

Application of Umbilical Cord Serum in the Management of a Persistent Corneal Epithelial Defect in a Patient with Graft-versus-host Disease

Erol Dülger¹, Burcu Özbakır², Rona Emiroğlu¹

¹Department of Ophthalmology, Near East University School of Medicine, Nicosia, Cyprus

²Department of Obstetrics and Gynecology, Near East University School of Medicine, Nicosia, Cyprus

A persistent epithelial defect (PED) of the cornea is challenging in the field of ophthalmology. We present the case of a patient with a PED and its alternative management with umbilical cord serum (UCS). The patient who had the PED in both eyes was treated with UCS for 3 weeks. The epithelial defect healed, and complaints decreased at the end of treatment. UCS is an effective alternative in treating patients with PEDs.

Keywords: Persistent epithelial defect, umbilical cord serum, autologous serum, graft-versus-host disease, dry eye disease

INTRODUCTION

The management of a patient with a persistent epithelial defect (PED) of the cornea is challenging in the field of ophthalmology. It is defined as the absence of improvement in an epithelial defect within 2 weeks with conventional treatment (1). There are non-surgical and surgical options for the management of PEDs (1-7). It is essential that recently introduced alternative therapies gain popularity in the treatment of PEDs refractory to current standard therapies. Herein we presented the preparation and application of umbilical cord serum (UCS) in the management of a PED of the cornea in a patient with graft-versus-host disease.

CASE PRESENTATION

A 65-year-old female who complained of pain, tearing, and stinging in her eyes for more than 2 weeks applied to our department. The patient had undergone bone marrow transplantation 3 years before due to acute myeloid leukemia. She had graft-versus-host disease and underwent immunosuppressive therapy for 2 years. An ophthalmic examination revealed a severely dry eye, a corneal ulcer, and an epithelial defect in both eyes; she received 0.05% topical cyclosporine two times a day, a topical steroid four times a day, and artificial tears four times a day in both eyes (Figure 1). Photophobia, blepharospasm, and thinning of the left corneal stroma were also observed. The 0.05% topical cyclosporine A and topical steroid were discontinued. The patient was followed up only with preservative free eye-drops for two weeks instilled every hour when she was awake. Meanwhile, the corneal culture was negative. There was no improvement in her complaints and physical findings. UCS were prepared as defined by Yoon et al. (4). Umbilical cord blood was collected from patients who underwent elective cesarean section delivery whom laboratory tests were negative for hepatitis B and C and human immunodeficiency viruses at the 8th and 36th gestational week of pregnancies after obtaining informed consent. Blood samples were obtained from the umbilical vein. Each sample was kept at room temperature for clotting for approximately 2 h. Serum was isolated following centrifugation at 3000 xg for 15 min and was diluted to a 20% concentration with balanced salt solution (BSS, Alcon Laboratories, Inc. Fort Worth, Texas 76134, USA). UCS were stored in bottles, 10 to 15 mL in volume. The patient was asked to keep the UCS bottle in a refrigerator at 4°C when used and to renew it every week and the unopened UCS bottles were kept in a freezer at -20°C. UCS was instilled 10 times a day for 2 weeks and 6 times a day at the 3rd week of treatment. In addition, artificial tears were instilled every hour when awake and moxifloxacin eyedrops were instilled four times a day for 3 weeks simultaneously with a 5-10-min interval. The corneal ulcer and epithelial defect healed in both eyes after 3 weeks of instilling UCS. Leucoma and corneal neovascularization on the left eye corneal surface were observed (Figure 2).

This study was presented at the 49th National Congress of Turkish Ophthalmology Society, 4-8 November 2015, İstanbul, Turkey.

Corresponding Author: Erol Dülger
E-mail: drerold@yahoo.com

Received: 28.02.2017
Accepted: 27.03.2017

©Copyright 2017 by Cyprus Turkish Medical Association - Available online at www.cyprusjmedsci.com

