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SHORT COMMUNICATION

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# Preoperative evaluation of limbal dermoids using high-resolution biomicroscopy

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**Abstract** *Background:* Only a few case reports have described the ultrasound biomicroscopic features of limbal dermoids. It remains unclear whether examination by ultrasound biomicroscopy (UBM) can detect the corneal depth of penetration which would improve planning of surgery. *Methods:* Eight consecutive patients [two female, six male, 1–24 years old (median 8.5 years)] examined by UBM (Zeiss-Humphrey, 50 MHz) were retrospectively studied. Five of the dermoids were excised without corneal grafting and histopathological evaluation was obtained. *Results:* Seven out of eight dermoids were located in the temporal lower quadrant. A Goldenhar syndrome was known in three cases. In all cases but one, UBM showed a more reflective and predominantly homogeneous lesion compared with the unaffected corneal stroma, so that the lateral margins of the lesion could be clearly identified. Incomplete stromal penetration of the dermoid was noticed in four cases; one eye showed a corneal full thickness dermoid. An intraocular protrusion was seen in one eye. Two more cases remained unclear because of reduced compliance. Descemet's membrane beneath the dermoid could not be visualized in most cases (seven out of eight) because of strong sound attenuation inside the lesion. Histopathological evaluation of five cases revealed the typical signs of a limbal dermoid. *Conclusion:* UBM improves the preoperative evaluation of limbal dermoids. Subtle examination technique for the depth of corneal penetration is required because of the strong sound attenuation in this tissue, reducing the visibility of deep corneal structures.

## Introduction

Limbal dermoids are uncommon choristomatous corneal tumours. They clinically present as round or oval, whitish or yellowish masses on the anterior surface of the eyeball. They are composed of ectodermal and mesodermal elements and may contain hairs, sebaceous and sudoriferous glands, teeth, fibrous tissue, fat, blood vessels and cartilage [1, 4, 7].

Only a few case reports have shown ultrasound biomicroscopic features of limbal dermoids [2, 3]. It remains unclear whether ultrasound biomicroscopy (UBM) can detect the corneal depth of penetration of dermoids. Since slit-lamp evaluation and gonioscopy is often not sufficient, additional echographic information would be very helpful in order to improve planning of surgery.

## Material and methods

In a retrospective analysis we reviewed the charts of eight consecutive patients (two female, six male, 1–24 years old, median 8.5 years) with unilateral limbal dermoid who underwent examination by UBM between January 1996 and April 2000. We used the Zeiss-Humphrey ultrasound biomicroscope (UBM 840) with the standard 50-MHz probe. Depending on age and compliance, the patients were examined under general anaesthesia before scheduled surgical excision of the lesion or under topical anaesthesia. In

one child, the examination was conducted during general anaesthesia for squint operation without excision of the dermoid.

The echographic procedure was performed in standardized immersion technique [5] and images were taken in a parallel and radial direction with respect to the limbus. The images were analysed for reflectivity, structure, and borders of the dermoids. The corneal depth of the lesion was recorded, as well as the visibility of Descemet's membrane and the anterior chamber angle.

Five of the dermoids were excised for cosmetic or functional reasons without corneal grafting. The specimens were fixed in 10% formalin and processed for routine light microscopy, which revealed the histopathological diagnosis of limbal dermoid in all cases. HE and PAS stains were reviewed for the basal resection margin, and it was recorded whether or not the lesion had been fully excised with respect to corneal depth.

## Results

The median age of all patients was 8.5 years, with a range from 1 to 24 years. None of them had undergone surgery on the limbal dermoid before UBM was performed. Seven out of eight lesions were located in the temporal lower quadrant, one was temporal. A Goldenhar syndrome was known in three children.

In all cases but one, UBM showed a lesion more reflective than the unaffected corneal stroma, so that the lateral margins of the dermoid could be clearly identified in these seven patients (Fig. 1). In seven out of eight cases, the dermoid was echographically homogeneous or predominantly homogeneous. The remaining case presented with strongly reflective areas inside the lesion with sharp-edged posterior sound attenuation.

Incomplete stromal penetration of the dermoid was noticed in four cases; one eye showed a corneal full-thickness dermoid. An intraocular protrusion was seen in one eye. Two more cases remained unclear because of reduced compliance of the young children examined without general anaesthesia. In general, the basal border of the dermoids was less clearly visible than the lateral margins because of the sound attenuation. The maximum thickness of the dermoid could be recorded in six cases (median 1.8 mm, SD 0.4 mm, range 1.4–2.5 mm).

Descemet's membrane beneath the dermoid could not be visualized in most cases (seven out of eight) because of the strong sound attenuation inside the lesion. In one case, weak echoes from parts of the membrane could be seen. For the same reason, the anterior chamber angle could not be visualized in three patients (Fig. 2).

Histopathological evaluation revealed the typical signs of a limbal dermoid in all five cases studied. The basal margins of the specimens seemed to be inside the lesion in three cases; one had to be excluded for technical reasons (basal margin not visible). In the remaining case we got the impression that the dermoid had been removed exactly at its basal border. The depth of penetration could not be correlated to the UBM results because penetrating corneal grafting (with normal corneal tissue at the basal margin in at least some cases) had not been performed.

