ISSN- O: 2458 - 868X, ISSN–P: 2458 – 8687
National Library of Medicine - ID: 101731606

International Journal of Medical Science and Innovative Research (IJMSIR)
IJMSIR : A Medical Publication Hub
Available Online at: www.ijmsir.com
Volume – 6, Issue – 4, August – 2021 , Page No. : 40 - 43

Clinical study of hypoxic ischaemic encephalopathy in neonates with special reference to ultrasonography cranium and clinical outcome

[1]Dr.Kumari Sony, Senior Resident, Dept. of Paediatrics, JLN Medical College & Hospital, Ajmer

[2]Dr Mahendra Nimel, Assistant Professor, Dept. of Paediatrics , JLN Medical College & Hospital, Ajmer

[3]Dr. Kamal Kishore Soni, Senior Resident, Dept. of Paediatrics , JLN Medical College & Hospital, Ajmer

[4]Dr. Kanwar Singh, Associate Professor, Dept. of Paediatrics , JLN Medical College & Hospital, Ajmer

Corresponding Author: Dr. Kamal Kishore Soni, Senior Resident, Dept. of Paediatrics, JLN Medical College & Hospital, Ajmer

Citation this Article: Dr. Kumari Sony, Dr Mahendra Nimel, Dr. Kamal Kishore Soni, Dr. Kanwar Singh, "Clinical study of hypoxic ischaemic encephalopathy in neonates with special reference to ultrasonography cranium and clinical outcome", IJMSIR- August - 2021, Vol – 6, Issue - 4, P. No. 40 – 43.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Background: Birth asphyxia is responsible for a large number of neonatal deaths after preterm births. The anterior fontanelle of the human infant is open, making it an available site for cranium ultrasonography.. In the proposed study, we plan to use cranium USG findings of asphyxiated newborns diagnosed with HIE with respect to the clinical outcome of asphyxiated babies during hospital stay.

Aim: Clinical study of hypoxic ischemic encephalopathy (HIE) occurring in asphyxiated neonates delivered at a tertiary care hospital attached to JLN medical college. To compare the USG cranium findings in asphyxiated babies with respect to the clinical outcome of asphyxiated babies during hospital stay.

Results: Among the 50 neonates in the case group 16(32%) had mild HIE, 14(28%) had moderate HIE and 6(12%)had severe HIE during the coursein NICU while 14(28%) never manifested features of HIE In this study we found Out of 50 neonates enrolled in the case group having suffered asphyxia 42(84%) were discharged, 6(12%) were LAMA, 2(4%) died. In our study Cranial USG were normal in 55.55 % of asphyxiated babies. Increase periventricular echogenicity and intracranial haemorrhage are most frequent findings in asphyxiated babies.

Conclusions: The diagnostic efficiency of usg cranium in asphyxiated neonates correlate with clinical outcome of neonates with HIE. It also proves ultrasonography cranium to be used as a screening tool which helps in localizing the extent of brain damage in different stages of HIE and also helps in prediction of outcome during the hospital stay of newborn.

Keywords: HIF, NICU, USG

Introduction

Perinatal asphyxia is thus a serious problem for child survival globally, more in developing countries. Perinatal asphyxia results in Intracranial haemorrhage ,

Water shed infarcts , Neuronal necrosis , Cerebral edema .Apart from increased mortality, perinatal asphyxia may have serious neurological consequences ranging from Hypoxic ischemic encephalopathy (HIE), cerebral palsy, intellectual disability and epilepsy in later life. Ultrasonography (USG) has emerged as a powerful screening tool for evaluation of a neonate with suspected HIE. The pattern of injury on brain imaging has crucial implications in therapies and predicted neurodevelopmental outcomes. The sonographic examination of neonatal brain was performed through anterior fontanelle in both the coronal and sagittal planes. In the present study, we have done usg cranium in asphyxiated babies and compared the sonographic findings with the clinical outcome of asphyxiated babies during hospital stay.

Material and methods

The present study was carried out in January 2019 to January 2020 in the Department of Pediatrics and Neonatology in Neonatal Intensive Care Unit of Mahila Chikitsalya, J.L.N. Medical College, Ajmer which provides neonatal care at this center. The study was conducted on 50 asphyxiated newborn infants at birth and 50 normal healthy newborn as control.

The general physical examination and systemic examination including cardiovascular system, respiratory system, gastrointestinal system and central nervous system including neonatal reflexes like rooting, sucking, swallowing, Moro's, Graps reflex and muscle tone were done. LEVENE classification was used to label and grade HIE.

Gestational age were detemined by using NEW BALLARD SCORE.

APGAR SCORING system used. The case group also had other relevant biochemical investigations and cranium USG done as per protocol. Using the real time ultra sound machine SONQACE X7 high frequency (7.5Mhz) transducer. Transducer was moved through anterior fontanelle along parasagittal plane and anterior –posterior plane to acquire the image of whole hemisphere. Clinical course was closely monitored and final outcome was recorded.

Observations and results

A study of 50 cases (neonatal asphyxia) and control of 50 cases (normal newborns), was undertaken to have an insight into clinical picture of HIE in asphyxiated newborn with special reference to usg cranium via anterior fontanelle.

