

Study of the clinical profile of neonatal seizures

Sameer Kumar Jain

Associate Professor, Department of Paediatrics, Lakhiram Agrawal Memorial Medical College Raigarh, Chhattisgarh, INDIA.

Email: jainsameer66@rediffmail.com

Abstract

To study the incidence, etiological factors, day of onset, clinical types and various biochemical abnormalities in neonatal seizures. A total of 102 neonates with neonatal seizures of either sex who were admitted at our hospital and developed seizures before 28 days of life were enrolled in the study. Their detailed history, physical examination and appropriate investigations were recorded on a predesigned proforma. Out of 102 neonates the incidence of neonatal seizures in the admitted cases was 8.5%. The seizures were more common in male babies 53% as compared to female babies 47%. 62.74% neonates were born to primigravida mothers while 37.36% neonates were born to multiparous women. Hospital delivered babies has less incidences of neonatal seizures 6.86% when compared to outside deliveries 17.77%. In these babies, 44.96% neonates had multifocal clonic seizures, 22.94% had subtle seizure, 21.10% had tonic seizure, 19.17% had clonic seizures and 1.83% had myoclonic seizures. Perinatal asphyxia is the leading cause of neonatal seizures in the present study 60.78%. The other causes of seizures in the order of frequency are infections, hypoglycemia, hypocalcaemia, intracranial haemorrhages, kernicterus and idiopathic in 4 cases. 45.09% of neonates have developed seizures on first day. Out of 102 babies, 16.66% neonates expired. The most common causes of neonatal deaths were severe perinatal asphyxia seen in 55% neonates followed by intracranial haemorrhage 30%, infections in 10% and kernicterus in 5 % neonates. The commonest causes of seizure in term babies was perinatal asphyxia with majority presenting to us within the first 72 hrs. Multifocal seizures were the commonest type of seizure observed in our study. Hypocalcaemia and hypoglycemia are the most common biochemical abnormality seen in neonates with seizures.

Keywords: Neonatal seizures, perinatal asphyxia, multifocal seizures.

Address for Correspondence:

Dr. Sameer Kumar Jain, Associate Professor, Department of Paediatrics, Lakhiram Agrawal Memorial Medical College Raigarh, Chhattisgarh, INDIA.

Email: jainsameer66@rediffmail.com

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INTRODUCTION

A seizure is the most frequent sign of neurological dysfunction in the neonate.¹ Seizures are not only more frequent in the neonatal period they are also very difficult to diagnose because of subtle nature. Seizures in a newborn are one of the few neonatal neurological emergencies where prompt diagnostic and therapeutic plans are necessary; a delay in therapy often results in poor neurological outcome.² 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.³ In the newborn, seizures are always due to an underlying cerebral or biochemical abnormality.⁴ Neonatal seizure have an adverse effect on neurodevelopment and may predispose to cognitive, behavioral or epileptic complications later in life.⁵ Immature brain of neonates is more epileptogenic than mature brain and seizure induced injury to developing brain may lead to serious consequences.⁶ Therefore, the aim of the study was to determine the incidence rate, etiological factors, clinical types and various biochemical abnormalities in neonatal seizures.

MATERIAL AND METHODS

The present prospective, observational study was conducted in the Neonatal Intensive Care unit, LAMMC hospital for 1 year. All the neonates developing clinically identifiable seizures before 28 days of life were enrolled in the study. A detailed antenatal history which included gestational age, maternal education, socio-economic status, history of maternal illness during pregnancy, natal

history, labour records for evidence of fetal distress and Apgar score, type of delivery and medication given to the baby were recorded on a predesigned proforma. Baseline characteristics of convulsive neonate; including sex, gestational age, weight; head circumference and length, were recorded at admission.

Clinical details of each seizure episode like age of onset of seizures, duration and type of seizures were noted. The neonatal seizures were classified into subtle, multifocal, clonic, focal clonic, tonic and myoclonic.⁷ Complete blood count, septic screening, blood glucose, total and ionized serum calcium and magnesium levels were done, immediately after baby had seizures and before institution of any specific treatment. Various criteria for diagnosing metabolic abnormalities were defined as Hypoglycemia: blood sugar <40 mg/dl, Hypocalcaemia: Total serum calcium <7.0 mg/dl, Hypomagnesaemia: serum magnesium <1.5mg/dl. CSF study was carried out in selected cases whenever indicated to find out etiology. An ultrasonogram was done in all babies with neonatal seizures. The data was recorded on proforma and analyzed using descriptive statistics.

