Journal Homepage: -www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI:10.21474/IJAR01/15824
DOI URL: http://dx.doi.org/10.21474/IJAR01/15824

RESEARCH ARTICLE

AMNIOTIC MEMBRANE AND OCULAR SURFACE DISEASE

Soukaina Haddougui[1,2], Mounia Bouchaar[1,2],Salma Bajjouk[1,2], Mehdi Khamaily[2,3], Yassine Mouzari[4,5], K. Reda[4,5] and A. Oubaaz[4,5]

1. Department of Ophthalmology, Cheikh Khalifa Ibn Zaid International University Hospital, Casablanca, Morocco.
2. University Mohamed VI of Health Sciences, Casablanca, Morocco.
3. Department of Ophthalmology, Mohamed 6 university hospital, Bouskoura, Morocco.
4. Department of Ophtalmology of the Mohamed V Military Teaching Hospital, Rabat, Morocco.
5. Faculty of Medicine and Pharmacy, Mohamed V University, Rabat, Morocco.

Manuscript Info

Manuscript History
Received: 05 October 2022
Final Accepted: 09 November 2022
Published: December 2022

Key words:-
Dehydrated Amniotic Membrane, Ocular Surface Disease,Corneal Disease, Epithelial Defect

Abstract

Amnion, the innermost layer of the placental sac, can be harvested as graft material. It has several mechanisms of action. There are three types of this AM; fresh, cryoconserved and dehydrated. The dehydrated Amniotic Membrane is the type used in our observations. We report two cases; the first one a 70 years old patient with bullous keratopathy and the second one a 65 years old patient with a diffuse epithelial defect in whom the dehydrated amniotic membrane graft gave good results The effectiveness of dehydrated membrane grafting has been demonstrated in several studies but a larger study is needed to confirm its effectiveness.

Introduction:-

Amnion, the innermost layer of the placental sac, can be harvested as graft material. This amniotic membrane (AM) is composed of the epithelium cubic monolayer; physiologically very active (growth factors , cytokines, & others: EGF, IL-6 IL-8 IL10…. , epidermal Growth Factor and keratinocyte Growth Factor) , a basement membrane (type IV collagen like human conjunctiva and cornea , collagen I,III,IV,V,VII,Laminin , Fibronectin, Hyalurocan) and a stroma (avascular collagen , stromal cells). [1,2]

It has several action mechanisms.It promotes epithelialization (BFGF, HGF,EGF,NGF) , Inhibits vascularization (Endostatin, Thrombospondin-1, TIMPs), anti-bacterial properties (Bactericidin, B Lysine , Lysozyme, Transferrin, Lactoferrin), anti-inflammatory: down regulation of TGF, ignalling system) 1 , biological bandage (reduces pain, reservoir of growth promoting factors), basement membrane (facilitates migration and adhesion of epithelial cells) and non-immunogenic (absence of HLA. Class II in amnion mononuclear).[3,4]

Amniotic membrane (AM) grafts have been widely applied in the treatment of ocular surface disorders for a long time, as they serve as a scaffold for cell growth and migration, facilitate re-epithelialization by providing growth factors, and reduce inflammation and scarring by inhibiting TGF-β signal transduction [5–8]

There are three types of this AM; fresh, cryoconserved and dehydrated. The dehydrated Amniotic Membrane low-temperature, vacuum-dried is the type used in our observations(Omnigen®; NuVision Biotherapies Ltd.,

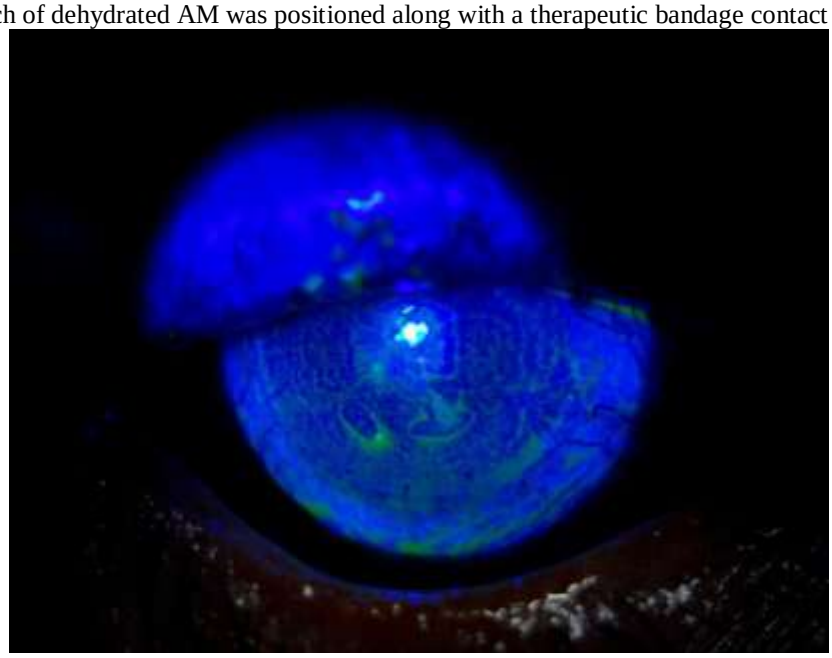
Corresponding Author:- Soukaina Haddougui
Address:- Department of Ophthalmology, Cheikh Khalifa Ibn Zaid International University Hospital, Casablanca, Morocco.

