AUTOLOGOUS SERUM IN OPHTHALMIC PRACTICE

Essay

Submitted for partial fulfillment of M.SC Degree

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2010

Acknowledgment

*I do thank **ALLAH** for all the gifts He gave me.*

*I wish to express my deepest appreciation and gratitude to **Prof. Dr. Mohammed EL Said** professor of ophthalmology for his kind supervision, constructive advice, continuous encouragement and unlimited support and kindness.*

*Words are no real assistance to express my deepest gratitude and thanks to **Dr. Nehal EL Gendy** lecturer of ophthalmology, who helped me choosing the topic of this essay, revised it and supported me all the time.*

*Special thanks and gratitude go to **My Parents**, my husband, my brother and sisters and express my sense of indebtedness and gratitude for their continuous help and support.*

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ABSTRACT

that are also present in tears including Vitamin A, Epidermal growth factor, transforming growth factor beta, basic fibroblast growth factor, Insulin like growth factor, Substance P as well as proteins such as lactoferrin and lysozyme. All these factors are essential for healthy functioning of ocular surface.

KEY WORDS

STRUM

OPHTHALMIC

PRACTICE

List Of Abbreviations

AS:	**autologous serum**
BCVA:	**best corrected visual acuity**
BMT:	**bone marrow transplantation**
BSS;	**balanced salt solutions**
BUT:	**break up time**
CCL:	**conjunctival epithelial cell line**
CGRP:	**calcitonine gene related peptide**
DES:	**dry eye syndrome**
EGF:	**epidermal growth factor**
ELISA:	**enzyme linked immune-sorbent assay**
FBS:	**fetal bovine serum**
FDA:	**food and drug administration**
GFP:	**growth factor peptide**
GVHD:	**graft versus host disease**
HPCT:	**haematopoietic progenitor cell transplantation**
ICG:	**indocyanine green dye**
IGF1:	**insulin like growth factor 1**
IL-1β:	**interleukin-1β**
LASIK:	**laser in situ keratomileusis**
LPS:	**lipopolysaccharides**
MMC:	**mitomycin**
NGF:	**nerve growth factor**
NK:	**neurotrophic keratopathy**

PDGF: platelet derived growth factor

PED: persistent epithelial defects

PTK; phototherapeutic keratectomy

rpm: round per minute

TBARS: thiobarbituric reactive substances

TGFb: transforming growth factor b

TNF: tumor necrosis factor

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INTRODUCTION

Autologous serum has been used to treat dry eye syndrome for many years. It contains several growth factors, vitamins, fibronectin and other components that have been considered important for corneal and conjunctival integrity **(Koffler, 2006)**

Of all human serum components, it is believed that the most important for ocular surface are: epithelial growth factor (EGF), transformer growth fibroblast β-factor (TGF-β), vitamin A, fibronectin, albumin, α -2 macroglobulin, the platelet-derived growth factor (PDGF-AB), hepatocyte growth factor, Autologous serum contains neuronal factors such as substance P and insulin-1-type growth factor, which seem to play a role in the migration and adhesion of the corneal epithelium to its stroma. PDGF-AB is one of the 5 known isoforms of platelet-derivated growth factors and is activated intracellularly and secreted by the alpha granules of platelets after its activation, enhancing mitosis and scarring. In addition, autologous serum contains immunoglobulines such as IgG, IgA, lysozyme and supplemental factors that provide bactericide and bacteriostatic effects **(López et al, 2007)**

Serum eye drops are usually prepared as an unpreserved blood solution. The serum is by nature well tolerated and its biochemical properties are somewhat similar to natural tears. Autologous serum eye drops have been reported to be effective for the treatment of severe dry eye-related ocular surface disorders (Sjögren's syndrome), and also other entities such as superior limbic keratoconjunctivitis, graft-versus-host disease, Stevens-Johnson syndrome, ocular

cicatricial pemphigoid, recurrent or persistent corneal erosions, neurotrophic keratopathy, Mooren's ulcer, aniridic keratopathy, filtering blebs after trabeculectomy, and post-keratorefractive surgery(**Quinto et al, 2008**)

Its utilization in ophthalmology arose out of the need of finding lacrimal substitutes which, in addition to lubricating the ocular surface, were able to provide other components of tears that are reduced in ocular surface disease **(López et al, 2007**)

