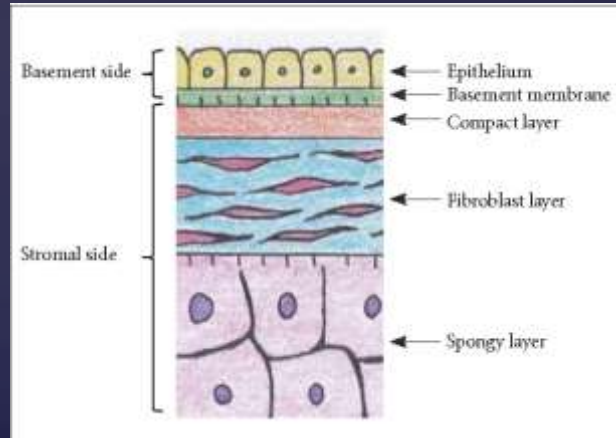


Amniotic Membrane In Ocular Surface Diseases

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Amniotic membrane transplantation (AMT) is considered actually one of the major new era in ophthalmic surgery during last decades.

Anatomy and Biological properties of amniotic membrane



Biological effect

1. improves epithelial cell immigration
2. Strengthen adhesions on basal cells
3. Induce epithelial differentiation
4. Prevent apoptosis, cicatrization and neovascularization

Constituents and biological properties of amniotic membrane (AM)

AM layer	Constituents	Biological properties
Epithelium	Growth factors* Cytokines	Maintains undifferentiated epithelial phenotype when culturing limbal stem cells
Basal lamina	Collagen IV/VII Laminin 1/5 Fibronectin [†]	Improves epithelial cell migration Strengthens adhesions on basal cells Induces epithelial differentiation (including goblet cells in conjunctiva) Prevents apoptosis
Stromal matrix	TGF-beta Anti-inflammatory and antiangiogenic proteins Protease-inhibition factors	Suppresses corneal myofibroblasts, limbal and normal and pathological conjunctival fibroblasts proliferation and differentiation – inhibits cicatrization Traps inflammatory cells from other tissues, inducing rapid apoptosis Inhibits inflammation and neovascularization

*Greater amount in intact AM, than in AM denuded of epithelium.[‡]

[†]Similar to conjunctiva.

Methods of applications

- As a graft (epithelial side up): In cases of epithelial and stromal defects Epithelialization occurs over the AM.
- As a patch (stromal side up): Acts as a biological contact lens that reduces inflammation and promotes epithelialization beneath.

Indications for Amniotic Membrane Transplantation (AMT) in Ocular Surface Diseases

1. AM as a graft in conjunctival reconstruction
2. AM as a graft or a patch in corneal surface reconstruction
3. AMT in limbal SC deficiency
4. AM as a substrate for culturing epithelial SC of the sclerocorneal limbus

AM as a graft in conjunctival reconstruction

- In areas with conjunctival tissue defects, AM restores a normal stroma and provides a suitable BM

AM has been successfully used following removal of conjunctiva in

1. Pterygium
2. Conjunctival scarring and symblepharon
3. Superior limbic keratoconjunctivitis,
4. Conjunctivochalasis
5. Ischemic conjunctiva

A case of symblepharon with AMT and stem cell grafting 2 months post operative



AM as a graft in corneal surface reconstruction

INDICATIONS

- 1.) Resistant Corneal Ulcers
- 2.) Shield Ulcers Associated With VKC
- 3.) Resistant Infectious Keratitis With Significant Stromal Melting
- 4.) Painful Bullous Keratopathy With Poor Visual Prognosis
- 5.) AMG Combined With A Modified Gundersen Conjunctival Flap

AM as a patch in corneal surface reconstruction

1.) Persistent Epithelial Defects

2.) Expected Postoperative Delayed Epithelialization

-AMT is strongly recommended in eyes undergoing corneal transplantation where expected postoperative delayed epithelialization (e.g. partial limbal deficiency, or herpes corneal disease)

3.) Band Keratopathy

- Used after chelation with ethyl diamine tetra acetic acid (EDTA)