Nottingham, UK) with multiple advantages; security, conservation: 3 years at room temperature, without suture, easily adjustable and possibility of installation in the office.

Clinical cases

Case report I:

We report the case of a 70-year-old patient who suffered from severe symptomatic pseudophakic bullous keratopathy. A patch of dehydrated AM was positioned along with a therapeutic bandage contact lens.



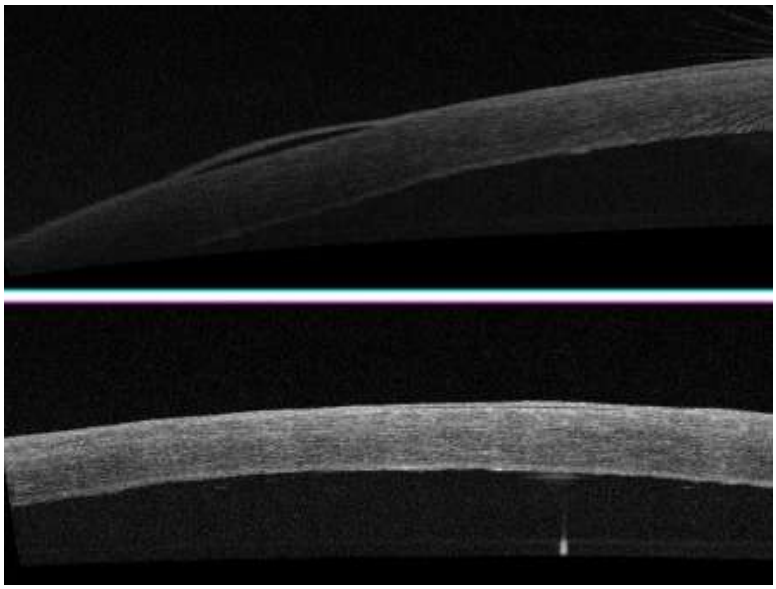


Figure 1:- Slit lamp images (White light and blue light) and OCT images of the patient before grafting.

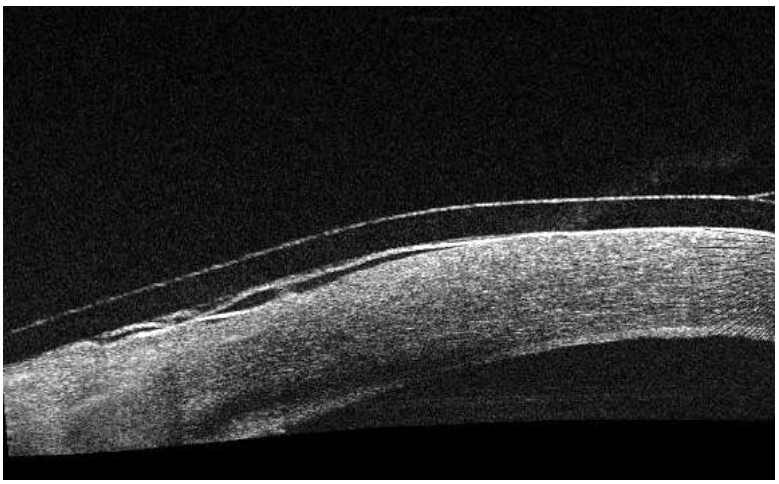
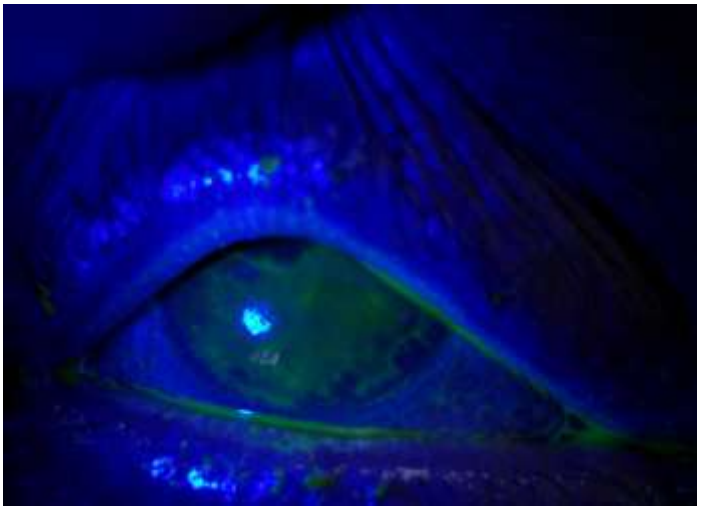