Table 1: Distribution of findings of cranial ultrasonography according to HIE

Sn.	Cranial USG FINDINGS	Control n=50		Asphyxiated							
				Mild N=16		Moderate N=14		Severe N=6		Total N=36	
		NO	%	NO	%	NO	%	NO	%	NO	%
1.	Intracranial hemorrhage	0	0	0	0	2	14.28	3	50.00	5	13.88
2.	Diffuse or focal increase in parenchymal echogenicity	0	0	0	0	2	14.28	2	33.33	4	11.11
3.	Increase periventricular echogenicity	0	0	0	0	6	42.85	1	16.66	7	19.44
4.	Normal	50	100	16	100	4	28.57	0	0	20	55.55

In our study cranial USG were normal in 55.55 % of asphyxiated babies. Increase periventricular echogenicity (19.44%) and intracranial hemorrhage (13.88%) were most frequent findings in asphyxiated babies.

Table 2: Comparison of outcome of neonates enrolled in the case group having suffered asphyxia with findings of cranial ultrasonography

Sn.	Outcome / USG Findings	Control n=50		Successfully discharged		LAMA		Death	
		NO.	%	No.	%	No.	%	No.	%
1.	Intracranial hemorrhage	0	0	5	10	0	0	0	0
2.	Diffuse or focal increase in parenchymal echogenicity	0	0	4	8	3	6	0	0
3.	Increase periventricular echogenicity	0	0	0	0	0	0	0	0
4.	Normal	50	100	30	60	1	2	0	0
5.	Intracranial hemorrhage and Diffuse or focal increase in parenchymal echogenicity	0	0	3	6	2	4	2	4

In our study, 60% of asphyxiated neonates had normal cranial USG and were successfully discharged.4% of asphyxiated neonates had intracranial hemorrhage and Diffuse or focal increase in parenchymal echogenicity and died. 10% of asphyxiated neonates had Intracranial hemorrhage and was successfully discharged. All control had normal cranial USG findings and were discharged.

Discussion

The present study entitled "Clinical study of Hypoxic ischemic encephalopathy in neonates with special reference to Ultrasonography cranium and clinical outcome." was conducted at Department of Paediatrics and Neonatology, at Neonatal intensive care unit of Rajkiya Mahila Chikitsalya, J.L.N. Medical College, Ajmer. The case and control group had cranium USG done as per protocol, once the babies were hemodynamically stable. In the present study all the 50 (100%) neonates in the case group had an Apgar score of <7 at 1 minute out of them 45 (90%) had an Apgar score between 0-3 (severe birth asphyxia) and 5 (10%) had Apgar score between 4-6 (moderate birth asphyxia).

At 10 minute of life 50(100%) neonates in the case group 9 had an Apgar score of <7 at 10 min. None had an Apgar score between 0-3 (severe birth asphyxia) and 9 (18%) had Apgar score between 4-6 (moderate birth asphyxia) remaining 41 cases had Apgar score of >7 at 10 min.

In our study the correlation of APGAR score at 1 min with HIE status among the cases and it was not found to be statistically significant. The correlation of APGAR score at 5 min with HIE status among the cases was found to be statistically significant with p value of <0.001.There by Apgar sc or e being helpful

as an important tool for the diagnosis and severity of birth asphyxia and timely helping in choosing appropriate resuscitation intervention.

In the present study ultrasound of brain was done in the first week as soon as the condition of baby became hemodynamically stable. Cranial USG were normal in 55.55 % of asphyxiated babies. Increase periventricular echogenicity (19.44%) and intracranial hemorrhage (13.18%) are most frequent findings in asphyxiated babies. Diffuse or focal increase parenchymal echogenicity was seen in 11.11% of cases. In the control group ultrasound brain was normal in all newborns.

Conclusion

The diagnostic efficiency of usg cranium in asphyxiated neonates correlate with clinical outcome of neonates with HIE. It also proves ultrasonography cranium to be used as a screening tool which helps in localizing the extent of brain damage in different stages of HIE and also helps in prediction of outcome during the hospital stay of newborn.

References

1. Apgar V : A proposal for a new method of evaluation of the newborn infant. Anesthesia and Analgesia 1953; 32 : 260-267.
2. Hayreh SS. Pathogenesis of oedema of the optic disc (pappiloedema). A preliminary report. Br J Ophthalmol 1964;48:522-43.
3. Forrest DM, Tsingoglou S. The false fontanelle as a practical method of long-term testing of intracranial pressure. Dev Med Child Neurol [Suppli 1968;16:17-20.
4. Armstrong D, Norman MG : Periventricular leucomalacia in neonates ; Complications and Sequel. Arch Disease Child 1974; 49 : 367,
5. Brown JK, Purvis RJ, Forfar J.O. et al. : Neurological Aspect of Perinatal Asphyxia Dev. Med Child Neurol 1974; 16 : 567.
6. Sarnat HB, Sarnat MS.Neonatal encephalopathy following fetal distress: A clinical and electroencephalo graphics study.ArchNeurol1976;33:696.
7. Volpe JJ : Perinatal Hypoxic ischemic brain injury pediatric clinics of North America 1976 ; 23 (3) : 383-397.
8. Vidyasagar D, Raju TN. A simple noninvasive technique of measuring intracranial pressure in the newborn. Pediatrics 1977;59:957-61.
9. Salmon JH, Hajjar W, Bada HS. The fontogram: A noninvasive intracranial pressure monitor. Pediatrics 1977;60:721-5.
10. Thomson AJ, Searle M and Russell G. : Quality of severe birth asphyxia, Arch Disease Child 1977; 52 : 620-626.