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Original Article

Neonatal seizures in a tertiary care hospital: clinical presentation and outcome

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Abstract:

Background: In the neonatal period, seizures emerge as the most apparent warning sign of neurological disorder and are most common in the first 10 days of life. The true incidence of newborn seizures is difficult to ascertain since clinical detection of neonatal seizures is challenging. Growing research suggests that newborn seizures impair neurodevelopmental outcome and may increase the risk of cognitive, behavioral, or epileptic consequences in adulthood.

Methodology: The Neonatal unit of the Paediatrics Department at the Jalalabad Ragib-Rabeya Medical College Hospital in Sylhet served as the site of this cross-sectional study. This study was conducted between July 2013 and December 2013. There were 100 newborns who had seizures participated in the study. After written consent, a thorough history was taken and complete physical examinations were done. Every seizure episode that was reported by the mother and later examined by the resident doctors documented clinically.

Results: Most neonates (74%) who experienced seizures were between 1 and 3 days old, and most of them were male children (63%). 40% of newborns cried right away, whereas 60% of them had a history of delayed crying. During the first three days of life, 83% of infants experienced seizures. More than half (57%) of newborns required resuscitation, and 100% of them had weak reflexes. Different types of seizures were observed in neonates. Among them 67% of patients had subtle seizures, 13% had tonic-clonic seizures, 10% had focal clonic seizures, and 10% had tonic seizures. Total 86% of the patients were discharged following treatment.

Conclusion: First three days of life and male babies are more prone to seizures. Neonatal mortality is largely caused by newborn seizures.

Keywords: neonate, seizure, subtle, tonic-clonic, focal-clonic, tonic, primitive reflexes, resuscitation, outcome.

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Introduction:

An important pediatric emergency is neonatal seizure, which happens commonly.[1] Neonatal seizures are characterized by aberrant motor, autonomic, and behavioral activity and are characterized by paroxysmal brain dysfunction.[2] They pose a significant risk for eventual neurological impairment or death, and they can independently have a negative impact on a neonate's neurodevelopmental outcome.[3] Because of subtle form of seizure is more common seizure during the neonatal period, it is highly challenging to identify.[4] According to a study, 80% of recorded seizures by electroencephalography (EEG) lacked apparent clinical symptoms.[5] Another study found that only 27% of clinical seizures were properly identified.[7]

Due to the difficulty of identifying many of these episodes in newborn babies and the possibility that nonepileptic events could be mistaken for seizures, the incidence of neonatal seizures remains uncertain.[4] It is vital to identify the precise cause of seizures because doing so helps to choose the best treatment plan and sheds light on how the condition will progress.[7]

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There is a higher chance of seizures during the first month of life.[2,3]

The four distinct clinical seizure types are myoclonic, clonic, tonic, and subtle. Each one can be widespread, multifocal, or focal.[8] Hypoxic-ischemic encephalopathy (HIE), which accounts for around 50% of the causes of newborn seizures, is the most frequent cause of neonatal seizures.[9] Other contributing factors include intra-cranial haemorrhage, cranial infections, metabolic diseases, CNS abnormalities, birth trauma, medication withdrawal, and less common metabolic problems such as inborn metabolic errors.[10] In the first two days after birth, hypoxic-ischemic encephalopathy was the cause of 80% of all seizures. Within the first two days, seizures are also caused by hypocalcemia, hypoglycemia, hyponatremia, hypernatremia or hypomagnesemia. After the first week, the majority of seizures are caused by developmental defects of brain or meningitis. Between five and seven days later, benign idiopathic newborn seizures started to occur. Episodes tended to happen earlier when caused by benign familial newborn convulsions.[8]

In order to identify neonatal seizures rapidly and offer treatment as soon as possible, this study aims to establish the clinical presentation and outcome of seizures in neonates in a tertiary care hospital.