Figure2:-OCT image of the patient after the AM transplant.

Figure 3:-Slit lamp image of the patient 7 days after the AM transplantation.

Case report II:

This is the case of a 65 year old patient with a persistentdiffuse epithelial defect.He was treated by positioning a patch of dehydrated AM overlapped with a bandage contact lens.



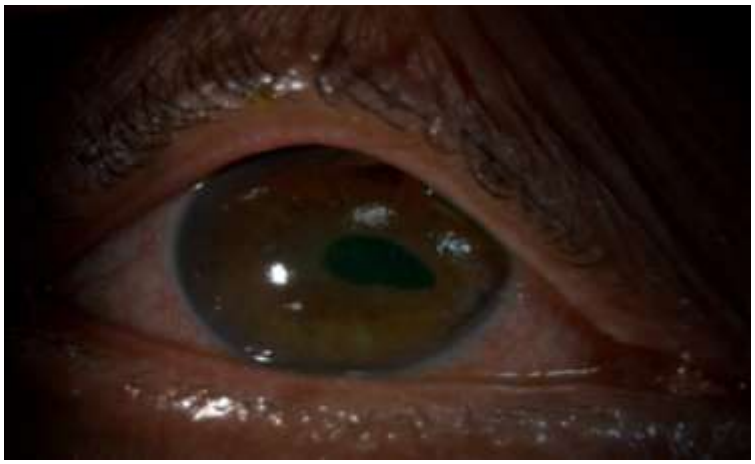


Figure4:-Slit lamp images of the patient before the transplantation.

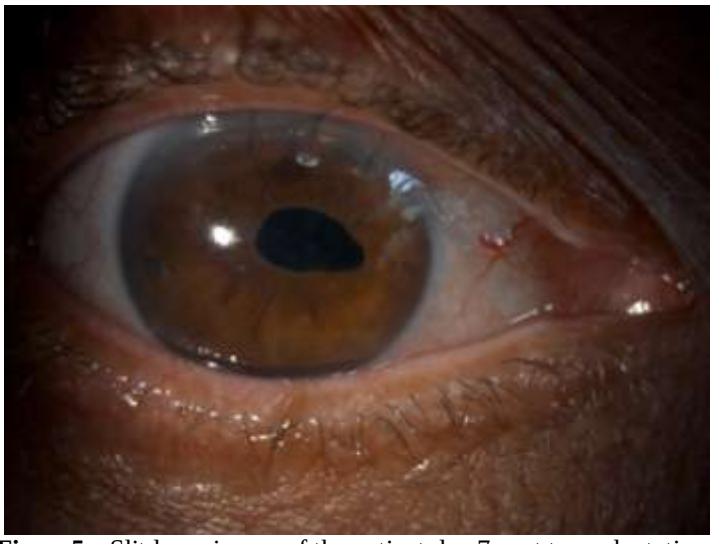


Figure5:- Slit lamp image of the patient day 7 post transplantation.

Discussion:-

The effectiveness of dehydrated membrane grafting has been demonstrated in several studies. Mimouni's study published in APRIL 2021 showed that dehydrated amniotic membrane without suture with bandage contact lens on 9 eyes resulted in resolution of persistent epithelial defects secondary to various etiologies in 89% of eyes with significant improvement in vision [9]. In the publication by Lavaris et al in JULY 2021 exposed a case of graft-versus-host ocular disease with significant epithelial defect, a dehydrated multilayer amniotic membrane patch was sufficient to alleviate symptoms, overall improvement in corneal structural integrity as well as increased corneal epithelial thickness.[10]

The retrospective analysis of Schuerch et al published in APRIL 2020 on non-epithelializing corneal ulcers refractory to standard medical treatment that included 149 eyes showed that in 70% of patients, a single Amniotic Membrane graft procedure was sufficient to achieve epithelial closure [11]. Huang's case series published in JULY 2020 about 17 patients showed that cryopreserved and dehydrated amniotic membrane are feasible alternative grafts for persistent or recurrent macular holes with 70% effectiveness [12].