Dry eye syndrome is recognized as a growing public health problem and one of the most frequent reasons for seeking eye care. The efficacy of 50% autologous serum drops in Sjögren's syndrom and keratoconjunctivitis sicca was proved to have beneficial effect which is propably due to the presence of essential tear factors in the serum **(Noble et al, 2004).**

Corneal erosions can be an extremely painful condition for many patients. The pathogenic mechanism is linked to abnormalities of the adhesion complex between the corneal epithelium and the stromal layer. **Del Castillo et al** studied the effect of 20% autologous serum in the treatment of recurrent corneal erosions which proved to be effective and safe in reducing the number of recurrences experienced by patients **(Del Castillo et al**,**2002)**

Mooren's ulcer is an inflammatory keratopathy characterized by severe pain, conjunctival and episcleral injection, and peripheral corneal ulceration. The corneal changes may expand centrally or peripherally producing dramatic corneal thinning, often with an overhanging edge of superficial cornea. Its clinical course and

eventual prognosis is variable and usually these ulcers respond poorly to conventional therapy. 20% autologous serum appears to be an effective supplementary treatment in Mooren's ulcer, by providing enhanced conditions for epithelial healing and by modulating the corneal inflammatory and immune response. **(Mavrakanas et al, 2007).**

Aniridic keratopathy, Keratopathy occurs in 20% to 90% of patients with aniridia and is caused by a primary dysfunction of the limbal stem cells. Corneal changes include recurrent erosions and ulcerations of corneal epithelium, tear film instability, dry eye, chronic pain, corneal vascularization, progressive corneal opacification, and blindness. the effect of 20% autologous serum eye drops was studied, where all patients showed a subjective improvement of keratopathy symptoms after the serum application. The corneal reepithelialization, corneal epithelial cell squamous metaplasia, and tear stability improved significantly with the treatment, but visual acuity, regression of vascular pannus, and subepithelial scarring showed only slight improvement **(López- et al, 2008)**

Filtering blebs after trabeculectomy, Aqueous leakage from filtering blebs is not a rare condition after trabeculectomy with antimetabolites, which can pose a potential risk for bleb-related complication. the efficacy of 20% topical autologous serum application to stop aqueous oozing or point-leak through filtering bleb after trabeculectomy was evaluated.it was found that autologous

serum application was significantly effective to stop aqueous oozing but not point-leaks **(Matsumoto et al,2004)**

In post-keratorefractive surgery one of the most common complications of photorefractive keratectomy (PRK) and laser in situ keratomileusis (LASIK) is dry eye syndrome. Although dry eye after refractive surgery is usually transient, some patients complain of severe symptoms, which may negatively influence their satisfaction with the outcome of the procedure. Both keratorefractive procedures have been reported to perturb the ocular surface homeostasis by causing a decrease in corneal sensitivity, tear film instability, decreased aqueous tear production, and corneal and conjunctival epitheliopathy **(Noda et al,2006)**

In neurotrophic ulcers, neural factors such as acetylcholine or substance P are depleted from the cornea. **Nishida et al** emphasized the importance of substance P and insulin-like growth factor for a normal wound-healing response autologous serum harbors neurotrophic factors and may provide neurologic healers for a compromised ocular surface **(Matsumoto et al**, **2004)**

Allogeneic haematopoietic stem cell transplantation (SCT) is considered a curative treatment for various hematological malignancies. However, chronic graft-versus-host disease (GVHD) remains a major complication after SCT.Dry eye is one of the major symptoms of GVHD. Although several therapies have been used to minimize the symptoms of dry eyes associated with GVHD, an effective treatment has not been established. In **2000, Rocha et al** reported the first two cases of GVHD with severe dry eyes treated

with autologous serum, which proved to be safe during the 10 months of treatment. **Ogawa et al., in 2003**, utilized autologous serum eye drops to treat 14 patients with severe dry eye associated with GVHD. The patients had been refractory to treatment with conventional artificial tears

In treatment of macular hole, autologous serum irrigated in the vitreous cavity just before completion of macular hole surgery can help remove ICG dye used in surgery. The application is simple and safe and significantly shorten the period of residual retinal ICG staining **(Nakamura et al,2005)**

The aim of work

The purpose of this study is to review the efficacy, indications, contraindications, complications and safety of using autologous serum in ophthalmic diseases.