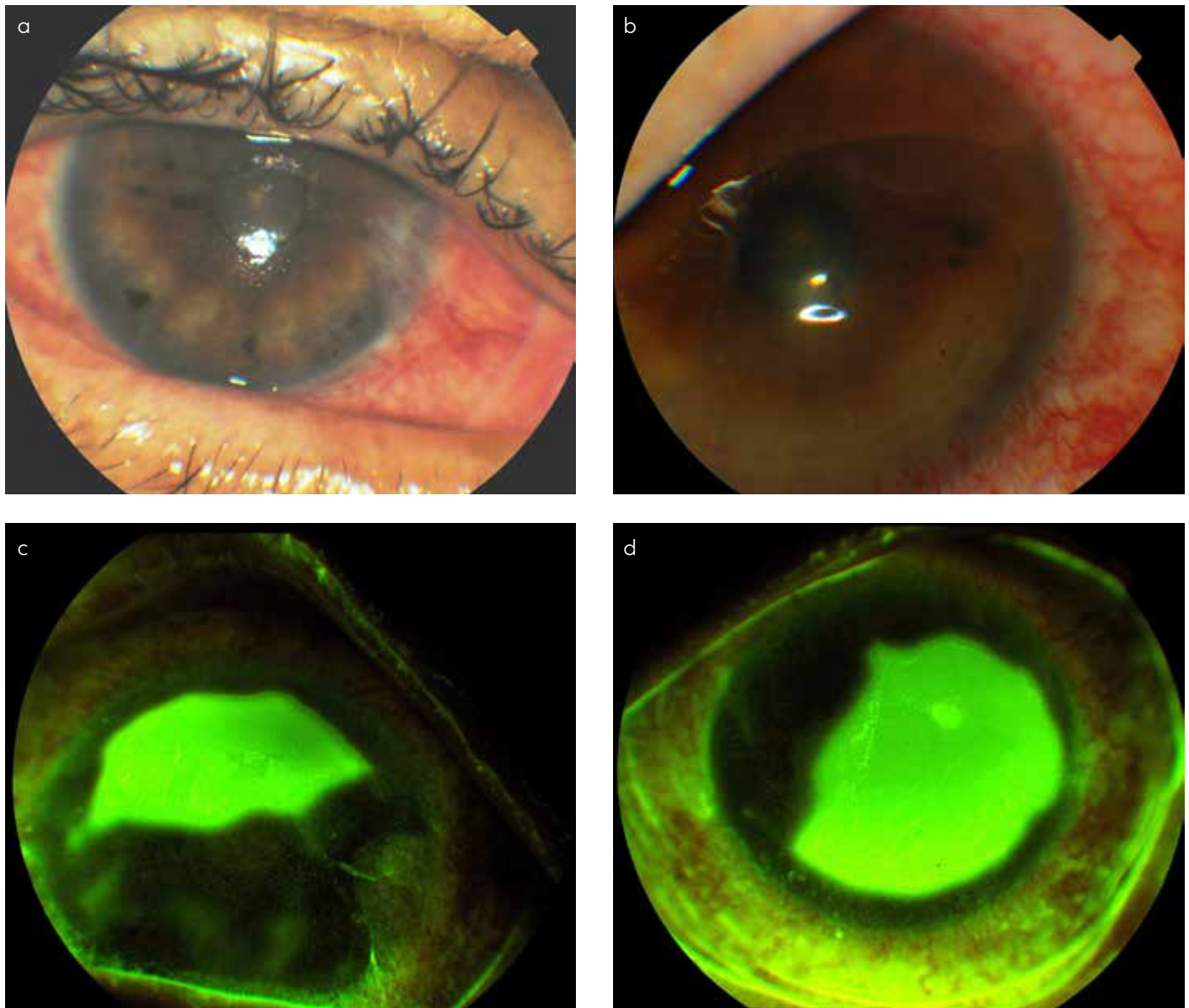


FIGURE 1. a-d. Severely dry eye and epithelial defect in the right (a), and left (b) eyes. The epithelial defect and epitheliopathy stained with fluorescein in the right (c) and left (d) eyes

DISCUSSION

There are several treatment modalities for treating PEDs (2). UCS and autologous serum (AS) have been gaining popularity in recent years due to their efficacy and easy application. Both contain growth factors such as substance P, insulin-like growth factor-I, and nerve growth factor for promoting corneal epithelial migration (5). In addition, both mainly contain epidermal growth factor, vitamin A, transforming growth factor-beta, and other growth factors and neuropeptides in different concentrations that can facilitate proliferation, migration, and differentiation (4).

Some of the disadvantages in the treatment of PEDs with UCS are blood-borne infections missed in laboratory tests,

infections in the window period, and contamination of UCS during preparation, transport, or storage; these might result in mild-to-serious local or systemic infections. AS might be safer than UCS in terms of blood-borne infections, but the probability of infections due to contamination using AS might be the same as that using UCS.

Umbilical cord serum is good option in patients who are not ideal candidates to receive AS such as systemically ill patients or patients with excess pro-inflammatory cytokines in serum such as graft-versus-host disease and Sjögrens syndrome (1, 6). In addition, UCS has been shown to be more effective in the healing of PEDs (7).