Conclusion:-

The effectiveness, safety and efficiency of sutureless dehydrated amniotic membrane grafting are contributing to excellent clinical outcomes and revolutionizing the treatment of various ocular surface diseases. The ease of use should introduce it as a first-line treatment for surface diseases. A larger study is needed to confirm its effectiveness**.**

Conflict of Interest

The authors declare that they have no competing interests.

References:-

1. Litwiniuk M, Radowicka M, Krejner A, Śladowska A, Grzela T. Amount and distribution of selected biologically active factors in amniotic membrane depends on the part of amnion and mode of childbirth. Can we predict properties of amnion dressing? A proof-of-concept study. Cent Eur J Immunol. 2018; 43(1):97-102. doi:10.5114/ceji.2017.69632

2. Krysik K, Dobrowolski D, Wylegala E, Lyssek-Boron A. Amniotic Membrane as a Main Component in Treatments Supporting Healing and Patch Grafts in Corneal Melting and Perforations. J Ophthalmol. 2020;2020:4238919. Published 2020 Feb 14. doi:10.1155/2020/4238919

3. Growth factors and their receptors derived from human amniotic cells in vitroZofia Grzywocz, Ewa Pius-Sadowska, Patrycja Klos, Marek Gryzik, Danuta Wasilewska, Barbara Aleksandrowicz, Malgorzata Dworczynska, Stanislawa Sabalinska, Grazyna Hoser, Boguslaw Machalinski, Jerzy Kawiak. Folia Histochem Cytobiol 2014;52(3):163-170. DOI: 10.5603/FHC.2014.0019

4. Walkden A. Amniotic Membrane Transplantation in Ophthalmology: An Updated Perspective. Clin Ophthalmol. 2020;14:2057-2072. Published 2020 Jul 22. doi:10.2147/OPTH.S208008
5. A. Paolin, E. Cogliati, D. Trojan et al., "Amniotic membranes in ophthalmology: long-term data on transplantation outcomes," Cell and Tissue Banking, vol. 17, no. 1, pp. 51–58, 2016
6. J. Liu, H. Sheha, Y. Fu, L. Liang, and S. C. Tseng, "Update on amniotic membrane transplantation," Expert Review of Ophthalmology, vol. 5, no. 5, pp. 645–661, 2010
7. C. Malhotra and A. K. Jain, "Human amniotic membrane transplantation: different modalities of its use in ophthalmology," World Journal of Transplantation, vol. 4, no. 2, pp. 111–121, 2014
8. S.-B. Lee, D.-Q. Li, D. T. H. Tan, D. Meller, and S. C. G. Tseng, "Suppression of TGF-β signaling in both normal conjunctival fibroblasts and pterygial body fibroblasts by amniotic membrane," Current Eye Research, vol. 20, no. 4, pp. 325–334, 2000.
9. Mimouni M, Trinh T, Sorkin N, et al. Sutureless dehydrated amniotic membrane for persistent epithelial defects. European Journal of Ophthalmology . 2022;32(2):875-879. doi : 10.1177/11206721211011354
10. Lavaris A, Elanwar MFM, Al-Zyiadi M, Xanthopoulou PT, Kopsachilis N. Glueless and Sutureless Multi-Layer Amniotic Membrane Transplantation in a Patient With Pending Corneal Perforation. Cureus. 2021;13(7):e16678. Published 2021 Jul 27. doi:10.7759/cureus.16678
11. Schuerch, Kaspar MD; Baeriswyl, Andrea; Frueh, Beatrice E. MD ; Tappeiner, Christoph MD. Efficacité de la greffe de membrane amniotique pour le traitement des ulcères cornéens. Cornée : Avril 2020 - Volume 39 - Numéro 4 - p 479-483 doi :10.1097/ICO.0000000000002179
12. Yu-Hsuan Huang, Der-Chong Tsai, Lei-Chi Wang, Shih-Jen Chen, "Comparison between Cryopreserved and Dehydrated Human Amniotic Membrane Graft in Treating Challenging Cases with Macular Hole and Macular Hole Retinal Detachment", Journal of Ophthalmology, vol. 2020, Article ID 9157518, 9 pages, 2020. https://doi.org/10.1155/2020/9157518.