RESULT

Out of the total 1200 cases admitted to NICU during the study period, 102 neonates developed seizures consisting of 8.5%. 70 neonates from 1020 inborn admission developed seizures comprising 6.86% whereas 32 out of 180 babies delivered outside and admitted developed seizures comprising 17.77 %. According to the weight of the seizures, 42 neonates were below 2500 gm comprising 41.17 %, and 60 (58.82 %) were above 2500gm. There were 54 (53%) males and 48 (47%) females and the male to female ratio was 1.12:1 The seizures were more common in male babies. 64 (64.74%) neonates were born to primigravida mothers while 38 (37.36%) neonates were born to multiparous women.

Table-2, shows birth asphyxia as the common cause of neonatal seizures in 62 (60.70%) followed by transient metabolic factors (hypoglycemia and hypocalcaemia) in 16 (14.4%) and infections in 15 (14.70%) cases. Regarding the transient metabolic causes hypoglycemia was the commonest cause 9 (8.82 %) and hypocalcaemia was the next common cause accounting for 6 (5.58%) cases. Other important etiological factors include intracranial haemorrhage, kernicterus.

In the present study 46 (45.09%) neonates have developed seizures on first day 25.45 % have developed between 24-72 hrs, 20.60% between 72 hr< 7days, 5.88 % between 7 days<14 days, Two babies developed seizures after 14 days.

Table 1: Demographic characteristics of neonates with seizure disorders

Weight of the baby	No. of cases	%
<2500gm	42	41.17
>2500gm	60	58.82
Gender		
Male	54	53
Female	48	47
Parity		
Primiparous	66	62.74
Multiparous	38	37.36

Table 2: Etiological evaluation of neonatal seizures

Etiology	No. of cases	Percentage
Perinatal asphyxia	62	60.78
Hypoglycemia	9	8.82
Hypocalcaemia	6	5.58
Infections	15	14.70
Intracranial haemorrhage	5	4.90
Hyperbilirubinemia	1	0.98
Others	4	3.92

Table 3: Age distribution of Neonatal seizures

Age	M	F	Total	%
<24hr	24	22	46	45.09
24-72hr	14	12	26	25.49
72hr<7day	11	10	21	20.60
7day<14day	3	3	6	5.88
>14day	2	1	3	2.94
Total	54	48	102	

Table 4: Outcome of the neonates with neonatal seizures

Outcome	No. of cases	%
Completely recovered	52	50.98
Discharged with sequelae	33	32.35
No. of deaths	17	16.66

DISCUSSION

Neonatal seizure is an important cause of morbidity and mortality. The incidence of neonatal seizures in hospital deliveries is 6.86 % and the incidence of outside deliveries is 17.77 %. This difference is because of the better availability of facilities in hospital deliveries. The neonatal seizures is more common in neonate born to a primi than multiparous women due to prolonged labour, feeding difficulties leading to delayed feeding. In our study seizures are common in babies more than 2500 gm. The incidence appears to be less in premature babies because majority of seizures in preterms are subtle. EEG is required for proper recording of neonatal seizures particularly in preterms. Since all the neonatal seizures are recorded only by clinical observation the disparity is seen in this series. when compared with other types of seizures, multifocal clonic seizures is common in the present study. Similarly Ajay

Kumar *et al.*⁸ and Tekgul *et al.*⁹ also found the clonic seizure to be the common type of neonatal seizure. Even though subtle seizures are the most common seizures in preterm babies and they can be easily over looked, They require EEG and video monitoring to record the exact incidence. Ross AL *et al.*¹⁰ studied 118 babies, out of which 48 (40.60%) had subtle seizures.

