Case Report

MODIFIED FOUR-PETAL TECHNIQUE WITH DERMIS FAT GRAFT FOR SECONDARY REPAIR IN WOUND DEHISCENCE AFTER EVISCERATION

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ABSTRACT

The evisceration technique has undergone a series of evolution in order to achieve lower complications and allow implantation of larger orbital implants. Furthermore, the tension on the wound surface should be minimized to decrease the rate of exposure. The four-petal technique with sclerotomy has been described in several studies to expand the scleral bag and extend the inner surface of the sclera to allow insertion of larger orbital implants with better cosmetic results and lower extrusion rates. To report a case of modified four-petal technique with dermis fat graft for secondary repair in wound dehiscence after evisceration. A 63-year-old female came to the hospital 1 month after underwent evisceration with two times wound dehiscence and re-suturing. Secondary repair with dermis fat graft implantation was performed using a modified four-petal technique. Four sclera radial incisions were made between the rectus muscle insertions to the equator to create a larger sclera pouch and minimal strain continued with dermis fat graft implantation taken from the low inguinal region. Sclera, tenon, and conjunctiva were sutured to the peripheral side of the dermis. Tarsorrhaphy was maintained for 6 weeks. Postoperatively, the tissue grew perfectly without complications. Prostheses were placed with motility maintained, and good cosmetics. Modified four-petal technique with dermis-fat graft implantation on small sclera pouch is an effective method and applicable with promising postoperative results.

Keywords: Evisceration, Four-Petal, Wound Dehiscence

I. INTRODUCTION

Evisceration is an ophthalmological surgery that removes intraocular contents, but leaves the white part of the eye, the sclera, and the muscles around the eye in place, and is usually followed by placement of an orbital implant to replace the lost ocular volume [1] [2] [10]. Compared to enucleation, the evisceration technique is easier to apply and has better functional and aesthetic outcomes. This technique is recommended for cases of severe eye injury, pain in a blind eye, and severe infection [3] [10].

Evisceration techniques have been greatly modified and are highly developed, one of which is the latest “Four-Petal” evisceration. Salez-Sand and Sand-Lopez described this technique in 2007. Although variations exist, there are core surgical steps, which remain fairly constant. In evisceration, there are 2 main goals, replacement of lost volume with proper implant size and optimal implant motility [6]. But, at the same time, the tension in the wound must be minimized to reduce the exposure of the implant by enlarging the scleral entry and expanding the area of the internal surface of the sclera [3]. Performing a sclerotomy, allowing greater implant placement, has become popular in recent years and carried out at this stage. Many different sclerotomies and relaxation methods have been described to facilitate the size of the cavity where the implant is placed [1]. Increased scleral capacitance and placement of larger orbital implants can achieve functional and satisfying cosmetic results and low risk of extrusion [3].

The Four-petal technique is eviscerated by four sclerotomies which are incised between the insertions of the rectus muscle, starting from the limbus to the optic nerve. The 4 sclerotomies form 4 separate scleral petals, each petal contains 1 rectus muscle insertion, and then the orbital implant is placed inside. Because all four petals are not interdependent, the sclera can facilitate various sizes of implants without tension [5].

The four-petal technique with dermal-fat grafts as primary implant offers tissue growth, spontaneous epithelialization, and satisfying tension-free conjunctival closure. Here, we report a modified four-petal technique with fat dermis graft for secondary repair of wound dehiscence after evisceration [6].
II. CASE REPORT

A 63-year-old female was referred to the emergency unit with pain and redness in her left eye. Visual acuity decreased 5 days ago. She had a history of cataracts in both eyes and underwent cataract surgery on the left eye 20 days prior. History of systemic disease and allergies were denied. Topical antibiotics installation from his previous hospital, but there was no improvement.

The visual acuity was 20/60 and light perception in the right and left eye, respectively. Intraocular pressure was 11 mmHg in the right eye and increased on the left eye by palpation.

