



Role of Neurosonogram in Evaluation of Brain Injuries in Preterm Babies

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Abstract

Background and Objectives: *Neuro developmental abnormalities was very common in premature neonates due to incomplete development of the central nervous system. Neurosonogram is a sensitive tool for detecting these abnormalities earlier. Hence, this study was done to identify various cerebral lesions in the preterm babies.*

Methods: *A total of 50 preterm babies, referred to Department of Radio diagnosis for cranial ultrasonography were included in the study.*

Results: *Among 50 babies, 39 (78%) showed normal study and remaining 11 (22%) showed abnormal scan of which Subependymal/ Intraventricular haemorrhage (SEH/IVH) 16% was very common and Periventricular echogenicity (PVE) 6 %.*

Conclusion: *Neurosonogram is cost effective, non-invasive, non-ionizing and helps in early detection of various cerebral lesions.*

Keywords: *preterm babies; SEH/IVH; periventricular leukomalacia; perventricular cystic changes.*

Introduction

Neuroimaging assessment of premature babies is becoming increasingly important as the number of premature birth is increasing and survival rate is also increasing and survivors remain at greater risk for neurodevelopment impairments.¹

Neurosonography is now an essential part of new born care, particularly in high risk and unstable premature infants. Current ultrasound technology allows for rapid evaluation of infants in intensive care with virtually no risk.² CT is not typically used in the premature infant because of the instability of the infant and the lack of good grey / white matter differentiation from the high water content in the newborn brain. The advantages of

sonography over computed tomography (CT) / magnetic resonance imaging (MRI) include portability, lower cost, speed, no ionizing radiation, and no sedation. Screening of premature infants for intracranial hemorrhage, periventricular leukomalacia and hydrocephalus has proven highly sensitive and specific.³ Hence, this study was done to diagnose various cerebral lesions in premature babies using neurosonogram.

Methodology

It was a prospective study conducted after approval from institution ethical committee. Study was conducted at RMMCH, Chidambaram from January 2017-June 2018. This study comprised of

50 preterm neonates with birth weight less than 2 kg, referred to Department of Radio diagnosis for cranial ultra sonography were included in the study. Babies with congenital malformations, severe infections and failed resuscitation were excluded. Preterm neonates were transported to ultrasound room after adequate feeding and wrapping them in warm clothing to avoid hypothermia. No sedation was used. The baby was laid in supine. The transducer and transmitting media gel (profuse coupling agent) were placed on the anterior fontanelle of neonatal head and images were obtained in coronal and sagittal planes. The examination started in coronal plane along the coronal suture, with transducer angled towards the frontal region. Then brain examined in various coronal plane by sweeping the transducer from anterior to posterior. Following the completion of examination in coronal plane, sagittal and parasagittal scans were obtained by

placing the transducer on the anterior fontanel, perpendicular to coronal plane and then sweep from midline thorough the lateral ventricles, the cerebral parenchyma on each side. Care was taken to absolute symmetry of scans which was maintained throughout the examination, as densely echogenic choroid plexus appears large on each side causing a false image of subependymal haemorrhage. The ultrasonogram scans were evaluated with special attention to the echogenicity of cerebral parenchyma, ventricle size, SEH/IVH, any focal echodense or cystic changes and PVE.

Observation and Results

Present study comprised of 50 preterm babies. Among 50 babies 39 (78%) babies showed normal scan and remaining 11 (22%) babies showed abnormal scan.

Table 1: Showing Various Lesions in Our Study

FINDINGS	TOTAL	
	N	%
NORMAL	39	78%
SEH/IVH	8	16%
PVE	3	6%

SEH/IVH: Subependymal/Intraventricular haemorrhage.
 PVE: Periventricular Echogenicity.

