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Original Research Article

Primary outcome of babies with hypoxic ischemic encephalopathy

Anil Kumar Rawat*, Rupali Praveen Shirke, Vipan Chandar

Department of Paediatrics, Himalayan Institute of Medical Sciences, Jolly Grant Dehradun, India

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***Correspondence:**
Dr. Anil Kumar Rawat,
E-mail: banganianil@yahoo.co.in

ABSTRACT

Background: Intrapartum fetal hypoxia followed by hypoxic ischemic encephalopathy (HIE) is a common cause of potentially avoidable brain injury in term infants. This study was conducted in a tertiary care centre and included 119 babies of hypoxic ischemic encephalopathy born in hospital as well as referred from neighbouring areas.
Methods: Babies with history of intrapartum hypoxia, delayed cry who required resuscitation at birth and in stage II or III of modified sarnat encephalopathy grade (MSEG) and those who had abnormal intrapartum course were included. After performing clinical neurological assessment further data collection included perinatal maternal characteristics- ante partum and intrapartum complications; morbidity pattern in baby including type of resuscitation, onset of seizure, antiepileptic drug, other co morbidity and short term outcome.
Results: Out of 119 babies 19% were born low birth and 6% were IUGR. 47% mother were primi gravida whereas 53% were multigravida, 32% pregnancy were unbooked. Ante partum risk factor was found in 3 cases and Intrapartum risk factor was found in 45 (38%) cases. According to MSEG stage II and III babies were enrolled overall 92% babies had seizure and 60% had on day one only. Single antiepileptic drug controlled seizure in 60% of babies who had seizure additional two and more antiepileptic drug were required in fewer no of cases. During stay most common complication was sepsis, observed in 26% cases followed by DIC in 11% cases and AKI in 7% cases. Majority 59% of babies were discharged, mortality was observed in 12.6% cases and 27% left against medical advice.
Conclusions: Maternal perinatal risk factors and effective neonatal intervention may improve outcome in babies with hypoxic ischemic encephalopathy.

Keywords: Asphyxia, Hypoxic ischemic encephalopathy, Modified sarnat encephalopathy grade, Perinatal risk factors

INTRODUCTION

Intrapartum fetal hypoxia followed by hypoxic ischemic encephalopathy (HIE) is a common cause of potentially avoidable brain injury in term infants.[1,2] Moderate-severe HIE typically presents with worsening clinical signs after the first 1.5-18 hours and then a slow improvement after 4-5 days.[3] Shalak et al, defined a modification of Sarnat's encephalopathy grading (the modified Sarnat encephalopathy grade)[3,4] Importantly, Shalak found that a combination of both mild and moderate encephalopathy clinical signs identified infants with an abnormal outcome at discharge with a sensitivity of 100%.

METHODS

This study was conducted from January 2012- December 2015 in a tertiary care centre of North India. Total no of 119 babies born above 36 weeks of gestation were enrolled retrospectively, out of which 31 were born in our Hospital (in born), whereas 88 babies were referred to us from different areas of Uttarakhand and neighbouring areas of Uttar Pradesh and Himanchal Pradesh.

Inclusion criteria

- Babies with history of Intrapartum hypoxia, delayed cry who required resuscitation at birth and in stage II or III of modified Sarnat encephalopathy grade (MSEG).
- An abnormal Intrapartum course (e.g. abnormal fetal heart rate, cord prolapse, uterine rupture, maternal haemorrhage, maternal trauma, maternal seizures, meconium stained amniotic fluid, prolonged 2nd stage).

Exclusion criteria

Severely dysmorphic infants or infants with at least one major congenital anomaly, chromosomal syndromes, moribund infants where demise was imminent or infants with grade I MSEG.

Neurological assessment

A clinical assessment was performed after initial stabilization and encephalopathy graded according to modified Sarnat encephalopathy grade; only grade II and III neonates were enrolled.

Date collection and analysis

After performing clinical neurological assessment further data collection included perinatal characteristics, morbidity and short term outcome. The data included; parity, antenatal care, pregnancy complication including hypertension, haemorrhage, mode of delivery. Intrapartum complication including fetal heart rate abnormality, cord- prolapsed, obstructed labour, uterine rupture, maternal seizure maternal haemorrhage, meconium stained liquor. Infant characteristics at birth; resuscitation, seizure and antiepileptic drugs, nosocomial sepsis and other co morbidity and complication, mechanical ventilation, use of blood products and final short term outcome.

