Role of Amniotic Membrane Transplantation in Persistent Corneal Epithelial defect

An Essay

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in Ophthalmology

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- **AM : Amniotic Membrane**
- **AMGs :Amniotic Membrane Grafts**
- **AMT : Amniotic membrane transplantation**
- **BSA : Body surface area**
- **CSDC : Corneal stroma derived cells**
- **D : Diopter**
- **DMEM : Dulbeco's modified Eagle medium**
- **DMSO : Dimethyl sulfoxide**
- **EDTA : Ethylene Diamine Tetraacetic acid**
- **EGF : Epidermal Growth Factor**
- **GVHD : Graft versus host disease**
- **HAM : Human amniotic membrane**
- **HIV : Human immunodeficiency virus**
- **HLA : Human leukocytic antigen**
- **HTLV : Human T-cell lymphotrophic virus**
- **HSK : Herpetic stromal keratitis**
- **HSV : Herpes simplex virus**
- **KCS : keratoconjunctivtis sicca**
- **IFN-AM : Human amniotic interferon γ**
- **IL : Interleukin**

- **ICGA : Indocyanine green angiography**
- **LCAT : Limbal-Conjunctival Autograft Transplantation**
- **LSCD : Limbal stem cell deficiency**
- **MMPs : Matrix metalloproteinase**
- **PBS : Phosphate buffered saline**
- **PED : Persistent epithelial defect**
- **PEDF : Pigment epithelium-derived factor**
- **PMC : Post mitotic cells**
- **PMNL : Polymorphic nuclear lymphocyte**
- **SJS : Stevens-Johnson syndrome**
- **TAC :Transient amplifying cells**
- **TDC :Terminally differentiated cells**
- **TEM : Transmission electrone microscopy**
- **TEN : Toxic Epidermal Necrolysis**
- **TGF : Transforming growth factor**
- **TIMPs : Tissue inhibitors metalloproteinase**
- **TNF-α : Tumor necrosis factor- alpha**
- **VEGF : vascular endothelial growth factor**
- **VLA : Very late activation**

INTRODUCTION

Ocular surface of the eye includes conjunctiva, cornea, sclera, and tear film and lid margin. This represent protective coat of the eye **(Snell and Lemp, 1998).**

An intact corneal epithelium is one of the most important factors in maintaining ocular surface health. Corneal epithelial defects heal without any complications but several factors, such as chemical injuries, topical medication, xerosis and neurotropic keratopathy interfere with wound healing leading to persistent epithelial defect (PED), corneal melting, and corneal perforation leading to loss of sight **(Macaluso and Feldman., 1997).**

In the field of ophthalmology, Amniotic membrane transplantation has been first used by De Roetth in 1940 to treat conjunctival defects **(De Rotth, 1940).**

The membrane has been used successfully to treat PED and ulcers from different causes. The procedure has been shown to promote epithelial healing, reduce vascularisation, yield a good cosmetics, and also to be relatively easy to perform **(Kruse et al., 1999).**

The human amniotic membrane is the innermost layer of fetal membrane, which composed of three basic layers:

epithelial monolayer, thick basement membrane and a vascular, hypocellular stromal matrix **(Magdi et al., 2000)**.

Amniotic membrane is obtained from prospective donors undergoing caesarean section, who are negative for communicable diseases including HIVs, Hepatitis and syphilis.

Amniotic membrane has unique combination of properties, including the facilitation of migration of epithelial cells, and ability to modulate stromal scarring and anti-inflammatory activity **(Fukuda et al., 1999).**

So amniotic membrane transplantation indicated in several ocular surgeries like: conjunctival surface reconstruction, pterygium surgery, cicatrizing conjunctivitis, Steven Johnson Syndrome, thermal and chemical burn, leaking blebs, ocular surface squamous neoplasia, symblepharon release, corneal surface reconstruction, persistent epithelial defect (PED), non healing sromal ulcers, bullous keratopathy, band keratopathy and partial and total limbal stem cell deficiency **(Fernandes et al.,2005).**

AIM OF THE WORK

Highlight the efficacy of amniotic membrane transplantation in persistent corneal epithelial defect and different ocular surface disorders.

ANATOMY OF AMNIOTIC MEMBRANE

Amniotic membrane (AM) is a thin innermost layer of the three layers that creates wall of amniotic sac which surrounds the human embryo.

In the process of human development, the blastocyst formation occurs when fluid secreted within morula form the blastocyst cavity with inner cell mass, which becomes embryoblast and outer cell mass, which becomes part of placenta, what's now called trophoblast; this occurs at 6 day **(Ronald, 2001).**

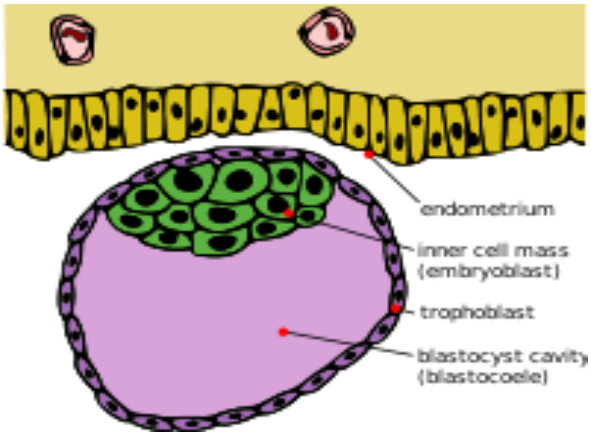

Fig (1): Blastocyst with an inner cell mass and trophoblast **(Ronald, 2001).**

The amniotic cavity first appears at about 7th day. The primitive ectoderm cells enclosing the cavity become flattened forming amnioblasts, amnioblasts cells which become the fetal