Two-dimensional Echoencephalography in the Young Child

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Summary. The authors report their experience with two-dimensional echoencephalography and compare this method with the possibilities inherent in the one-dimensional technique. The satisfactory results obtainable with tomographic echoencephalography are discussed in view of their contribution to a further expansion of this method for fast and harmless evaluation of intracranial processes in the young child.

In 1967 Schiefer and Kazner still had their justifiable doubts as to whether echotomography had any place in the diagnosis of intracranial tumours. While this technique has meanwhile become a routine procedure in most gynecological and ophthalmological centers, the visualization of intracranial structures is hampered by the pronounced sound absorption of the bony skull and the resultant marked refraction and distortion of the echo pulses (Gordon, 1969; Kresse 1968). This very circumstance was the reason underlying attempts at visualizing intracranial processes with the help of transdural echography and after craniotomy (Galichich et al., 1965; Kikuchi et al., 1957; Müller, 1969 and 1971). Although a satisfactory two-dimensional pattern can be recorded during operation with the help of a modified A-mode technique by visualizing, for instance, the exact location of a process (Müller, 1969 and 1971), the method is still of a more or less experimental nature.

In examinations of the skull one-dimensional echoencephalography thus constitutes currently the soundest ultrasonic technique (Schiefer and Kazner, 1967),

although it is used essentially for visualizing the normal position and any shifts of the midline echo. This can be done with an accuracy of 98% (Mason, 1969). In normal subjects the correlation of echos recorded on one-dimensional echoencephalography is still relatively easy, while an interpretation of the complex echo patterns produced by pathologic pro-
Fig. 3. Female newborn, aged 4 months, with congenital hydrocephalus. (a) Pneumencephalogram after ventricular tap showing marked hydrocephalic enlargement distension of the lateral ventricle. (b) Identical findings are obtained on scanning along the coronal line at the level of the external auditory canal.

Fig. 4. Male newborn, aged 4 days, with congenital hydrocephalus. Massive distension of the frontal horns is seen on the lateral pneumencephalogram. Brain mantle thickness approximately 1 cm (a). (b) Shows identical findings on B-type echoencephalography along the coronal line at the level of the external auditory canal.

Fig. 5. Female newborn, aged 1 week, with very marked congenital hydrocephalus. (a) Shows the lateral pneumencephalogram (photo-assembly of frontal and occipital lunar air configuration). (b) Mediosagittal echotomography shows the intact structures in the area of the basal ganglia.