

Study of Clinical Profile in Neonatal Seizures in Rural Area

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Research Article

Abstract: Aim: To know etiologies and clinical profile of neonatal seizures; course of these babies in neonatal intensive care unit. **Methodology:** Descriptive study was carried out. All Neonates admitted in Neonatal Intensive Care Unit with seizure were included. For all babies with neonatal seizures, obstetric history and detailed history were recorded. Appropriate investigations were done to find out most probable etiology of seizures in each case. Every baby was followed till discharge or death and condition is noted at the time of discharge. **Result:** Seizure rate for preterm and term babies were 25 and 10.3 per 1000 live births respectively. Subtle seizures were the most common seizure type found in 35 (43.75%) term neonates. In preterm babies' subtle seizure was common type of seizure 12 (63.15%). Seizure percentage decreases as day of onset increased. Hypoxic Ischemic Encephalopathy was prominent cause of seizures found in 37 (46.25%) babies.

Keyword: Neonatal seizure, Subtle type, Hypoxic Ischemic Encephalopathy.

Introduction

Seizures during the neonatal period are relatively common, occurring in approximately 1.1 to 8.5 per 1000 live births, with greater frequency in premature or low birth weight babies as compared to term babies.¹ Neonatal seizures can be defined as paroxysmal alteration in motor activity, behavior or autonomic function that results from abnormal electrical activity of brain in neonatal period. Seizures are most frequent sign of neurological dysfunction in the neonatal period.² Seizures may be the only sign of central nervous system dysfunction in neonates. Hence their recognition is important. Neonatal seizures frequently are nonspecific sign of an underlying disease.³ Seizures are more frequent in neonatal period than any other period of life due to immature brain; early development of excitatory synapses predominantly over inhibitory influences at early stages of maturation of central nervous system ; several metabolic, toxic, structural and infectious disease and neurotransmitters with inhibitory activity on central nervous system have excitatory activity on immature central nervous system.³ Neonatal seizures increase the susceptibility of the developing brain to subsequent seizure-induced injury.⁴ If untreated seizures may continue for a considerable period of time poor outcome in the form of mortality and

morbidity have been seen. Poor prognosis for infants with seizures is reflected in high rates of subsequent long-term disability and mortality. The severity and timing of the pathologic process continue to be the major determinants for outcome.⁵ So the study carried out to know etiologies and clinical profile of neonatal seizures; course of these babies in neonatal intensive care unit.

Material and Method

This study was done in SRTR Government Medical College and Rural Hospital Ambajogai in Marathwada region of Maharashtra state. Hospital being situated in the rural area, the main drainage of patients is from rural area; where the majority of population are illiterate. They are not keen about the symptoms of new born and conditions are adverse for birth of new born. Due to less accessibility to hospital, patients come to advice very late, by the time disease is advanced. Most of the time patients are being partially treated by private practitioner in rural areas due to non affordability, in such conditions, diagnosis is made more difficult and our mainstay of diagnosis remains on the available data from the patient and limited investigations in our institution. Descriptive study was carried out in department of Pediatrics during Aug 2010 to September 2012. All Neonates admitted in Neonatal Intensive Care Unit with seizure were included in this study. Neonates weighting less than 800 gms, i.e. incredibly low birth weight babies are excluded from study. Study was explained to the parents and consent was taken. Study protocol was approved by institutional ethical committee. For all babies with neonatal seizures, obstetric history of mother was recorded including parity, registration in hospital for ANC, period of Amenorrhea, investigation, complications and medication received during pregnancy. Birth history was recorded, with details regarding preterm or full term delivery, mode of delivery, Vaginal or LSCS, Liquor, resuscitation and Apgar score. All babies were classified into preterm or term and small for gestational age or appropriate for gestational age, by using reference charts. All babies with seizure are examined at admission with

detailed examination of Central Nervous System. The detailed history of convulsions with respect to day of onset, type of seizure and controlled and uncontrolled was taken. Appropriate investigations were done to find out most probable etiology of seizures in each case. All neonates were managed as per standard protocol of NICU with all aseptic care. Details of treatment given including anticonvulsants used and course in NICU is recorded. Every baby was followed till discharge or death and condition is noted at the time of discharge. The data was collected on proforma and analyzed using descriptive statistics.