Anterior segment examination in the left eye showed eyelid edema and ocular discharge. The conjunctiva is hyperemia with mixed injection and scars in the superior limbus. The melting cornea. (figure 1.a). Posterior segments were difficult to evaluate. Right eye examination was normal except for lens haziness.

Routine hematology examination revealed leukocytosis (10.610 µL). Chest ray examination showed cardiomegaly and aortic elongation. B-scan ultrasound showed points like lesions and vitreous opacity due to endophthalmitis. Based on clinical manifestations and ophthalmology examinations, the patient was diagnosed with Acute Postoperative Endophthalmitis. Then, the patient was given antibiotic injection intravitreal with Vancomycin 1 mg and Ceftazidime 2.25 mg.

Figure 1. Descriptions of the patient. Acute endophthalmitis with corneal melted (a), Cornea perforated (b), post evisceration (c), first wound dehiscence (d), post debridement, and resutured (e), second dehiscence (f)

7 days after intravitreal injection, the patient came with no light perception, intraocular pressure was decreased with palpation, eyelid edema, ocular discharge, hyperemia conjunctiva with mixed injection, melted cornea with uvea mass, anterior chamber and other details were difficult to evaluate (figure 1. b). Evisceration was performed the day after with conventional technique without sclerotomy (figure 1. c, 4. a)

Figure 2. Surgical technique. A peritomy 360-degree (a), Removal contents of the scleral bag (b), Sclerotomy, four-petal (c), Dermis fat graft (d), Dermis fat is fixed, dermis layer anteriorly oriented (e), Tarsorrhaphy (f)
Two weeks after the first evisceration, the patient arrived with wound dehiscence and sclera melting (figure 1.d). Routine hematology was normal. Oral therapy combined antibiotics (Levofloxacin 500 mg and Metronidazole 500 mg), and steroids. Topical therapy was given (Dexamethasone-Neomycin-Polymyxin B) 3.5 g ointment. Wound debridement and re-suturing under general anesthesia were performed the day after (figure 1.e).

10 days after wound debridement and re-suturing, the patient revisited with wound dehiscence for the second time (figure 1.f). Then the patient was referred to the ophthalmology reconstruction division for further treatment.

Repair of wound dehiscence has been done by implanting dermis fat graft with a modified four-petal technique.

**Surgical Technique**

Under general anesthesia, a 360-degree peritomy was performed (figure 2.a). In this case, blunt dissection is performed on the sub-tenon and scleral fibrosis. Elimination of necrotic tissue, remove the contents of the scleral bag, and curette clean (figure 2.b). Sclerotomy in four insertions starts from the limbus to the equator (figure 2.c). Plant a dermis fat graft that has been harvested from the abdominal region (30mm x 20mm), into the sclera bag (figure 2.d). Dermis layer anteriorly and the posteriorly oriented fat.

Fixation of dermis fat graft to all sides of the sclera with 5/0 interrupted Vicryl sutures. And suture of the extraocular muscles and conjunctiva to the edge of the dermis fat border using 6/0 Vicryl (figure 2.e). Insert a conformer and tarsorrhaphy at the end of the surgery (figure 2.f).

6 weeks later, the tarsorrhaphy is released. The tissue around the fat graft of the dermis and the conjunctiva grows perfectly and closes without strain. No complications were found. The next step will be planned prosthetic fittings (figure 4.a).

### III. DISCUSSION

Endophthalmitis can be caused by a variety of events, including trauma, corneal ulcers, systemic infections, and intraocular surgery. One approach to treatment is evisceration and enucleation [2].

