Introduction

Hypoxic-ischemic encephalopathy (HIE) **means that neonatal encephalopathy when caused by diffuse hypoxic-ischemic brain injury (1) ;** hypoxia refers to an arterial concentration of oxygen that is less than normal and ischemia refers to blood flow to cells or organs that is insufficient to maintain their normal function. HIE is an important cause of permanent damage to central nervous system cells, which may result in neonatal death or which may manifested later as cerebral palsy (CP) or mental deficiency. 15 to 20 % of infants with HIE die in neonatal period ; 25-30% of survivors develop permanent neuro-developmental abnormalities(CP ,mental retardation). (2)

Cranial ultrasonography , Doppler study &computed tomography are used frequently for diagnosing ; although the magnetic resonance imaging is the most sensitive modality for evaluating the patterns of brain injury .(3).

The routine cranial ultrasound examination for visualization of the intracranial contents in neonates is via the acoustic window created by fontanelles. This is the soft area of the cranium and is generally usefully open before the sutures have fused and the fontanelles become ossified at about 6 -9 months. In conditions such as hydrocephalus where the sutures and therefore the anterior fontanelle remain open longer, the examination can be undertaken in an older infant.(4-6)

Transfontanellar ultrasound usually is done only on babies as part of routine screening of babies born prematurely to detect bleeding in the brain, such as intraventricular hemorrhage (IVH) or to monitor any complications or to detect periventricular leukomalacia (PVL).

IVH and PVL increase a baby's risk of developing disabilities, including cerebral palsy or mental retardation and to screen for brain problems that may be present from birth (such as congenital hydrocephalus) also it can be done to evaluate an enlarging head or to detect infection or abnormal growths in or around the brain (7).

Colour-coded Doppler imaging (CCDI) has allowed fantastic pictures of the cerebral arterial and venous circulation in non invasive manner. CCDI can define the extra-axial spaces (subarachnoid or subdural) by positions of veins. Power Doppler is more sensitive to flow and has some unique advantages. The use of transcranial duplex Doppler ultrasound and the resistive index (RI) also pulsatility index (PI) have advocated its use in HIE.(8)

CT is applied for evaluation of acute hemorrhages (epidural, subtotal subarachnoid,, posterior fossa hemorrhages, battered child . . .) as well as – if MRI is unavailable for assessment of complex malformations, hydrocephalus and similar conditions.(9)

However the best imaging modality of HIE is MRI, which allows a multi-planar imaging in any direction with exquisite resolution, great anatomic information, more differentiation of grey and white matter than US and – using new tools such as spectroscopy, imaging – reveals functional information not available otherwise(10-12).