Results

There were 4364 live births in the hospital during study period, out of which 52 babies developed seizures, thus seizure rate for the hospital was 11.91 per 1000 live births. Among 480 preterm deliveries 12 babies developed seizures and 40 babies of term gestation (3884) developed seizures. Seizure rate for preterm and term babies were 25 and 10.3 per 1000 live births respectively. In our study 80 babies having neonatal seizures were included out of them 52 (65%) babies were from intramural deliveries and remaining 28 (35%) babies were from extramural deliveries.

Table 1: Baseline characteristics of study participant

Characteristics	Cases (n)	Percentage (%)
Sex		
Male	50	62.5
Female	30	37.5
Birth Weight		
<2500 gms	40	50
≥2500 gms	40	50
Gestational Age Group		
Preterm	19	23.75
Full term	61	76.25
Parity		
Primigravida	48	60
Multigravida	32	40

It was observed that seizure was more common in males 50 (62.5%) than female i.e. 30 (37.5%). Seizures observed in both group having birth weight more than and less than were same. Seizure was observed in 61(76.25%) full term babies. In our study 48 (60%), babies were born to primigravida were admitted and had seizures. Among all neonates studied fetal distress 24 (30%), premature rupture of membranes 10(12.5%), and prolonged 2nd stage 12(15%) were the most frequent complication observed in ante partum and intrapartum period. Meconium Liquor, Gestational Diabetes, Oligohydramnios complication were seen in the 5(6.25%); 3(3.75%) and 1 (1.25%) respectively.

Table 2: Type of Clinical Seizures

Seizure Type	Preterm	Term	Total
Subtle	12(63.15%)	23(37.77%)	35(43.75%)

Multi-Focal Clonic	4(21.05%)	28(45.90%)	32(40.0%)
Focal Clonic	1(5.26%)	3(4.91%)	4(5.0%)
Tonic	2(10.54%)	7(11.47%)	9(11.25%)
Myoclonic	0	0	0
Total	19 (100%)	61 (100%)	80 (100%)

Subtle seizures were the most common seizure type found in 35 (43.75%) neonates followed by multifocal clonic seizure type found in 32 (40.0%) neonates. In preterm babies' subtle seizure were common type of seizure 12 (63.15%), and in term babies Multi-Focal Clonic were common type of seizure 28 (45.90%). None of the baby had myoclonic seizure. In our study we observed that 73 (91.25%) babies seizures was started within 7 days. Onset of seizure was on 1st day of life was observed in 28(35%). Seizure percentage decreases as day of onset increased.

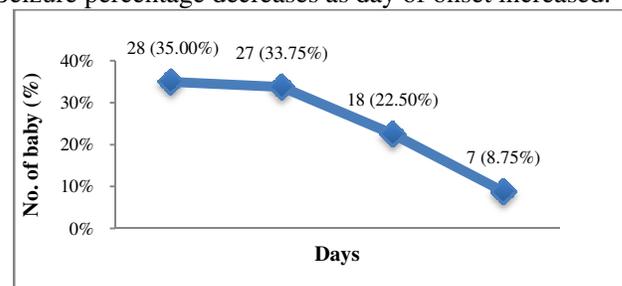


Figure 1: Day of Onset of seizure

In our study out of 80 baby of neonatal seizures 7 (8.75%) were dead. Only one episode of seizure was observed only in 35 (43.75%) while status convulsion was found in 7(8.75%). Mortality among babies with single seizure episode was 3 (8.57%) while in babies having status convulsion were 5 (71.42%). Hypoxic Ischemic Encephalopathy was prominent cause of seizures found in 37 (46.25%) babies, Acute metabolic disturbances like Hypoglycemia, Hypocalcaemia, infections and intracranial hemorrhage were important cause of seizures in babies found in 13 (16.25%), 4 (5%) 9 (11.25%) and 15 (18.75%) respectively. USG skull was done in all preterm babies, cerebral oedema, Intracranial Hemorrhage (ICH), Ischemic Areas of Thalamus and Basal Ganglia (IATBG) and Ventriculitis were seen in 6 (31.57%); 6 (31.57%) , 1 (5.26%) and 1 (5.26%) respectively. Normal USG skull finding was observed in 5 (26.31%) babies. Out of 61 term babies 16 (26.22%) babies showed normal USG. Cerebral Edema, Intracranial Hemorrhage were most common finding seen in 24 (39.4%) and 5 (8.19%). Other less common findings were Multi Focal Ischemic Parenchymal Lesion (MFIPL) in 4(6.55%), Diffusely Increased Echogenicity of Brain Parenchyma (DPED)in 4(6.55%), Increased Focal parenchymal Echodensity (FPED)in 3 (4.91%) ; Cerebritis in 3 (4.91%). Ischemic Areas of Thalamus and Basal Ganglia (IATBG), Ventriculitis in each 1 (1.63%) of babies. Out of 19 preterm babies CT Brain of 9 babies