Figure 1: Pie Chart showing various Lesions in the Brain

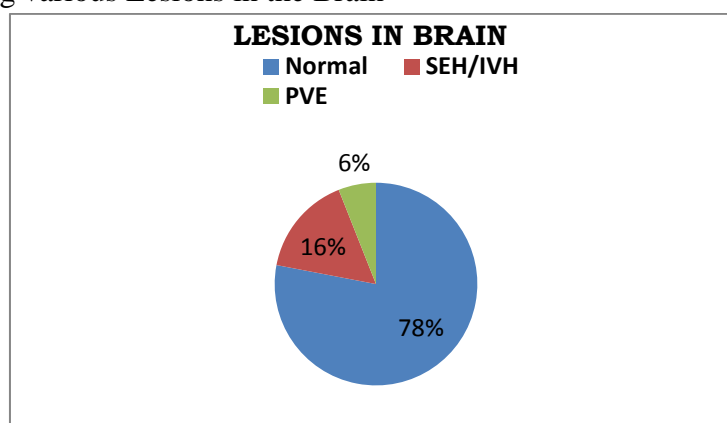


Table 2: Distribution of Grade of Hemorrhage

GRADE	N	%
GRADE-1	4	50%
GRADE-2	2	25%
GRADE-3	1	12.5%
GRADE-4	1	12.5%

Table 3: Distribution of Various Lesions

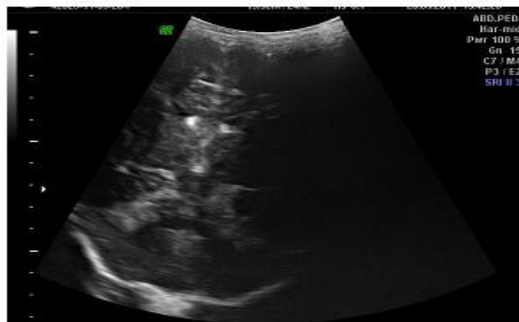
Gestational Age In Weeks	Hemorrhage	PVE	N	Total
28-32	3	1	11	15
33-36	5	2	28	35
Total	8	3	39	50

Table 4: Distribution of Brain Injuries in birth weight < 2 Kg

Birth wt. (kg)	Total No. of babies	No. of babies with brain injuries	Percentage
< 1.5 kg	15	4	26
1.5 kg-2 kg	35	7	20
Total	50	11	

Table 5: Demographic Distribution of Various Lesions

Sex	Hemorrhage	PVE	N	Total
M	5	1	21	27
F	3	2	18	23
	8	3	39	50



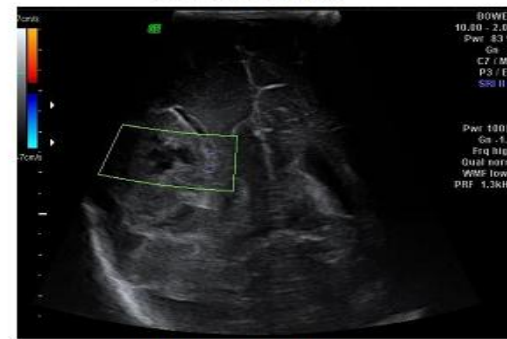
GRADE 1 (SEH) IVH



GRADE 2 IVH



GRADE - 3 IVH



GRADE - 4 IVH



PVE

Discussion

In this prospective study of 50 neonates, 27 were male and 23 were female. Among 50 babies, 39 (78%) showed normal study and remaining 11 (22%) showed abnormal scan. From our study it

was noted that 8 babies had SEH/IVH (16 %) and 3 babies had periventricular echogenicity (PVE-6%). This study is compared to various previous studies as shown below.

Grade	Laurence A Mack et al ⁴ 1981	Tzipora Dolphin et al ⁵ 1982	Carol M Rumack et al ⁶ 1985	Kadri et al ⁷ 2006	Present study
Grade-1	37%	40%	32%	52.4%	50%
Grade-2	25.9%		32%	30.95%	25%
Grade-3	25.9%	19%	12%	11.9%	12.5%
Grade-4	11.1%		18%	4.76%	12.5%

The present study correlates with the study done by Kadri et al⁷ (2006).

Conclusion

Real time cranial ultrasonogram is a sensitive, non-invasive, cost effective tool for early detection of various cerebral lesions in premature babies which aids proper management and helps in preventing neonatal morbidity, mortality and further maldevelopment.

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