

Clinico- Biochemical Profile of Neonatal Seizure.

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Abstract

Objectives: The present study was undertaken to study the incidence, etiological factor, and days of onset, clinical types and biochemical abnormalities in babies having neonatal seizures. **Materials and Methods:** This is a retrospective, observational hospital based study. Ninety neonates, who developed seizures before 28 days of life and admitted to neonatal intensive care unit and nursery with neonatal seizure, were evaluated for incidence, etiological factor, clinical types and biochemical abnormalities found in neonatal seizure. The variables were analysed using Chi- Square and student t- test. **Results:** The incidence of neonatal seizure was 10.3/ 1000 live births. The seizures were common in male babies. 65 (72.2%) neonates were born to multiparous women while 35 (38%) were born to primigravidas. In birth asphyxia (n= 40), the most common type of seizure observed was subtle seizure 20 (50%), followed by focal clonic 10 (25%) and multifocal clonic 5 (12.5%). Tonic type of seizure was observed in 3 (7.5%) and myoclonic in 2 (5%). Meningitis and septicaemia was the second most common cause of neonatal seizure observed in our study. Among metabolic abnormalities hypoglycaemia was found in 20 (22%) and hypocalcaemia in 10 (11%). **Conclusion:** The commonest cause of seizure was birth asphyxia presenting within 72 hours of life. Among infection septicaemia and meningitis was the most common cause leading to neonatal seizure. Among biochemical abnormalities the most common cause of seizure observed in our study was hypoglycaemia and hypocalcaemia. Subtle seizures were the commonest type of seizure observed in this study.

Key words: Neonatal seizure, biochemical disturbances in seizure.

Introduction:

The presence of seizure does not constitute a diagnoses but it is a symptom of an underlying central nervous system disorder due to systemic or biochemical disturbances. Biochemical disturbances occur frequently in the neonatal seizures either as an underlying cause or as an associated abnormality. In their presence, it is difficult to control seizure and there is a risk of further brain damage. Early recognition and treatment of biochemical disturbances is essential for optimal management and satisfactory long-term outcome. Seizures represent the signal of neurological disease in the newborn period and these convulsive phenomena are the most frequent manifestation of neonatal neurological disorder¹. Delay in recognition and treatment results in poor neurological outcome². Seizures during the neonatal period are relatively common, occurring in 1.8 to 3.5 per 1000 live births, with greater frequency in premature or low birth weight babies as compared to term babies³. Neonatal seizures are always due to an underlying cerebral or biochemical abnormalities although no cause may be identified in 10% of cases⁴. In the Neonatal Intensive Care Unit, the incidence goes as high as 10-25% out of which about 15% will die and 35 to 40% will have major neurological sequelae⁵. There is increasing evidence that neonatal seizures have an adverse effect on neurodevelopment and may predispose to cognitive, behavioural or epileptic complication later in life⁶. The present study was conducted to evaluate the incidence, etiological

factor, clinical types and to observe various biochemical abnormalities.

Materials and Methods:

The present study was a retrospective, observational study conducted in the Neonatal Intensive Care Unit and Nursery at B. P. Koirala Institute of Health Sciences from 1st December 2006 to 15th October 2007. All neonates with seizure before 28 days of life were included in the study. The neonatal seizures were classified according to Volpe's classification into subtle, focal clonic, multifocal clonic, tonic and myoclonic. Metabolic abnormalities and infections were noted. Hypoglycemia were defined as blood sugar < 40 mg/dl, and hypocalcaemia when total serum calcium was less than 7.0 mg/dl. Total 90 cases of neonatal seizure presenting before 28 days of life was included in the study. Age, sex, etiological factors and biochemical parameters were recorded in a pre-designed data sheet. The data was analysed by using SPSS 10.0 version.

