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Imaging of a Severe Case of Acute Hydrops in a Patient with Keratoconus Using Anterior Segment Optical Coherence Tomography

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Key Words

Acute hydrops · Anterior segment optical coherence tomography · Intrastromal cleft

Abstract

Aim: To investigate the clinical and diagnostic findings of a patient with acute hydrops using anterior segment optical coherence tomography (AS-OCT).

Methods: The AS-OCT findings of a 43-year-old patient with acute hydrops associated with keratoconus were examined. At the initial examination and during follow-up, evaluation of the anterior segment was performed.

Results: The patient presented with decreased visual acuity, pain, and redness in the right eye. The symptoms, clinical presentation, and topographical findings of the right eye confirmed the diagnosis of acute corneal hydrops. Changes in the stroma and Descemet's membrane during the healing process of acute hydrops could be demonstrated by high-resolution AS-OCT. The use of contact lenses was improved at the last follow-up visit after 8 months and increased visual acuity to 20/20 with correction.

Conclusions: AS-OCT is a useful tool for studying the morphologic features of acute hydrops.

Introduction

Acute corneal hydrops is a severe complication that has been reported in about 3% of keratoconic eyes [1, 2]. One of the well-known complications to be essential for the development of acute hydrops is the rupture of Descemet's membrane [3, 4]. Conventional treatments include patching, bandage soft contact lenses, and hypertonic

sodium chloride solution. Basically, acute corneal hydrops completely resolves after approximately 3–6 months. Recently, anterior segment optical coherence tomography (AS-OCT) has been shown to provide high-resolution images of the anterior segment [5]. In particular, high-definition OCT (Cirrus HD-OCT) is an emerging noninvasive, high-speed, and high-resolution imaging modality for the anterior segment of the eye. The purpose of our study is to investigate the corneal morphologic characteristics of acute hydrops using AS-OCT.

Case Report

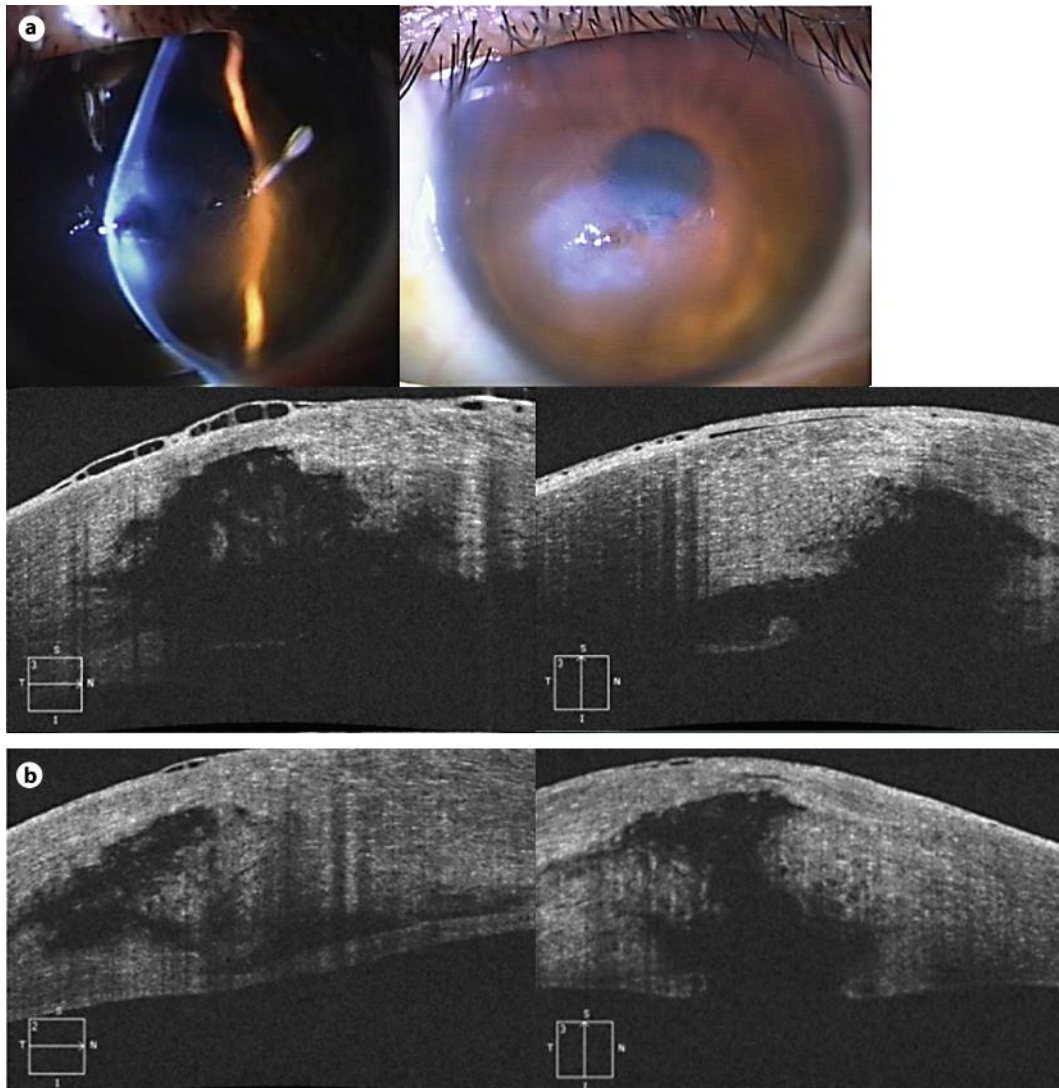
A 43-year-old man was admitted to the St. Marianna University School of Medicine because of acute hydrops with keratoconus in his right eye (OD). His visual acuity was 20/100 with –3 sph. The patient's ocular history was positive for mild myopia OD (–3 sph) and hard contact lens use. He had visited another hospital for the treatment of keratoconus for 6 years. Slit-lamp examination showed acute hydrops OD. AS-OCT (Cirrus HD-OCT; Carl Zeiss Meditec GmbH, Oberkochen, Germany) after the onset of symptoms revealed a severe corneal stromal edema with a rupture of Descemet's membrane and large intrastromal clefts (fig. 1a). On the AS-OCT image, the clefts could be observed in the anterior chamber. Two weeks later, a corneal edema with a large intrastromal cyst connecting to the anterior chamber appeared (fig. 1c). Although visual acuity was improved to 20/20 with +0.5 sph, clinical, AS-OCT, and topographic images 8 months later revealed a deficiency of Descemet's membrane with a resolved corneal epithelial edema and a decreased corneal stromal edema (fig. 1g).