Methodology:

This is a cross-sectional study, conducted in the Neonatal unit of the Department of Paediatrics, Jalalabad Ragib-Rabeya Medical College Hospital, Sylhet. This study was carried out from July'2013 to December'2013. The study population included all neonates hospitalized in the neonatal unit with a seizure within the first 28 days of life. Neonates who had seizures after 28 days of life, meningitis, sepsis, congenital anomaly of the brain and central nervous system, as well as those who refused to enroll in this study were excluded. A consecutive sampling strategy was used to choose the population. Total 100 neonates with seizures were enrolled. After admission, enrollment was done within 12 hours. Legal guardians of the patients were fully informed of the facts of the disease process and the study's objectives before providing written permission. A thorough history was taken and physical examinations were done. Clinical information such as age at onset of seizures, duration of seizures and clinical type of seizures were recorded for each episode. It was reported by the mother and subsequently observed by resident doctors on duty. According to Volpe's classification, neonatal seizures were divided into four types: subtle, focal clonic, tonic and myoclonic. [11]

Statistical Package for the Social Sciences (SPSS) version 22 was used to perform the statistical analysis. Variables were expressed as frequencies and percentages. Tables and pie chart were used for data presentation.

Results:

The result showed that, age of the majority (74%) of seizure affected neonates were 1-3 days and most of them were male child (63%). The vast majority (64%) of patients were from rural areas. Most of newborns' birth weights (57%) was more than 2.5 kg (Table 1).

40% neonates cried immediately after birth whereas 60% had the history of delayed crying. In the first three days of life, 83% of infants developed seizure. Resuscitation was done on more than half (57%) of neonates and all of them (100%) had poor reflex.

Subtle seizures were observed in 67% patients, tonic-clonic in 13%, focal clonic in 10% and tonic in 10% (Figure 1). The pie diagram shows 86% patients discharged after received treatment (Figure 2).

Table 1: Characteristics of the study population (N=100)

Characteristics	Sub group	Number of patients	Percentage (%)
Age (Days)	1-3	74	74.0
	4-6	23	23.0
	7-10	3	3.0
Sex	Male	63	63.0
	Female	37	37.0
Resident	Rural	64	64.0
	Urban	36	36.0
Weight (in kg)	<2.5	43	43.0
	≥ 2.5	57	57.0

N= Total number of subjects

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Table 2: Clinical presentation of study population (N=100)

Variables	Sub group	Number of patients	Percentage (%)
Time of 1st cry	Immediately	40	40.0
	Delayed	60	60.0
Day of onset of seizure (days)	1-3	83	83.0
	4-7	17	17.0
Resuscitation	No	43	43.0
	Yes	57	57.0
Reflexes	Poor	100	100.0
	Good	00	00

N= Total number of subjects

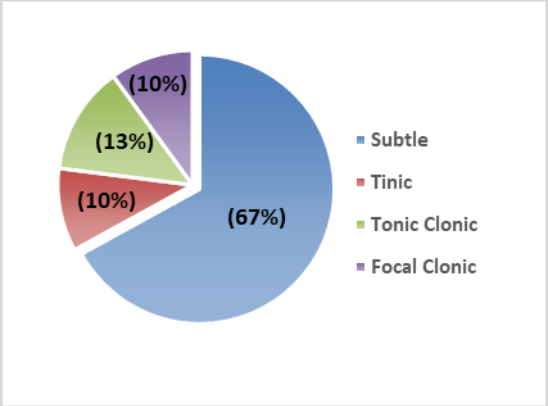

Figure 1: Seizure types in the neonates (N=100)

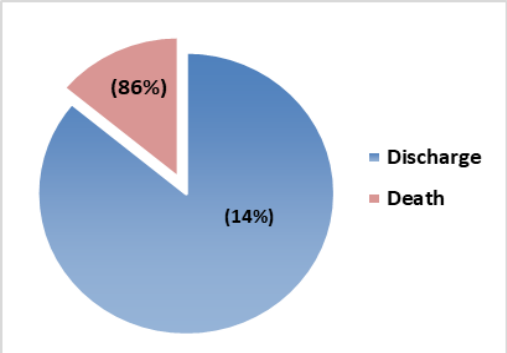

Figure 2: Outcome of study population (N=100)

Discussion:

The most distinctive manifestation of a neurological disorder in the newborn period is seizures.[3] Because they frequently signify a disruption of the central nervous system (CNS), seizures in a newborn infant leave neonatologists experiencing a sense of urgency.[8] After neonatal seizures are diagnosed, it is necessary to determine the etiology. Neonatal seizures should be evaluated with serologic tests, metabolic tests, EEG and ultrasonography. Imaging can reveal information about severe structural defects.[12]

Out of 100 neonates, it was found in our study that 74 patients were between the ages of 1 and 3 days, 23 patients were between the ages of 4-6 days and 3 patients were between the ages of 7 and 10 days. Sabzehei, Basiri and Bazmamoun 2014 noticed that 51 newborns (50%) experienced their first seizure before 72 hours (three days) of age. At the same time, the remaining newborns had their first seizure after 72 hours.[2] There were 37% female and 63% male, male to female ratio was 2.2:1. These findings were consistent with Amar et al. 2005, 66.4% of neonates in their study were male and 33.6 % were female.[13] Neonatal seizures are more frequent in male neonates (64%), according to Paswan and Singh's 2018 report.[14] Sabzehei, Basiri and Bazmamoun 2014 found 56% of male neonates were affected by seizures.[2]

64% infants belonged to the rural area in our study. No study has shown any evidence that newborns in rural areas are more likely to have seizures. We observed that seizures were more likely in newborns who weighed more than 2.5 kg. Another research found comparable results. In their 2018 study, Paswan and Singh reported that 62.4% of infants weighed more than 2.5 kg .[14]

Out of 100 newborns, we discovered that 60% had a history of delayed crying, and 40% of those individuals cried right away. The time of onset of the seizure may be a crucial indicator for determining its diagnosis. In our study, 83 newborns had seizures in the first three days of life and 17 appeared with seizures between the fourth and seventh days of life. This outcome is close to that of Paswan and Singh's study, in which 56.0% of the newborns who experienced seizures had them within the first day of life.[14] In this context, Das et al. discovered that 10.5% of neonates between the fourth and seventh days of life presented with seizures, compared to 71.3% of newborns who did so in the first three days.[15] Additionally, it was noted that more than half

(57%) of newborns underwent resuscitation after birth. Anand and Nair's 2014 investigation noted a comparable observation. In their study, 58.3% of the 108 neonates who had seizures underwent resuscitation.[1]

All of the patients in our study (100.0%) had weak reflexes, which may be related to the severity of the etiological factors in neonates experiencing neonatal seizures. According to Mansour et al. 2023, moro and gripping reflexes were absent in 31.6% of infants and weak in 18.3% of infants. 53.3% of cases had poor suckling. In terms of deep reflexes, 71.7% of babies showed hyporeflexia, and 15% of babies showed hyperreflexia.[16] Based on clinical observation and a precise description of the seizure type, newborn seizures can be confirmed. In our study, subtle seizures were the most frequent type. Subtle seizures were seen in 67% of patients with all affected newborns, tonic-clonic seizures in 13%, focal clonic seizures in 10%, and tonic seizures in 10%. In this investigation, myoclonic seizures were not seen. Our observations matched with Taksande et al. 2005 and Sabzehei et al. 2014.[17,2] While Paswan and Singh 2018 reported that clonic seizures affected 36.0% of patients, while subtle seizures affected 41.6% of patients.[14] However, according to Aziz et al. 2017 clonic convulsions were the most prevalent type of seizure.[18] 86 of the 100 newborns who had seizures improved following treatment and were discharged, while 14% of them expired. Similar findings by Sabzehei et al. 2014 revealed a 14.7% death rate in neonates with seizures.[2]

Conclusion: According to the results of our study, subtle seizures are the most common forms in infants, who typically present with seizures in the first three days of life. Males are most commonly affected. It is apparent from the current study that newborn seizures are a substantial cause of neonatal mortality, even if the curative rate is higher. It would be better to report the results if neonatal follow-up is conducted.

Ethical clearance: Taken from institutional ethics committee.

Conflict of interest: Nil

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