was done in which all preterm babies show abnormal findings. IVH in 3 (33.3%) followed cerebral edema 2 (22.2%) were most common finding. Out of 61 term babies, CT Brain of 34 term babies was done in which 31 babies shows abnormal finding. Mild hypo densities to severe hypo density were most common finding seen in 19 (91.17%) babies. Other findings observed were S/o Meningitis; S/o Cerebrities, ICH and SAH seen in 8 (23.5%), 1 (2.94%), 2 (5.88%) and 1 (2.94%) respectively.

Discussion

Seizure rate for preterm and term babies were 25 and 10.3 per 1000 live births respectively. In our study total 80 neonates were studied out of them 19 (23.75%) were preterm and remaining 61 (76.25%) were term babies. The prevalence is approximately 1.5% and overall incidence approximately 3 per 1000 live births. The incidence in pre-term infants is very high (57–132 per 1000 live births).⁶ Most (80%) neonatal seizures occur in the first 1–2 days to the first week of life. The newborn brain is particularly vulnerable to seizures which are associated with poor neurodevelopment outcome. The problem of electro-clinical dissociation, where there is no temporal correspondence between electrical paroxysms and repetitive stereotyped motor phenomena, is common in the newborn. There is at present very little information on which clinicians can base a rational decision about treatment which is often ineffective and does not alter neurodevelopment outcome.⁶ Ronen GM *et al* reported that incidence of neonatal seizures was 2.6 per 1000 live births, 2.0 per 1000 live births for term neonates and 11.1 per 1000 live births for preterm neonates.⁷ In our study male neonates were more in number during study period. Omene JA *et al*, reported that preponderance of male infants in the seizure population, among whom; preterm infants were significantly more common.⁸ Lanska MJ *et al*, in his study of neonatal seizures reported that seizures occurred in 3.5 per 1000 live births. The seizure risk varied inversely with birth weight: 57.5 per 1000 live births among very low birth weight infants (less than 1500 gms); compared with 4.4 per 1000 live births for infants with moderately low birth weight (1500 gms to 2499 gms), 2.8 per 1000 live births for those with normal birth weight (2500 gms to 3999 gms) and 2.0 per 1000 live births for those with high birth weight (4,000 gms or more).⁹ In our study seizure rate was same in both group of birth weight. In our study maximum number of babies i.e. 48 (60%), were born to primigravida were admitted and had seizures. Saliba RM *et al*, in their population based study found that primiparity was marginally significant for term infants.¹⁰ Saliba RM *et al*, in their population based study evaluated risk factors for neonatal seizures. For preterm infants, a birth weight of less than