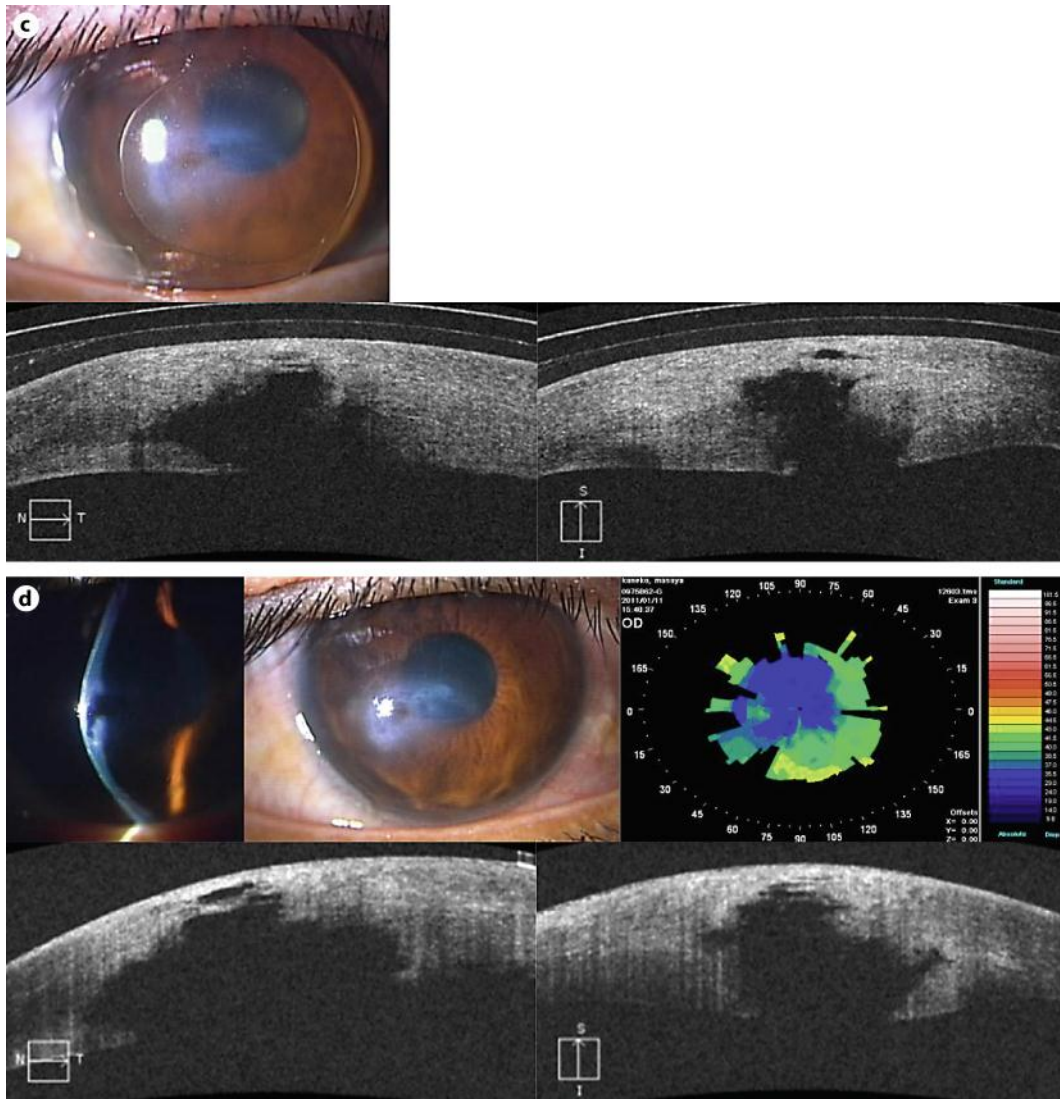
Discussion

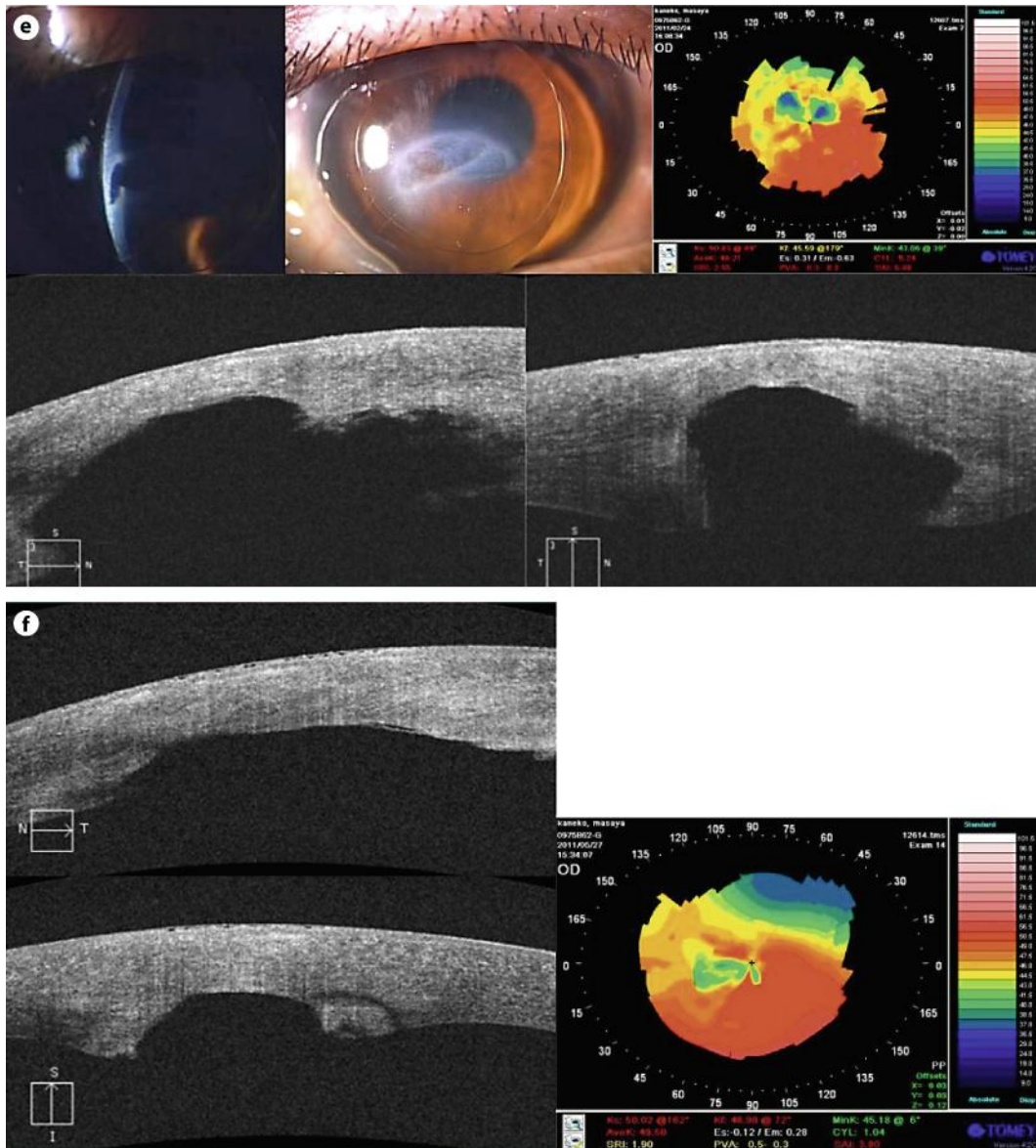
The AS-OCT method does not require the use of an eye cup and, as is the case with ultrasound biomicroscopy, can avoid external pressure in the case of acute hydrops with Descemet's membrane rupture. As AS-OCT can also provide higher-resolution images, it might be helpful for determining the mechanism causing acute hydrops and for anticipating a possible acute hydrops. We therefore suggest that AS-OCT is a useful tool to investigate the morphologic features during the healing process of acute hydrops.

