SUMMARY

Neonatal brain imaging is a rapidly developing field. Cranial sonography has taken its place beside Computed Tomography (CT) and Magnetic resonance imaging (MRI) in effective imaging of the brain in infants.Cranial sonography is considered the first screening examination necessary to evaluate intracranial lesions in infancy with accurate assessment of congenital brain malformations, ventriculomegaly, intracranial cystic lesions, neonatal hemorrhage and intracranial infection. The recent advanced application of Doppler study for intracranial vessels add more valuable informations. RI is elevated in cases of hydrocephalus and can help in differentiation between ventriculomegaly due to brain atrophy and ventriculomegaly due to communicating or non-communicating hydrocephalus. In cases of intracranial hemorrhage, the vascular resistance is elevated due to angiospasm. RI increase with increasing grades of SE-IVH. An abnormal RI is also found in other abnormal cerebral events, such as brain oedema, subdural effusion, periventricular leukomalacia, asphyxia and brain death.

In this study we intended to emphasize the role of cranial sonography of infants in the diagnosis of different neurological disorders.

In the course of our work we have described the gross and sonographic anatomy of the infant brain, the pathology of the

different lesions of the infant brain and reviewed the works of different authors about this subject.

The study was conducted on 65 infants. Their age ranged from one day to one year. All cases were subjected to clinical examination and sonographic examination of the brain. Doppler ultrasound was conducted on 15 cases, plain x-ray skull was performed for 10 cases and CT examination for 44 cases.

The detected abnormalities found in the examined 65 cases were classified according to final diagnosis into the following seven groups :

Group I : Congenital brain malformation (29 cases).

Group II : Hydrocephalus (38 cases).

Group III : Cystic brain lesions (21 cases).

Group IV : Intracranial infection (13 cases).

Group V : Intracranial hemorrhage (11 cases).

Group VI : Cerebral atrophic changes (3 cases).

Group VII : Intracranial neoplasm (one case).

Our findings can be summarized into the following :

Congenital brain malformations :

Ultrasound can readily diagnose cases of chiari-malformation, encephalocele, Dandy walker malformation, holoprosencephaly, agenesis of corpus callosum and schizencephaly, as well as other major intracranial structural anomalies. Ultrasound is of equal sensitivity in detection of congenital lesions as CT. CT is more

superior in detection of bony lesions (as bony defects in cases of encephalocele and bony changes of chiari malformation) and detection of sturge weber syndrome in infancy.

Hydrocephalus :

Hydrocephalus is simply diagnosed by US which can determine the level of obstruction and some help can be obtained in detection of the cause. US is reliable in early ventricular evaluation and this is particularly important for neonates at risk where significant ventricular dilatation may occur before the condition is clinically suspected. US is also valuable for follow up of hydrocephalus after shunt operations to monitor the ventricular size and detect shunt complications.

Cystic brain lesions :

US can readily diagnose and differentiate cases of porencephalic cysts, arachnoid cysts, Dandy walker cysts, holoprosencephaly and vein of Galen aneurysm. CT is more superior in detection of small extra-axial peripherally located cystic lesions.

Intracranial infection :

Sonography is helpful and accurate method for detection of post-meningitic complications as hydrocephalus, ventriculitis and brain abscess. US can detect the complications of virus infection as cytomegalovirus and other TORCH infections.

Intracranial hemorrhage :

SE-IVH (subependymal-intraventricular hemorrhage) is the most important variety of neonatal intracranial hemorrhage because of its high frequency of occurrence and severity. Ultrasound proved to be accurate in the diagnosis and grading of SE-IVH and parenchymal hemorrhage. US should be used to screen all premature infants for intracranial hemorrhage.

In subdural hemorrhage ultrasound can detect moderate amounts but small amount of blood particularly if it is peripheral and lies immediately under skull bone, is difficult to be diagnosed by ultrasound and may be missed. US is not specific for detection of subarachnoid hemorrhage. CT is the method of choice in such cases.

Cerebral atrophic changes :

Diffuse brain atrophy is suspected by cranial sonography and cranial Doppler study can differentiate ventriculomegaly due to atrophic changes from hydrocephalus.

Intracranial neoplasm :

Intracranial neoplasm in neonates are extremely rare. US has a limited value in diagnosis of neonatal intracranial tumours. CT and MRI are more superior to US particularly after contrast enhancement.