![Figure 3. Illustrations: (a) Coronal view of the 4 petals after radial incisions to the equator. (b) Sagittal view. (c) DFG implantation. (d) The four petals were sutured to the peripheral side of the dermis](image)

The decision to remove an eye must be individualized to each patient. Advantages and disadvantages exist among the different surgical techniques and implant materials [7]. In the case of recalcitrant endophthalmitis, evisceration may be preferable to enucleation to reduce the potential risk of intracerebral infectious spread. Evisceration is considered a safe procedure with removal of the intraocular contents but leaving the scleral shell in the socket. Adequate volume replacement after these surgeries with the placement of an orbital implant is crucial for cosmetic and functional rehabilitation [9]. Many of the advantages offered by evisceration versus enucleation, including postoperative fornix and implant motility, make prosthetic installation easier and increase cosmesis [2]. Wound dehiscence, exposure, or post extrusion are some postoperative complications. If there is a large conjunctival defect or severe infection, an autologous dermis graft (DFG) is usually done. DFG functions as primary or secondary ophthalmic implants to reconstruct the volume deficit in a cosmetic and functional manner post-operatively DFG is suitable for tissue growth, spontaneous epithelialization, adequate vascularization, and satisfying tension-free conjunctival closure [6] [10].

Smith and Petrelli in 1978 described the use of DFG to reconstruct the first anophthalmic socket. DFG minimizes fat reabsorption by replacing lost orbital volumes, maintaining the conjunctival surface area, and forming conjunctival fornices for prosthetic installation. DFG being autologous has no risk of rejection [8]. Complete volume replacement is the main thing from the orbital reconstruction.

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The insertion of implants that do not match their size will produce various complications if the excess size will be vulnerable to extrusion, strain, and prosthetic comfort. Whereas if the size is small it will cause a volume deficit of the socket, a superior sulcus, and the need for a bad and large prosthesis [3].

Evisceration with standard techniques, 13-16 mm spherical implant insertion is possible. External prosthetic sagittal depth is usually 1.5 mm so that the best cosmetic results in evisceration can be achieved by inserting an implant measuring 3 mm smaller than the axial length of the other eye. Post-evisceration eyes tend to have small sclera pockets due to ptosis bulbi. Considering that it is not possible to insert implants greater than 16 mm in corneal-off evisceration with the closure of the sclera overlapping without sclerotomy [3].

To increase sclera capacity in evisceration, a technique modification was carried out including trans-sclera evisceration by posterior sclera incisions. Massry and Holds in 2001 proposed an evisceration technique with two scleral flaps by sclerotomy of full-thickness in the infero-nasal and supero-temporal quadrants. Yang et al. with scleral quadrisection after evisceration, without cutting it from the optic nerve.

![Figure 4. (a) Six weeks after surgery, before (b) and after pairing a prosthesis (c)](image_url)

Four-petal evisceration was first presented by Sales-Sanz & Sanz-Lopez in 2007. Kim et al. with the evisceration technique of four anterior full-thickness scleral incisions between the recti muscle insertions to the equator, and the circular posterior sclerotomy that surrounds the optic nerve. Huang et al. described a similar technique involving scleral quadrisection and suturing the implant with each rectus muscle through the scleral petal. In this case, repair of wound dehiscence is carried out with a four-petal modification technique with DFG as a primary implant. This surgical technique refers to the technique presented by Sanz-Lopez.

Four petal techniques differ from other techniques in sclerotomy. In this technique, sclerotomy is made like 4 petals. The sclera is incised from the limbus to the optic nerve between the rectus muscle insertions. However, in this case, 4 techniques were used and modified (figure 3), because the condition of wound dehiscence with the sclera and the conjunctiva was fibrosis. So the sclerotomy 4 of the petals are only incised to the equator, in the hope that the sclera will not be damaged until deeper. With this modification, it is still possible to insert DFG (size 30mm x 20mm) into the sclera bag. Then the sclera was sutured with 5/0 Vicryl interrupted to the edge of the dermis until it was fixed properly. The dermis surface is left exposed, and a conformer is inserted, then tarsorrhaphy. The surgery is complete. Six weeks after surgery, the tissue around the dermis-fat graft and conjunctiva grows perfectly and closes without any strain. The prosthesis has been paired (figure 5. C). The patient feels comfortable and satisfied with the results.

**IV. CONCLUSION**

Modified four-petal technique with dermis-fat graft implantation on small sclera pouch is an effective method and applicable with promising postoperative results.

**REFERENCES**


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