Results:

Total admission during the study period was 867 live births, out of which 90 neonates presented with seizure. The incidence of neonatal seizure was 10.3/ 1000 live births. The seizures were more common in male babies observed in our study. 65 (72.2%) neonates were born to multiparous women

while 35 (38%) were born to primigravidas. In birth asphyxia (n= 40), the most common type of seizure observed was subtle seizure 20 (50%), followed by focal clonic 10 (25%) and multifocal clonic 5 (12.5%). Tonic type of seizure was observed in 3 (7.5%) and myoclonic in 2 (5%). Meningitis and septicaemia was the second most common cause of neonatal seizure observed in our study. Among metabolic abnormalities hypoglycaemia was found in 20 (22%) and hypocalcaemia in 10 (11%). The commonest cause of seizure was birth asphyxia presenting within 72 hours. Among infection septicaemia and meningitis was the most common infection leading to neonatal seizure. Among biochemical abnormalities the most common cause of seizure observed in our study was hypoglycaemia and hypocalcaemia. Subtle seizures were the commonest type of seizure observed in this study. In majority of cases the seizure occurred within 24 hours that has been shown in Table III.

Table 1: Incidence of Neonatal Seizure According to Weight.

Weight of the neonates	Total no. neonates	Neonates with seizure	Percentage
< 2500 gms (LBW)	400	60	66%
2500 gms	467	30	33%

Table II: Relationship of Aetiology and Type of Seizure.

Aetiology	Total (n= 90)	Subtle (n= 38)	Focal clonic (no=30)	Multifocal clonic (no= 10)	Tonic (no= 10)	Myoclonic (no = 2)
Birth asphyxia	40 (44%)	20 (50%)	10 (25%)	5 (12.5%)	3 (7.5%)	2 (5%)
Septicaemia	10 (11%)	5 (50%)	2 (20%)	1 (10%)	1 (10%)	1 (10%)
Meningitis	10(11%)	6 (60%)	1 (10%)	1 (10%)	1 (10%)	1 (10%)
Hypocalcaemia	10 (11%)	7 (70%)	1 (10%)	0	1 (10%)	1 (10%)
Hypoglycaemia	20 (22%)	13 (65%)	5 (25%)	0	1 (5%)	1 (5%)

Table III: Aetiology Versus onset of seizure.

Aetiology	No of cases	0-1 days	1-2 days	3-7 days	< 7days
Birth asphyxia	40	26 (65%)	12 (30%)	2 (5%)	0
Septicaemia	10	1 (10%)	5 (50%)	1 (10%)	3 (30%)
Meningitis	10	6 (60%)	2 (20%)	1 (10%)	1 (10%)
Hypocalcaemia	10	7 (70%)	1 (10%)	1 (10%)	1 (10%)
Hypoglycemia	20	16 (80%)	1 (5%)	2 (10%)	1 (5%)

Discussion:

Neonatal seizure is an important cause of neonatal morbidity and mortality. The present study showed incidence of 10.3/ 1000 live births which is similar to Holden KR et al study⁷. In the present study the most common type of seizure observed were subtle which constitutes 50% of seizure in both term and preterm babies⁸. The most common cause of seizure encountered in this study was birth asphyxia, which is comparable with Sood A et al study that reported 45.7% cases of seizure were due to birth asphyxia⁹. Our study showed 20% of the seizure were due to infections i.e. septicaemia and meningitis, which is also similar to study, conducted by Ledigo

et al who reported 5% developed septicaemia and 12% developed meningitis¹⁰. In present study hypocalcaemia is observed in 11% and hypoglycaemia in 20%. The study conducted by Kumar A et al¹¹ found that birth asphyxia was the commonest cause of seizure in first 48 hrs of life which was similar to our finding. In the present study prolonged rupture of membrane, Meconium stained liquor/ foul smelling liquor, repeated vaginal examination during pregnancy, repeated instrumentation, maternal fever, maternal diarrhoea and prematurity were the risk factors for development of neonatal sepsis. The presence of seizure does not constitute a diagnosis but it is a symptom of an underlying central nervous system disorder due to systemic or biochemical disturbances. Hypoglycaemia and hypocalcaemia are the most common biochemical abnormality seen in neonates with seizure and carries a good short term outcome.

Conclusion:

To conclude, birth asphyxia was the commonest cause of neonatal seizure that can be managed by providing intensive care unit and by resuscitation. Early recognition and treatment will improve the long-term outcome. Meningitis and septicaemia also contributed to neonatal seizure, which needs aggressive management. Among the biochemical abnormalities

hypoglycaemia and hypocalcaemia was the commonest cause for neonatal seizure. Subtle seizure was the commonest type of seizure that can be easily missed, as it is very mild.

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