Case Report

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Phototheraputic Keratectomy for a Patient with Corneal Intraepithelial Dysplasia

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ABSTRACT

Purpose: To report a case of a patient who underwent phototherapeutic keratectomy for corneal intraepithelial dysplasia.

Case Report: A 68-year-old female consulted us for visual disturbance with localized opacification of the corneal epithelium in her right eye. Her corrected distance visual acuity was 20/40 in the affected eye, and a slit-lamp examination revealed plaque-like isolated epithelial corneal lesions at the paracentral to central cornea. No vascular invasion of the lesion was found. The patient was diagnosed with corneal intraepithelial dysplasia based on preoperative examinations. The lesions were removed by phototherapeutic keratectomy using the NIDEK EC-5000 excimer laser system. At the 6-month follow-up, the visual acuity improved in 20/20, and a slit-lamp examination revealed no epithelial corneal lesions in the eye.

Conclusion: Excimer laser ablation may be effective in the treatment of corneal intraepithelial dysplasia without disease recurrence.

Abbreviations: CIN: Corneal Intraepithelial Neoplasia; PTK: Phototherapeutic Keratectomy; CDVA: Corrected Distance Visual Acuity; AS-OCT: Anterior Segment Optical Coherence Tomography

Introduction

Intraepithelial neoplasia and squamous cell carcinoma of the cornea and conjunctiva are the most common tumors of the ocular surface [1] with a reported incidence of 0.13 to 1.9/100,000, depending on geographic location [2]. This tumor is classified as an in situ form, known as conjunctival and/or Corneal Intraepithelial Neoplasia (CIN), or invasive squamous cell carcinoma. CIN encompasses entities that were previously referred to as dysplasia and carcinoma in situ. Corneal epithelial dysplasia occurs in elderly patients. Although the etiology remains unknown, it has been suggested that excess ultraviolet exposure and human papilloma virus infection may cause the lesion [3,4]. The pathogenesis of corneal epithelial neoplasia usually commences at the limbal region in that abnormal epithelium grows towards the central cornea and often associates with neovascularization into the lesion. The most common treatment for conjunctival and corneal neoplasia is radical excision in combination with cryotherapy [5]. Newer chemotherapeutic modalities, such as mitomycin C (MMC) [6] 5-fluorouracil (FU) [7] and interferon,8 are now being used to avoid the operating room altogether and decrease the potential risk of limbal stem cell loss and scarring. There has been only one case of recurrent corneal intraepithelial dysplasia treated with Phototherapeutic Keratectomy (PTK) [8,9]. In this report, we describe a case of primary corneal intraepithelial dysplasia after PTK.

Case Report

A 68-year-old woman presented with blurred vision in the right eye for 6 months before the initial visit to the clinic. We did

not obtain a medical history of the etiologic factors associated with induction of the neoplasm. Her Corrected Distance Visual Acuity (CDVA) was 20/40 and 20/20 in the right and left eyes, respectively. Central pachymetry measured 564 μm in the right eye and 530 μm in the left eye. Biomicroscope demonstrated plaque-like isolated epithelial corneal lesions extending from the paracentral cornea into the central visual axis in her right eye. The cornea of her left eye also showed translucent epithelial corneal lesions at the paracentral cornea, but no symptoms occurred. The cornea was avascular, and the corneal stroma seemed to be uninvolved. The anterior chamber was quiet, and the remainder of the ocular examination was unremarkable. Anterior Segment Optical Coherence Tomography (AS-OCT) (CASIATM, Tomey Corporation, Nagoya, Japan) was performed and demonstrated thickening and highly increased reflectivity of the corneal epithelial layer extending from the paracentral to central cornea of the right eye. In accordance with the thickening lesions, anterior corneal steepening was observed in the keratometric map using AS-OCT. Based on these morphological characteristics, we diagnosed corneal intraepithelial dysplasia in both eyes in this patient.

We conducted PTK with the NIDEK EC-5000 excimer laser system and used the following parameters: wavelength, 193 nm; fluency, 165 mJ/cm2; repetition rate, 40 Hz; ablation zone diameter, 7.0 mm; transition zone, 1.0 mm; and ablation depth, 200 μm based on the AS-OCT. We used the transepithelial technique for removal of the corneal epithelium. No histological examination was performed on the ablated tissue after PTK. Postoperatively, steroidal (0.1% fluorometholone) and antibiotic (1.5% levofloxacin) medications were topically administered 4 times daily for 1 week after insertion of a soft contact lens, and the dose was steadily reduced thereafter. The patient returned at the 1-month follow-up examination with subjective improvement in vision and no subjective complaints. The preceding epithelial corneal lesions had diminished. Her CDVA had improved to 20/20 in the affected eye, with mild punctate epithelial erosions at the inferior cornea. AS-OCT was again performed, demonstrating normal epithelium without the lesions previously observed. The anterior corneal astigmatism also improved to 1.2 diopters in the AS-OCT keratometric map. The CDVA remained at 20/20, and no recurrence of epithelial corneal lesions occurred at the 6-month follow-up.

Discussion

Current treatment modalities include excision with or without adjuvant cryotherapy, topical chemotherapy (e.g., MMC, 5-FU, or interferon), radiation therapy, and in extreme cases, exenteration of the orbit [10]. Surgical excision alone of CIN has been associated with higher rates of recurrence, ranging from 17% to 24% for dysplasia and from 30% to 41% for squamous cell carcinoma [2,11]. In the current case, the corneal lesion was diagnosed as corneal intraepithelial dysplasia of the ocular surface before treatment with PTK. Although histological examination might be helpful in determining the confirmed diagnosis, a dysplastic tissue sample was not obtained because of excimer laser ablation. To our knowledge, this is the first reported case of PTK in primary corneal intraepithelial dysplasia. Our case demonstrated isolated neovascularized corneal epithelial dysplasia compared to a previous case report by Dausch, et al [9]. We conclude that PTK is an appropriate technique for mild to moderate cases of corneal intraepithelial dysplasia. Excimer laser ablation may be effective in the treatment of corneal intraepithelial dysplasia. High-resolution AS-OCT is emerging as an important noninvasive technique that can help diagnose and evaluate the efficacy of treatment. AS-OCT was performed to look for evidence of recurrence in the present case. We are conducting imaging using an AS-OCT described in many patients.

Patient Consent

Written consent to publish this case report has been obtained from the patient.

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Conflicts of Interest

The following authors have no financial disclosures: Hidenaga Kobashi, Ikuko Toda, Tomoo Obayashi, Kazuo Tsubota.

Authorship

All authors attest that they meet the current ICMJE criteria for Authorship.

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