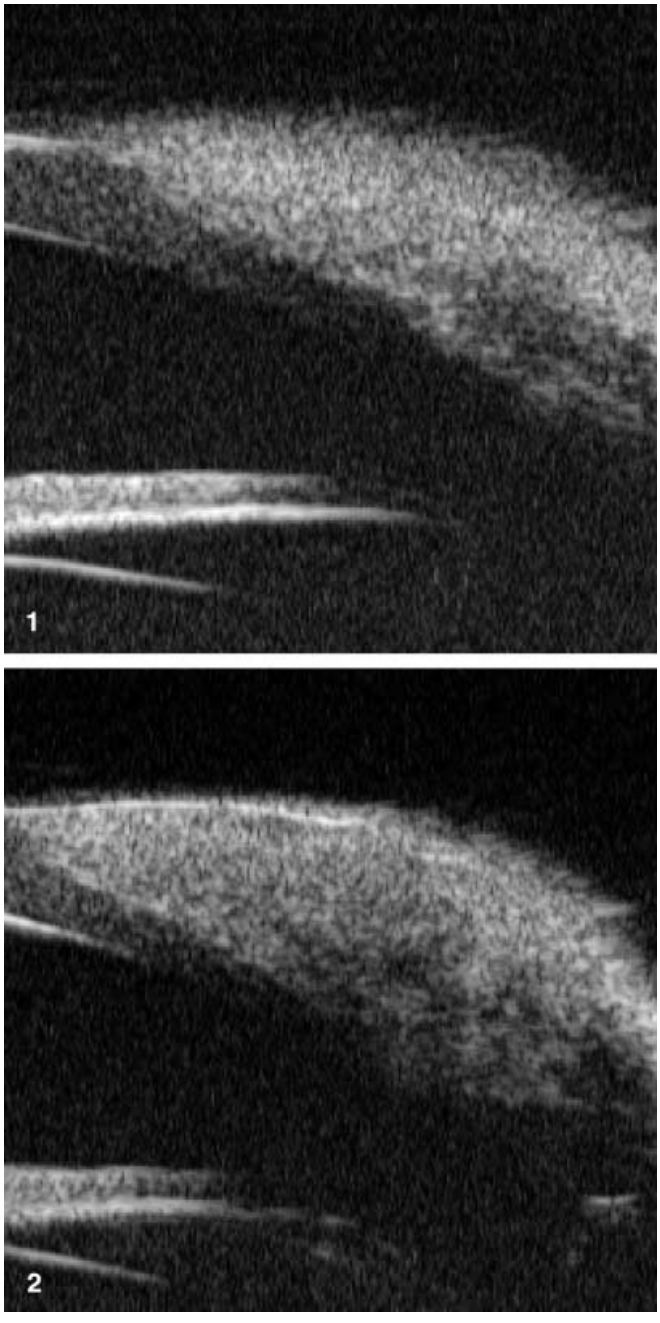


**Fig. 1** Ultrasound biomicroscopy of the anterior segment shows a highly reflective limbal mass with sharp borders. Descemet's membrane beneath the lesion is not visible

**Fig. 2** Same patient as in Fig. 1. Note that the anterior chamber angle is not depicted due to strong sound attenuation inside the dermoid

## Discussion

High-resolution UBM is a suitable technique for the evaluation of corneal and scleral diseases [5, 6]. Since not much information has been published on the useful-

ness of UBM examination of limbal dermoids, we performed a retrospective analysis of eight consecutive cases.

UBM was helpful in obtaining information on the corneal extent of the lesion. The lateral margins of the lesions could be better visualized than the basal borders because the strong sound attenuation inside the lesion made evaluation of deep corneal structures more difficult. Information on the depth of infiltration into the cornea, which is most important for planning of surgery, could be obtained in six cases with good compliance. As a consequence, two cases with full corneal thickness involvement had not been submitted to surgery.

Interestingly, Descemet's membrane, although highly reflective in normal corneas, could not be visualized beneath the dermoids in most of the cases. This problem could be solved neither by perpendicular sound axis nor by increasing sound energy. Unfortunately, none of the patients had a second UBM examination after surgical excision. There are no hints in the literature that limbal dermoids are combined with structural changes of Descemet's membrane [4, 7]. We assume that the strong sound attenuation inside the limbal masses was the most important reason for poor visibility of deep corneal structures and anterior chamber angles in these cases.

Lanzl et al. reported on two cases of limbal dermoids with full-thickness corneal involvement [3]. Descemet's membrane is not visible in the UBM images of these patients, although a perpendicular sound axis was used in at least one case.

In general, UBM improves the preoperative evaluation of limbal dermoids and should be performed in addition to slit-lamp evaluation and gonioscopy. Subtle examination technique for the depth of corneal penetration is required because of the strong sound attenuation in this tissue, reducing the visibility of deep corneal structures. Small children should be examined under general anaesthesia.

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