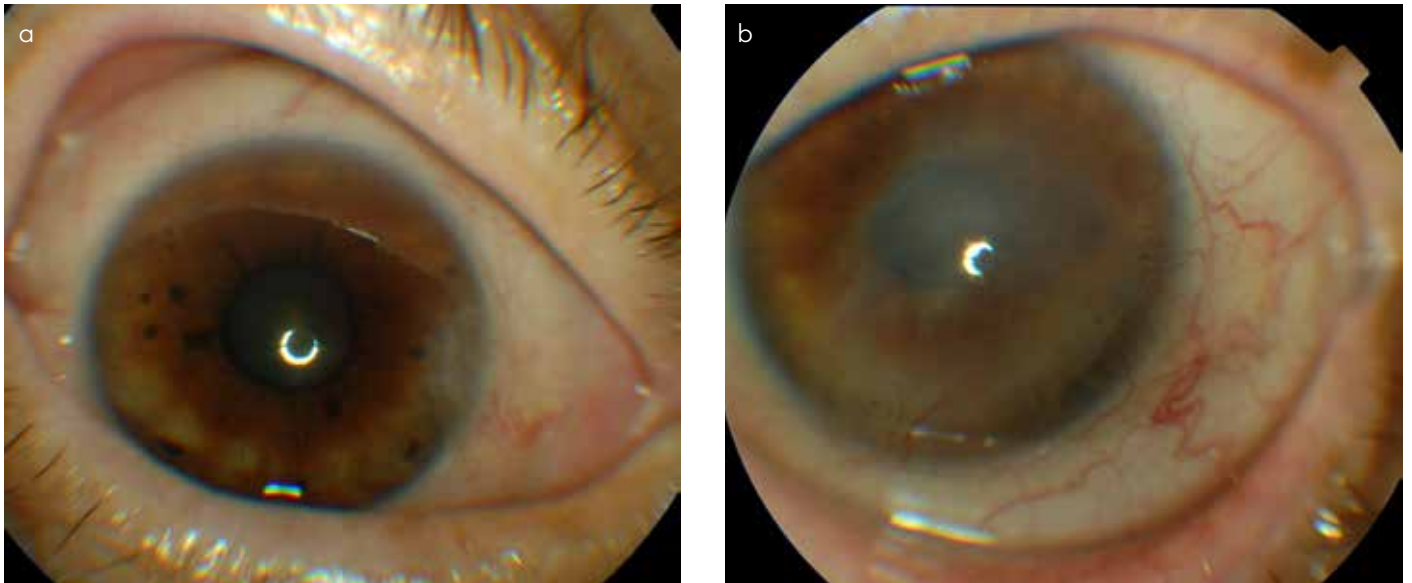


FIGURE 2. a, b. Healthy epithelium in the right eye (a), and left eye with neovascular leucoma (b) after treatment with UCS
UCS: umbilical cord serum

Informed Consent: Written informed consent was obtained from patient who participated in this study.

Peer-review: Externally peer-reviewed.

Author contributions: Concept - E.D, B.Ö.; Design - E.D.; Supervision - E.D, B.Ö, R.E.; Resource - B.Ö; Materials - B.Ö, E.D; Data Collection and/or Processing - E.D, R.E.; Analysis and/or Interpretation - E.D, R.E.; Literature Search - R.E.; Writing - B.Ö; Critical Reviews - B.Ö, E.D, R.E.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study has received no financial support.

REFERENCES

1. McCulley JP, Horowitz B, Hussein ZM, Horowitz M. Topical fibronectin therapy of persistent corneal epithelial defects. Fibronectin Study Group. *Trans Am Ophthalmol Soc* 1993; 91: 367-86.
2. Katzmann LR, Jeng BH. Management strategies for persistent epithelial defects of the cornea. *Saudi J Ophthalmol* 2014; 28: 168-72. [\[CrossRef\]](#)
3. Erdem E, Yagmur M, Harbiyeli I, Taylan-Sekeroglu H, Ersoz R. Umbilical cord blood serum therapy for the management of persistent corneal epithelial defects. *Int J Ophthalmol* 2014; 7: 807-10.
4. Yoon KC, Im SK, Park YG, Jung YD, Yang SY, Choi J. Application of umbilical cord serum eyedrops for the treatment of dry eye syndrome. *Cornea* 2006; 25: 268-72. [\[CrossRef\]](#)
5. Yoon KC, You IC, Im SK, Jeong TS, Park YG, Choi J. Application of umbilical cord serum eyedrops for the treatment of neurotrophic keratitis. *Ophthalmology* 2007; 114: 1637-42. [\[CrossRef\]](#)
6. Versura P, Profazio V, Buzzi M, Stancari A, Arpinati M, Malavolta N, et al. Efficacy of standardized and quality-controlled cord blood serum eye drop therapy in the healing of severe corneal epithelial damage in dry eye. *Cornea* 2013; 32: 412-8. [\[CrossRef\]](#)
7. Vajpayee RB, Mukerji N, Tandon R, Sharma N, Pandey RM, Biswas NR, et al. Evaluation of umbilical cord serum therapy for persistent corneal epithelial defects. *Br J Ophthalmol* 2003; 87: 1312-6. [\[CrossRef\]](#)