RESULTS

Out of 119 babies 88 were out born and 31 were in born. 23 (19%) babies were of low birth weight, 7 (6%) were IUGR and only 3 were born post term. All in born babies except 2 required resuscitation at birth, whereas the history of resuscitation was available for 12 out born babies.

56 (47%) mother were primi gravida whereas 63 (53%) were multi gravida, 37 (32%) pregnancy were unbooked. Ante partum risk factor was found in 3 cases and Intrapartum risk factor was found in 45 cases. Though majority (64.5%) of in born babies were born by LSCS yet majority (81%) of out born were delivered normally.

According to MSEG 70% of babies belong to stage II whereas 30% belong to stage III. Over all 92% of babies had seizure and 60% had seizure on day 1 of presentation. Seizure were controlled with phenobarbitone in 86% babies, additional phenytoin was required in 8% babies and third antiepileptic drug was required in 6% of babies.

Looking morbidity profile-sepsis was observed in 31(26%) cases, disseminated intravascular coagulation (DIC) in 14(11%) cases, acute kidney injury (AKI) in 8 (7%) cases. Blood component (PRBC, Platelet) were transfused in 12 (10%) cases and fresh frozen plasma in 11(9%) cases. 52 (43.6%) babies required ventilation majority in form of mechanical ventilation.

Out of 119 babies, 70 (59%) were discharged, 32 (27%) babies left against medical advice (LAMA), 15 (12.6%) babies expired and 2 (1.6%) babies were referred due to major congenital heart disease.

Table 1: Risk factor and outcome of babies with hypoxic ischemic encephalopathy.

	No (119)	%
Primi gravida	56	47
Multi gravida	63	53
Unbooked	37	32
Antepartum risk factor	3	2.5
Intrapartum risk factor	45	37.8
Low birth weight	23	19
Small for gestation	7	6
NVD	93	70
LSCS	36	30
HIE stage II	83	70
HIE stage III	36	30
Seizures at D1	72	60
Seizures at D2	26	21.8
Seizures after D2	11	9.2
Associated sepsis	32	26
DIC	13	11
AKI	21	17
Ventilator support	52	43.6
Discharge	70	58.8
LAMA	32	27
Expiry	15	12.6
Referred	2	1.6

DISCUSSION

Term babies born with primary diagnosis of hypoxic ischemic encephalopathy were evaluated, 6% babies were found to be IUGR, and 19% were of low birth weight. Findings were in contrast to Badawi et al who found IUGR the strongest risk factor for neonatal encephalopathy.[5]

Type of resuscitation performed for outborn babies was documented for 12 (13.6%) babies only 32% pregnancy were unbooked and 53% were multigravida; a study from

Ellis et al also observed that multigravida are more likely to have neonatal encephalopathy.[6]

Ante partum risk factor-hypertension hemorrhage were observed in 2.5% of pregnancy; similar were documented by Badawi et al and not by Ellis et al.[5,6]

Intrapartum risk factor like cord prolapse, obstructed labour, uterine rupture, maternal seizure, haemorrhage, meconium stained liquor were documented in 45 (37.8%) cases in contrast to Badawi et al and Ellis et al in 7-8% cases.[5,6] More cases in our study may be due to maximum number of meconium stained liquor which has not been taken into account in both the studies. Horn AR et al observed Intrapartum risk factor in 90% cases and they also included meconium stained liquor as risk factor.[7]

Encephalopathy grading according to MSEG show 70% stage II whereas 30% of stage III babies and 60% had seizure on day one of presentation, in a study by Mizrahi et al more than one half of infants had seizure.[8] Single antiepileptic drug was sufficient in 86% babies, additional 2 and 3 antiepileptic drug were required in 8% and 6% babies respectively. This was in contrast to Painter et al who found seizure control with one drug in only 45% and with 2 drugs in 60% cases.[9]

High numbers of sepsis cases (26%) were predominantly observed in outborn babies and most of these babies stayed beyond 2 weeks; other co morbidity like DIC and AKI were observed in 11% and 7% cases respectively. Nouri S et al found AKI in 17% of cases.[10]

Moratality rate of 15% was similar to earlier study who found 15-20% death in neonates with hypoxic ischemic encephalopathy.[11]

CONCLUSION

Early identification of adverse maternal risk factors and early intervention in babies with birth asphyxia and hypoxic ischemic encephalopathy may alter morbidity and improve short term outcome in these babies.

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