augmentation in the anophthalmic socket. They are the only autogenous orbital implants currently in use. The major advantages are its minimal inflammatory reaction and total compatibility with the host⁶. Other advantages include easy availability & all complications of alloplastic implants are avoided⁷. Exposure is an uncommon complication after orbital implant placement. Rates of exposure for porous polyethylene implants vary widely between 2% and 13% after enucleation, and between 0% and 3.3% after evisceration.¹¹⁻¹⁸ Similar rates are noted for hydroxyapatite implants.^{11-14 17} The risk of exposure may be increased by previous orbital radiation. While wrapping porous implants is thought to provide an additional tissue layer to prevent exposure, no clear benefit has been defined, and vascularisation of the implant may be compromised.^{12 15 19 20} Smith et al has the privilege of carrying out^{11 8} dermo fat grafts in six years³ while Shore et al reviewed 60 cases for anophthalmic socket reconstruction following dermis fat graft⁸.

Dermis fat grafts have also been reported as a secondary implant following exposure or extrusion of alloplastic implants. Our series investigates the use of dermis fat graft as a primary implant after evisceration. Dermis fat grafts have the advantages of relative abundance and light weight.

For the same volume, a dermis fat graft is lighter than silicone or hydroxyapatite implants. Previous reports have documented the harvest of dermis fat from the inner thigh⁹ and arm.¹⁰ This study showed that dermis fat graft as a primary implant is a safe procedure. Even after endophthalmitis, the placement of dermis fat graft into the scleral shell rendered volume replacement without further infection. Dermis fat integration occurred in patients with medical comorbidities. Patients who are at risk for alloplastic implant exposure from poor wound healing may benefit from this procedure. We used MRI to document the radiological changes of orbital dermis fat. As per our observation, there was no fat atrophy and fat necrosis and no volume loss.



Fig:1: painful blind eye.

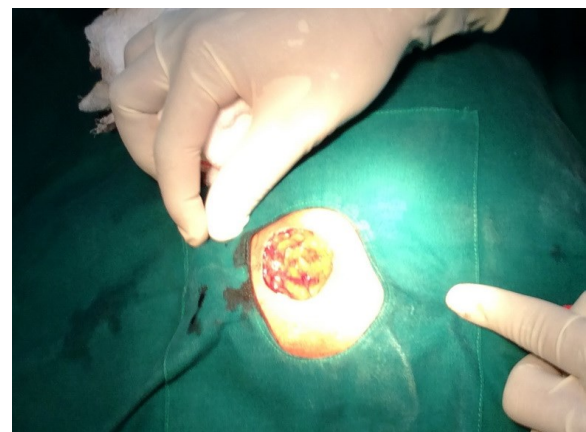


Fig 2: Dermis fat being harvested from the gluteal region



Fig 3: Dermis fat graft being prepared.



Fig 4: Eviscerated socket



Fig 5: postop picture

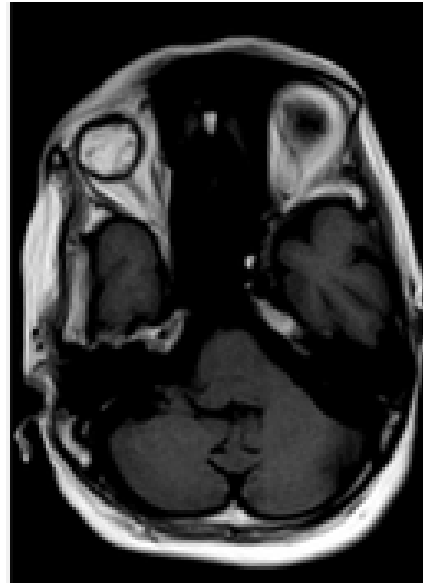


Fig 6: Post op MRI image

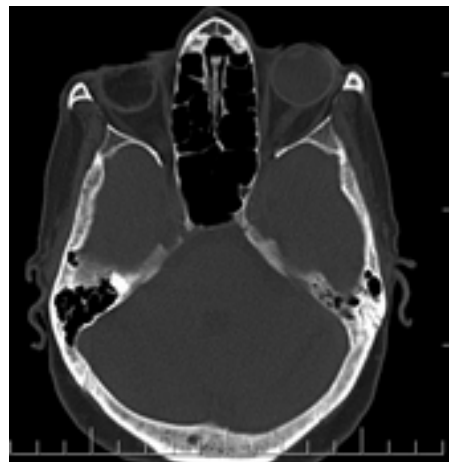


Fig 7: Postop CT image

References:

1. Smith B, Petrelli R. Dermis-fat graft as a movable implant with in muscle cone. *Am J Ophthalmol.* 1978;85:62-6.
2. Paris GL, Spohn WG. Correction of enophthalmos in the anophthalmic orbit. *Ophthalmology.* 1980;87:1301-8.
3. Smith B, Bosniak S, Nesi F, Lisman R. Dermis-fat orbital implantation: 118 cases. *Ophthalmic Surg.* 1983;14:941-943.
4. Bonavolonta G, Tranfa F, Salicone A, Strianese D. Orbital dermis-fat graft using periumbilical tissue. *Plast Reconstr Surg.* 105:23-26. 200.
5. Chen W. Evisceration. In: Chen WP, editor. *Oculoplastic surgery, the essentials.* 1st ed. New York: Thieme, 2001:347-55.
6. Petrelli RL. Use of autogenous materials in reconstructing the anophthalmic socket. *Adv Ophthalmic Plast Reconstr Surg.* 1990;8:153-69.
7. Hintschich CR, Beyer-Machule CK. Dermal fat transplant as autologous orbital implant. *Klin Monatsbl Augenheilkd.* 1996 Mar;208(3):135-41.
8. Shore JW, McCord CD Jr, Bergin DJ, Dittmar SJ, Maiorca JP. Management of complications following dermis fat grafting for anophthalmic socket reconstruction. *Ophthalmology* 1985 Oct;92(10):1342-50.
9. Vagefi MR, McMullan TF, Burroughs JR, Isaacs DK, Tsirbas A, White GL Jr, et al. Autologous dermis graft at the time of evisceration or enucleation. *Br J Ophthalmol.* 2007;91:1528-31.
10. Hardy TG, Joshi N, Kelly MH. Orbital volume augmentation with autologous micro-fat grafts. *Ophthalm Plast Reconstr Surg.* 2007;23:445-9.
11. Su GW, Yen MT. Current trends in managing the anophthalmic socket after primary enucleation and evisceration. *Ophthalm Plast Reconstr Surg* 2004;20:274-80.
12. Custer PL, Kennedy RH, Woog JJ, et al. Orbital implants in enucleation surgery: a report by the American Academy of Ophthalmology. *Ophthalmology* 2003;110:2054-61.
13. Hornblass A, Biesman BS, Eviatar JA. Current techniques of enucleation: a survey of 5,439 intraorbital implants and a review of the literature. *Ophthalm Plast Reconstr Surg* 1995;11:77-86.
14. Trichopoulos N, Augsburger JJ. Enucleation with unwrapped porous and nonporous orbital implants: a 15-year experience. *Ophthalm Plast Reconstr Surg* 2005;21:331-6.
15. Blaydon SM, Shepler TR, Neuhaus RW, et al. The porous polyethylene (Medpor) spherical orbital implant: a retrospective study of 136 cases. *Ophthalm Plast Reconstr Surg* 2003;19:364-71.
16. Li T, Shen J, Duffy MT. Exposure rates of wrapped and unwrapped orbital implants following enucleation. *Ophthalm Plast Reconstr Surg* 2001;17:431-5.
17. Remulla HD, Rubin PA, Shore JW, et al. Complications of porous spherical orbital implants. *Ophthalmology* 1995;102:586-93.
18. Jordan DR. Problems after evisceration surgery with porous orbital implants: experience with 86 patients. *Ophthalm Plast Reconstr Surg* 2004;20:374-80.

19. Gayre GS, Lipham W, Dutton JJ. A comparison of rates of fibrovascular ingrowth in wrapped versus unwrapped hydroxyapatite spheres in a rabbit model. *Ophthal Plast Reconstr Surg* 2002;18:275–80.

20. Soparkar CN, Wong JF, Patrinely JR, et al. Porous polyethylene implant fibrovascularization rate is affected by tissue wrapping, agarose coating, and insertion site. *Ophthal Plast Reconstr Surg* 2000;16:330–6.