Abstract. The ocular region was examined by echography using a high resolution annular array probe. The following results were obtained: (1) Homogeneous and clear images of the ocular region with excellent axial resolution and lateral resolution. (2) The occurrence of artifacts, which are specific to ultrasonograms, was relatively low, and images showing the precise shape of the eyeball without distortion were obtained. (3) Since the distance between the transducer and eye surface was relatively long, adequate images of the anterior ocular region were obtained, as with the sector scanning procedure by the immersion method. (4) As a result of long focal zone, each site of the eyeball could be distinctly and homogeneously visualized.

Key words: Annular array transducer, multifocus imaging, resolution

Introduction

We have recently used in a trial a hand-held, large diameter, annular array probe for the purpose of examining superficial tissues. This study was particularly aimed at the goal of improving image resolution. We applied this device to ophthalmologic diagnosis.

Equipment and Technique

The main specifications of this probe are as follows:
Shape of probe: Concave annular array.
Frequency: 7.5 MHz.
Diameter of transducer: 36 mm.
Number of transducer elements: 12.
Axial resolution: 0.25 mm (−12 dB).
Lateral resolution: 0.5 mm (−12 dB).

This probe, owing to electronic beam forming, provides an ideal pencil shape of the echo-beam and a long focal zone. It is also able to move by
software control the focus on 2 different sites, i.e. intrabulbar and intraorbital. In addition, two foci could be used simultaneously in one image, although at half the normal frame rate. This is a major characteristic of the probe.

The external appearance of the annular array probe and display apparatus are shown in Figs. 1 and 2, respectively. When it was used for examination, scopisol was applied to the palpebra. The tip of the probe slightly touched the closed palpebrae. While the palpebrae were still closed, the patient was instructed to move the eyes to the right and left. Kinetic diagnosis was performed by examination of the mobility of intraocular membranous lesions.

The image-receiving apparatus used was Sonolayer SSA-250 type equipment. The images were recorded on video tape, and frozen images were also photographed.