Double Layer of Processed Dry Amniotic Membrane for an Exposed Glaucoma Drainage Device Tube

John Mark de Leon*, Jose Maria Martinez

Department of Health Eye Center, East Avenue Medical Center, Quezon City, Philippines

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*Corresponding author: John Mark de Leon, Department of Health Eye Center, East Avenue Medical Center, Quezon City, Philippines, Tel.no: +639179573276; E-mail: jmarkmd1@yahoo.com

Purpose

To present a case of the use of a double layer of processed dry amniotic membrane to cover an exposed Baerveldt Glaucoma Drainage Device (GDD) tube where no more autologous conjunctiva was available for harvesting.

Background

Although GDD insertion has proven to be effective in the management of refractory or complex glaucomas they are not without complications and conjunctival complications include early dehiscence and late erosion with exposure of the tube through both the patch graft and conjunctiva [1]. Rates of 2.5-7.1% for GDD tube exposure have been reported in the literature [2-4]. The causes of conjunctival erosion, though not well defined, probably comprise poor tissue turgor and mechanical rubbing of the eyelid margin against the tissue patch graft, excessive conjunctival tension over the tube, tube malposition, lack of a smooth tapered surface between the patch graft and host with poor ocular lubrication and minute amounts of absolute alcohol retained in the donor sclera [5]. Exposed GDD tubes must be promptly repaired as they may lead to various complications, including vision-threatening endophthalmitis. Techniques similar to those of initial GDD insertion have been described for the repair of tube exposure with other tissues including buccal mucosa grafts and amniotic membranes [6-8].

Case Report

A 63 year old male with angle closure glaucoma had a previously inserted Baerveldt GDD on the right eye. Four months after the GDD was inserted, the scleral patch graft retracted temporally and the tube originally under the scleral graft eroded through the overlying original conjunctiva. Hoping to cover the 3 X 2 mm exposed tube, we harvested a generous amount of conjunctiva from inferior bulbar area of the same eye; however the tube exposed again after a month (Figure 1). We finally decided to replace the old scleral patch graft with a new one and cover it with a double layer of processed dry amniotic membrane since the patient was not amenable to obtaining another conjunctival autograft from the unaffected contralateral eye.

Methods

The conjunctival edges surrounding the exposed tube were undermined. The old scleral patch graft was dissected and replaced with a new much larger scleral patch graft over the exposed tube. Since there was lack of autologous conjunctiva to cover the new much larger scleral patch graft, we utilized processed dry amniotic membrane (AmnioTek®) to cover the scleral patch graft using a double layer technique described by Ainsworth et al [7]. The first layer of the amniotic membrane (8 x 5 mm) with the epithelium side facing up was draped over the scleral patch graft and its edges tucked under the peripheral undermined conjunctiva. The second larger layer of amniotic membrane (12 x 8 mm) with epithelium side facing down was sutured above the entire area with nylon 10-0 sutures (Figure 2).

Results

On day 1 post-op, the double layer amnion graft appeared transparent over the sclera. Starting 2 weeks post-op, vascularization on the scleral graft was observed and spread gradually and eventually covered the majority of the area of the scleral patch graft in 10 weeks (Figure 3).

Discussion

We had no more options to obtain conjunctival autografts since our patient declined to have the contralateral eye harvested for conjunctiva. The publication of Ainsworth et al [7] (Figure 2)

Figure 1: Exposed GDD tube (3 x 2 mm) after temporal retraction of the scleral patch graft and erosion of the tube through the conjunctival autograft.

Figure 2: Double layer technique from Ainsworth.

Figure 3: Increasing graft vascularization from week 2 to week 10 post-op with decreasing epithelial defects (fluorescein stained).

described the technique that we utilized to manage our patient's exposed GDD tube.

In retrospect, in the initial GDD insertion we had a difficult time covering the scleral patch graft over the tube because of the taught conjunctiva and this could have led to the problems we had eventually encountered leading to the exposure. Secondly we should have already replaced the scleral patch graft with a new one and not just have patched up the initially exposed GDD tube even with a generous amount of conjunctival autograft. This big conjunctival autograft already could have worked well with a new scleral patch graft. So at this point we had no other option but to utilize a new conjunctival allograft.

The two pieces of amniotic membrane sandwiched the conjunctival edges of the defect. The underlying epithelial side up provided a substrate for epithelial migration from the conjunctiva and closure of the defect. The underlying amniotic graft became incorporated into the conjunctiva, while the overlying amniotic patch provided protection for the underlying graft which sloughed off after several weeks.

Conclusion

Erosion of the GDD tube without viable conjunctiva can be successfully managed using a double layer of processed dry amniotic membrane.

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