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ROLE OF NEUROSONOGRAPHY IN EVALUATION OF PERINATAL ASPHYXIA

Radio-Diagnosis

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ABSTRACT

Objective: The purpose of this study is to signify the importance of timely diagnosis of HIE and its classification into various grades to aid in management ,to emphasize the significance of first and second assessment in diagnosing HIE **Materials and methods:** The present study reviews the neonates with clinically suspected intracranial pathology admitted to neonatal ICU of Government General Hospital , kakinada **Results:** Out of 60 neonates 61.7% preterm neonates and rest were born at term. 17 neonates had transient periventricular echo densities persisting for more than seven days and two had grade 2 HIE, who had transient periventricular echo densities evolving into small, localized fronto- parietal cysts.Second assessment revealed grade 1 HIE in 20 neonates and grade 2 in two neonates.ICH was not found in 93.3% of the neonates. **Conclusion:** Transcranial neurosonography stands as an excellent and reliable investigation of choice for neonates due to its effective detection of HIE, ICH and intracranial congenital anomalies like corpus callosal agenesis due to its easy availability, portability and non radiation imaging, therefore can be repeated.

KEYWORDS

HIE, ICH, Neurosonography

INTRODUCTION

Preterm neonates have a higher mortality and morbidity because of their greater risk for intraventricular hemorrhage (IVH)[1] and hypoxic ischemic encephalopathy (HIE)[2] also known as periventricular leukomalacia (PVL), which can lead to poor neuro developmental outcomes. Premature neonates have impaired cerebrovascular autoregulation, including pressure-passive cerebral circulation. Episodes of hypotension result in reduced cerebral blood flow, hypoxia and reperfusion injury that can also result in germinal matrix hemorrhage..Early diagnosis of hemorrhage allows for clinical neonatology efforts to minimize subsequent sequelae[3-6].The neurological manifestations of injury to the premature brain can range from cognitive defects to the major motor defects of cerebral palsy.Findings on follow-up ultrasound can serve as a prognostic indicator for long- term neurodevelopmental outcome.

AIM

To signify the importance of timely diagnosis of HIE using NSG

MATERIALS AND METHODS

The present observational study included neonates with clinically suspected intracranial pathology admitted to neonatal ICU of Government General Hospital , kakinada

Inclusion Criteria

All those considered clinically at risk of ICH and HIE due to their prematurity and low birth weight were included in the study. Informed consent was obtained from one of the parents of each infant before the study.

Exclusion Criteria

Neonates born with major congenital malformations, chromosomal abnormalities, or any metabolic disorders; neonates born with birth trauma; or neonates born to mothers who have received magnesium sulfate or opioids within four hours before delivery.

Nsg Imaging:

NSG studies were performed with ESoateMyLab7 using a high frequency linear probe(6-8MHz) and convex probe(3-5MHz)

The study used Transcranial neurosonography of neonates two time points; one between first and third day and second between 7th and 10th day during admission in the neonatal intensive care unit. Their ultrasound examination included assessing for ICH,HIE.

RESULTS

- Authors included 60 neonates in the present study, and mean weight of the neonates was 1.93±0.65 kgs.
- There were 61.7% preterm neonates and rest were born at term.
- Mean APGAR[9-11] score at 1 minute was 8.6 (range 5 to 10) and at 5 minutes was 9.58 (range 8 to 10).
- 17 neonates as they had transient periventricular echo densities persisting for more than seven days and two had grade 2 HIE, who had transient periventricular echo densities evolving into small, localized fronto- parietal cysts[13].

Second assessment revealed grade 1 HIE in 20 neonates and grade 2 in two neonates.

- ICH was not found in 93.3% of the neonates.
- First assessment revealed two neonates with grade 1 ICH as they had a small hemorrhage confined to the germinal matrix.
- Two cases had grade 2 ICH in which hemorrhage originated from the germinal matrix but leaked into the lateral ventricle
- While on second assessment one grade 2 hemorrhage turned to be grade 3.

DISCUSSION

In premature neonates, ICH is found to be more common in the subependymal, intraventricular and/or intraparenchymal regions.

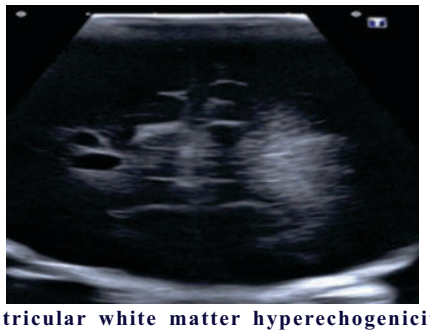
The ICH severity in premature neonates is most commonly evaluated according by Papile et al[7], which was used in the present study as well.

Transcranial neurosonography is the method of choice for a better approach during the intensive care of the premature neonate, which allows the imaging diagnosis. Scan is performed by anterior and temporal transfontanellar approach, it allows a better visualization of cerebral hemispheres, cerebellum, corpus callosum and blood vessels.[8] Transcranial neurosonography was able to detect subependymal and intraventricular hemorrhage in premature infants. With recent advances in ultrasonography and Doppler software and hardware, increased resolution and improved image quality with much more sensitive vascular flow analysis is available.

Germinal matrix hemorrhage-intraventricular hemorrhage (GMH-IVH) occurs in the first week of life as approximately 50% of their cases occurred in the first day of life, and about 65% occur by the end of the first week.

Others found that 70% of their cases was classified as Grade I HIE.

Peri ventricular white matter hyper echogenicity-Grade I HIE



Periventricular white matter hyperechogenicity with frontoparietal cysts – grade 2 HIE

Intra ventricular haemorrahge filling dilated lateral ventricles

CONCLUSION

Transcranial neurosonography stands as an excellent and reliable investigation of choice for neonates due to its effective detection of HIE, ICH and intracranial congenital anomalies like corpus callosal agenesis due to its easy availability, portability and non radiation imaging, therefore can be repeated.

It not only detects abnormalities but gives excellent clue to clinicians for management of neonates. Therefore, authors recommend it as a routine test in all neonates admitted in neonatal intensive care unit and in those suspected for any intracranial congenital anomalies.

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