1500 gms was the strongest risk factor, followed by birth in a private or university hospital and male gender. For term infant's significant risk factors included birth by caesarian section, birth in private or university hospital and maternal age of 18-24 compared with 25-29 years. Birth by assisted vaginal delivery and primiparity were marginally significant for term infants.¹⁰ Arpino C *et al*, found neonatal seizures to be associated with maternal disease 2 year before pregnancy, mother's weight gain more than 14 kg during pregnancy, placental pathology, preeclampsia, low birth weight, low gestational age and jaundice in the first 3 days of life. They concluded that the causal pathways for neonatal seizures often begin before birth and some of the factors identified may be preventable.¹¹ Minchom P *et al*, found that nulliparity, hydramnios, post-term pregnancy, oxytocin augmentation of labour, abnormalities of fetal heart rate and/or meconium stained amniotic fluid, prolonged second stage of labour, emergency caesarian section, assisted vaginal delivery, low Apgar score, resuscitation at delivery and subsequent ventilator support were all statistically, significantly more common among cases of neonatal seizures.¹² In our study Fetal distress, premature rupture of membranes, and prolonged 2nd stage were the most frequent complication observed. Meconium Liquor was common in preterm babies. Domenech, Martinez E *et al*, concluded that 42% babies presented with subtle seizures, 33.9% with tonic, 64.3% with multifocal clonic, 10.7% with focal clonic and 16.1 % with multifocal myoclonic seizures. 55.4% of infants had 2 or more types of clinical convulsions.¹³ Calciolari G *et al*, found that subtle seizures (65% of total), and multifocal clonic seizures (54% of total) were the most common seizure types. Subtle seizures usually occurred in combination with other seizure types. Only one seizure type was related to gestational age i.e. focal clonic seizures in the term infant.¹⁴ Subtle seizures were the most common seizure type found in 37 i.e. 46.25% neonates followed by multifocal Clonic seizure type found in 34 neonates i.e. 42.50%. In preterm babies, subtle seizure were common type of seizure (63.15%), and in term babies Multi-Focal Clonic were common type of seizure (49.18%) were findings from our study. Kumar A *et al*, reported that a total of 232 seizure episodes occurred in 90 babies with an average of 2.58 seizure episodes per baby in first 28 days of life.¹⁵ In our study only one episode of seizure was observed only in 35 (43.75%) while status convulsion was found in 7(8.75%). Hypoxic Ischemic Encephalopathy was prominent cause of seizures found in 46.25% babies, Intracranial Hemorrhages and acute metabolic disturbances were major cause of seizures in preterm babies found in 26.31% followed by infections and hypoglycemia in 21.05% each and hypoxic ischemic

encephalopathy in 15.78% were findings from our study. It was found that hypoxic ischemic encephalopathy contributed to 46% seizures in term and 9% in preterm infants, CNS infection in 0% term and 9% preterm infants, intracranial hemorrhage in 13% term and 47% preterm infants, acute metabolic in 10% term and 2% preterm infants, inborn errors of metabolism in 4% of term and 0.1 preterm infants, CNS malformation in 4% term and 2% preterm infants, drug withdrawal in 0% term and 2% preterm infants and cerebral infarction in 15% term and 0% preterm. Etiology was undetermined in 8% term and 30% preterm babies¹⁶. Eriksson M. *et al.*, reported that 48% of infant, hypoxia was considered to be the probable main etiology, while infection and metabolic diseases including hypoglycemia and hypocalcemia were next commonest causes, 12% for each condition¹⁷. Lien JM *et al.*, studied term early onset neonatal seizures. These seizures were attributed to hypoxic events in 37.5%, cerebral malformations in 17.5%, cerebral infarcts in 17.5%, intracranial hemorrhages in 12.5% infections in 7.5% and unknown etiology in 7.5%¹⁸. Current study shows cerebral edema on USG skull in maximum Preterm and term neonates. NK Anand *et al.*, Reported that hypoxic ischemic encephalopathy on USG skull examination revealed cerebral edema and or ischemia in 86% neonates.¹⁹ In current study out of 19 preterm babies CT Brain of 9 babies was done in which cerebral edema in 2, s/o meningitis. Out of 61 term babies, CT Brain of 34 term babies was done in which intracranial hemorrhage in 2, s/o meningitis in 8, mild hypodensity in 12, moderate hypodensity in 5, and severe hypodensity in 2 and normal finding in 3 babies.

Conclusion

Neonatal Seizures is higher in preterm babies than term babies. Seizure was more common male babies and babies born to primigravida mother. Maximum babies with seizures were associated with complicated pregnancy and delivery. Subtle seizures were commonest seizure type seen in preterm babies and Multi-focal Clonic type of seizures in term babies. Maximum number of babies had onset of seizure within first 3 days. Hypoxic Ischemic Encephalopathy was prominent etiology of seizure in term babies and Intracranial Hemorrhage, infections and metabolic disturbances were commonest causes of seizures in preterm babies.

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