Perinatal asphyxia was the common cause of seizures observed in our study 60.78 % followed by infections, hypoglycemia and hypocalcaemia. Sood A *et al.*¹¹ and Kumar A *et al.*¹² reported that birth asphyxia as etiology of seizure was seen in 45.71% and 48.27 % cases respectively which are comparable with the results of our study. Other causes of neonatal seizures were intracranial haemorrhage. Bushra A *et al.*¹³ reported that intracranial bleed was reported in 9.5% of the cases which is comparable with our study. Two term babies and 4 preterm neonates (30%) had intraventricular hemorrhage. The incidence of IVH was higher in preterm babies than term babies. Periventricular hemorrhage of IVH is the most common cause of intracranial bleed and neurological damage in low birth weight and preterm babies.

In the present study, hypoglycemia in (8.82%) hypocalcaemia was observed in (5.58%) neonates. Kumar A *et al.*¹² studied 35 neonates of which 22 (62.8%) had biochemical abnormalities. Sood A *et al.*¹¹ studied 59 neonates of which 29 (49.15%) had biochemical abnormalities. The study conducted by Kumar A *et al.* and Sood A *et al.* showed that biochemical abnormalities were seen in cases of HIE, intracranial bleeding, infection and metabolic disorder. The above results were comparable with finding of the present study.

In the present study 45.09% of cases of neonatal seizures were recorded on the first day. The increased incidences of seizures on the first day are due to birth asphyxia and metabolic disorders. Ross AL *et al.*¹⁰ also found early onset seizures in 75 (50.33%) babies. Holden KR *et al.*¹⁴ reported that 36 (13 %) babies had convulsions after 8 days, which were due to sepsis and meningitis. In our study, 4 babies had convulsions after 8 days of life, all of them had septicemia. The outcome of the neonates with seizures in the present study are, 50.98% cases of neonatal seizures have recovered completely, 32.35 have neurological sequelae, 16.66 % of cases of neonatal seizures have died.

In conclusion, the commonest cause of seizure in term babies was perinatal asphyxia with majority presenting within the first 72hrs. Multifocal clonic seizures were the commonest type of seizures observed. Hypoglycemia and hypocalcaemia are the most common biochemical abnormality seen in neonates with seizures. A significant high mortality rate was associated with intraventricular hemorrhage.

REFERENCE

1. Laroia N. Current Controversies in diagnosis and management of neonatal seizures Ind.Pediatr 2000;36:367-71
2. Scher MS. Controversies regarding the neonatal Seizures recognition epileptic disorders. June 2002; 4 (2): 139158
3. Mosley M. Neonatal seizure. Pediatric in review 2010;31:127-8
4. Neurological disorder. In : Singh M. Textbook of care of new born 5th ed, New Delhi : Sagar Publication, 2010: 340-344
5. Levene M. Clinical conundrum of neonatal Seizures. Arch dis child fetal neonatal 2002; 86 (2): 75-77.
6. MorronJ, RusselA, Guthsle E,risk of antiepileptic drugs in pregnancy, a prospective study form the UK,J Neurol Neurosurg Psychiatry 2006;77:193-98
7. Mizrahi EM, Kellway P. Characterization and classification of Neonatal Seizures. Neurology. 1987;37:1837-1844
8. Kumar A , Gupta A, Talukdar B. Clinico etiological and EEG profile of neonatal seizures. Indian journal of pediatr. Jan 2007;74 (1):33-7
9. Tekgul *et al.*. The current etiologic profile and neurodevelopment outcome of seizures in term neonates Pediatrics volume 117, Number 4, April 2006,P.1270.
10. Ross AI, Lomorso C. Neonatal Seizures state : A study of clinical, Pathology and electrographic features in 137 full term babies with a long term follow up. Pediatrics 1970;45:404-425.
11. Sood A, Grower N and Sharma R.Biochemical abonormalities in neonatal Seizure. Indian J Pediatric ; 70 (3): 221-224
12. Kumar A, Gupta V, Kacchawaha and singla. A study of biochemical abnormalities in neonatal Seizure. Indian Pediatrics. 1995;52: 424-427.
13. Bushra AM, Butt MA, Shamoan M, Tehseen Z, Fathima A, Hashmat N. Seizures etiology in the newborn period J Coll Physicians Surg Pak 2005;15(12):786-90.
14. Holden KR. Mellitus D and Freeman JM. Neonatal Seizures :Correlation of perinatal events with outcome. Pediatrics. 1982;70:165-176.

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