Disclosure Statement

The authors have no proprietary and/or conflicts of interest to disclose for this paper.







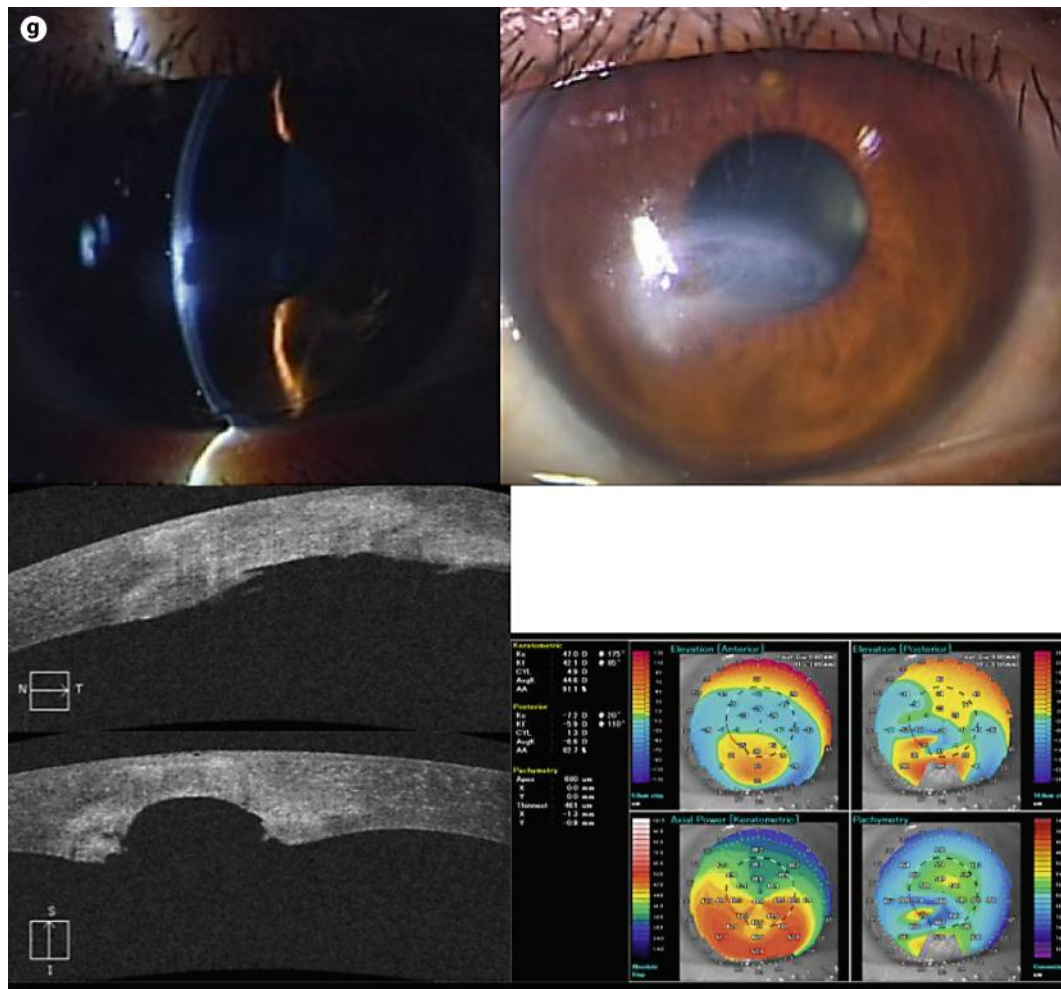


Fig. 1. Slit-lamp examination and AS-OCT images of the evolution of acute hydrops with keratoconus at baseline, 5 days, 2 weeks, and 1, 3, 5, and 8 months of follow-up. **a** Cornea at the first visit. Image of the Descemet's membrane rupture due to acute hydrops. A deficiency of Descemet's membrane was revealed in the epithelial and stromal edemas along with rolled edges of the Descemet's membrane. The corneal edema did not improve following bandage soft contact lens use after 5 days (**b**). Clinical photographs and AS-OCT images showing the corneal edema with a large intrastromal cyst connecting to the anterior chamber 2 weeks (**c**) and 1 month later (**d**). Clinical, AS-OCT, and topographic images showing deficiency of Descemet's membrane with the resolved corneal epithelial edema and the decreased corneal stromal edema 3 months (**e**), 5 months (**f**), and 8 months later (**g**). Eight months later, central cornea with no clefts and edema measured 308 μm.

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