A simple and effective gluing technique for corneal perforations: The use of dried amniotic membrane with Histoacryl®

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Introduction

- Corneal perforation can result from infection, inflammation, trauma, exposure/neurotrophic keratopathy or corneal degeneration. Small perforations can be sealed with tissue adhesives, however larger perforations are more challenging and may require an emergency corneal graft.
- There is a growing interest around the combination of cyanoacrylate with different scaffold materials, which have the dual purpose of providing additional tectonic support and preventing cyanoacrylate entry in the anterior chamber:
  - Tenon's membrane
  - Scleral membrane
  - Amniotic membrane
- These possible solutions require the procedure to be done in a surgical theatre setting.

Dried Amniotic membrane

- Amniotic membrane has been used in ophthalmology for some time and has anti-microbial and anti-inflammatory properties that can be beneficial to the eye.
- Dried amniotic membrane has become available which can be used in a clinical setting, allowing easier and faster application in some cases.
- In this study, we describe the technique and outcome of a perforation treated with a dried amniotic membrane (OmniGen®) plus Histoacryl® glue.

Case presentation

A patient attended the Emergency Eye clinic with a right corneal perforation and intraocular pressure of 2 mmHg. He has been grinding metal 2 weeks before.

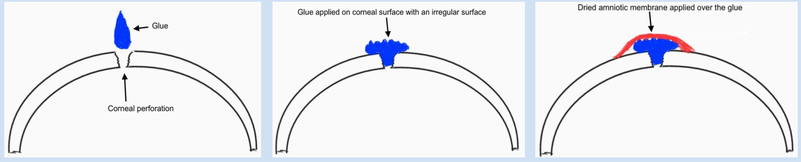
1st gluing attempt:
- Corneal gluing was performed in theatre using a 5 mm disc of clear sterile drape. The glue was dislodged 3 days later.

2nd gluing attempt:
- The cornea was glued again and only lasted for another 3 days before being dislodged.

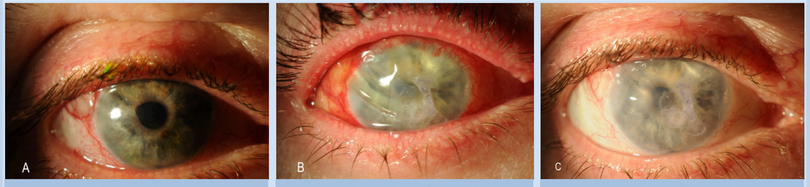
3rd gluing attempt:
- This time the gluing was performed in combination with a dried amniotic membrane called OmniGen ®.

Gluing technique with dried amniotic membrane OmniGen®

1. A speculum was inserted to help keep the eye open.
2. After drying the corneal surface with a spear, a drop of Histoacryl ® glue was applied.
3. A dried amniotic membrane was applied on top of the glue.
4. The glue was allowed to set for a few minutes before inserting a bandage contact lens.



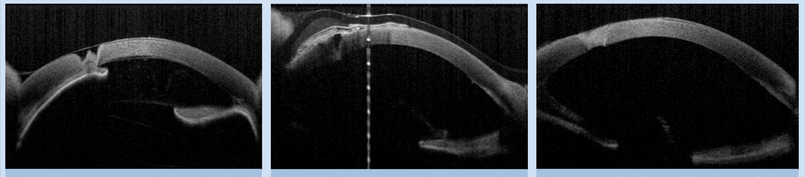
Anterior segment pictures



Before gluing | **Immediately after gluing** | **3 months after gluing**

Anterior segment OCT

- The patient was followed up for 3 months with regular anterior segment OCTs.
- There was no leak and the corneal wound healed with a corneal thickness of 460 um.



Corneal perforation with iris plugging, before gluing | **Immediately after gluing with dried amniotic membrane** | **Corneal healing after removal of glue and dried amniotic membrane, 3 months post gluing**

Discussion

- Problems of corneal gluing without dried amniotic membrane:
  - Glue creates a raised irregular surface that can cause discomfort when blinking.
  - This can also cause the glue to dislodge quickly.
- Advantages of adding a dried amniotic membrane:
  - Dried amniotic membrane is malleable and can adapt to the contour of the underlying glue, which increases its comfort and durability.
  - A tissue punch can be used to cut the dry amniotic membrane to the desired size and then applied using a straight tying forceps.
  - A large bandage contact lens can add further stability to the glue.
  - This procedure is easy to perform by any ophthalmologist and could be done in clinic without the need of an operating theatre.
  - Amniotic membranes provide anti-microbial and anti-inflammatory properties that contribute to the healing of the cornea.
  - No additional risk of complications compared to routine gluing.

Our experience with dried amniotic membrane in the Liverpool Royal University Hospital

- So far this technique has been used several times with great success on patients with corneal perforation and persistent corneal epithelial defect.
- We also found this technique easy to teach to other ophthalmologists and easy to apply in outpatient settings.
- To bare in mind that this technique carries an additional cost due to the price of the dried amniotic membrane.

Disclosure statement

- We have no financial interest or affiliation with the products being discussed in this presentation.