4.) Superficial Corneal Degenerations

- AMT associated with superficial keratectomy may improve the corneal surface in superficial corneal degenerations (e.g. Salzmann's degeneration)

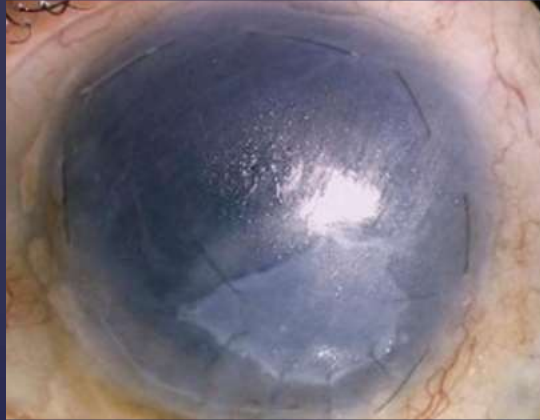
5.) Acute Phase Of Chemical And Thermal Burns

- Restore corneal and conjunctival surfaces
- Reduce limbal stromal infiltration and
- Limit symblepharon formation

Surgical procedure



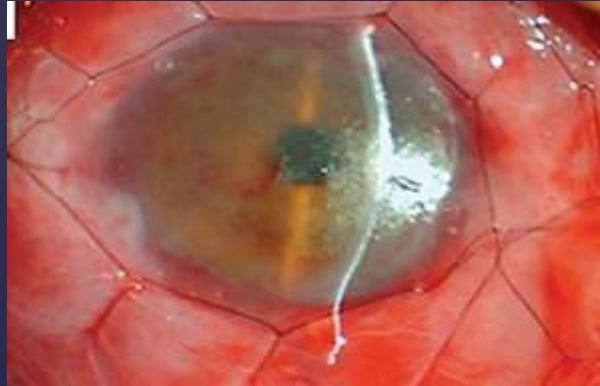
Neurotrophic corneal ulcer not responsive to medical treatment. Surgical clean-up of the ulcer bed and border, and AM graft and patch



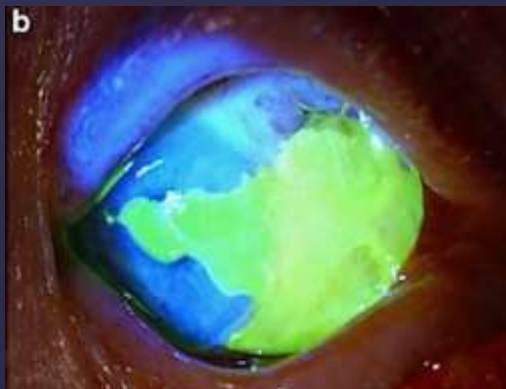
one months after surgery complete re-epithelialization is observed



AM in place at day 7



Lost AM and exagrated ulcer size at day 7



Partially dissolving AM at 14th day



Healed ulcer with superficial scarring after AMG
with stromal filing



Limitations of AM Transplantation in Ocular Surface Diseases

- AMT is only useful in localized symblepharon and in absence of active disease
- AM grafts have a higher recurrence rate than conjunctival auto grafts in Pterygium surgery
- AMT has not been effective in treating perforated corneal ulcers
- In inflamed, vascularized eyes AM dissolves quickly
- In total limbal deficiencies, AM alone is not effective and a limbal transplant is required

Recent trends of AM uses

- Prokera ring



Drug loaded AM

- Ofloxacin, moxifloxacin, cefazolin
- 5 flu in glaucoma to decrease scarring
- Bevacizumab loaded AM to decrease vascularisation
- AM as a scaffold in tissue engineering.
- Use of nanotechnology to load the AM with potential anti inflammatory medications like 15-deoxy .14 pg j² nanoparticles

conclusion

Amniotic membrane transplantation procedure offers a cheap and safe line of treatment, with short learning curve, limited needs of surgical instruments.

So amniotic membrane transplantation should be the first choice in surgical management for ocular surface disease.

Thank you