

Causes of Seizures in Neonates - A Tertiary Care Hospital Study in Rawalpindi, Pakistan

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Abstract

Introduction: Seizures is the most common neurological condition of neonates. Recognition of the etiologies of neonatal seizures would enable us to plan effective strategies for the reduction of morbidity and mortality associated with the neonatal seizure. Our objective is to determine the etiology of neonatal seizures along with the frequency of causes of seizures in neonates who presented to the pediatric department of Benazir Bhutto Hospital (BBH) and Holy Family Hospital (HFH), Rawalpindi.

Methods: It is a descriptive study of neonates who suffered from seizures at Benazir Bhutto Hospital (BBH) and Holy family Hospital (HFH), Rawalpindi from 1st of October 2017 to 15th of

December 2017. Patients' files and records were maintained and only those neonates (<28days) were included who presented with seizures or developed fit during the stay in the pediatric department of BBH and HFH, Rawalpindi. The neonates suspected of tetanus were excluded. Data were analyzed using SPSS Version 21.

Results: During the study period, 400 neonates were selected. The male to female ratio was 2.48:1. The age and weight of study participants were 4 to 11 days and 2.35 to 2.88 kg, respectively. The majority (65.75%) were term neonates. The most common cause of fits was birth asphyxia (52.25%), followed by metabolic causes (19.25%) and sepsis with meningitis (17.75%). No cause was identified in (3.5%) of patients.

Conclusion: Birth asphyxia is the most common cause responsible for causing seizures in neonates.

Key Words: Seizure, fits, Birth asphyxia, Neonates, Metabolic causes, meningitis.

Introduction

A seizure is defined as a paroxysmal neurological event affecting motor, behavior and/or autonomic function (1). The occurrence of seizures indicates central nervous system dysfunction. It is the most prevalent neurological manifestation in the neonatal period affecting approximately 1% of all neonates (1,2). Worldwide, its prevalence is 1.5% but in Pakistan, the incidence of neonatal seizures is 4.8% in hospitalized neonates (3). Neonatal seizures are classified into subtle, clonic, tonic and myoclonic seizures. Clonic and tonic seizures are further categorized into focal and generalized types. (1) Seizures are one of the immediate neonatal emergencies, where diagnostic and therapeutic management are immediately necessary as delay often results in the poor neurological outcome, even inpatient death of neonates. (4) Despite increasingly sophisticated neonatal intensive care, clinicians managing seizures remain challenged by difficult prognostic and therapeutic questions. (5)

Determination of etiology is paramount for treatment as long-term prognosis depends on it. (2) Birth asphyxia during the perinatal period has been reported as the worldwide most common cause of neonatal seizures. Relatively less common causes include septicemia, intracranial hemorrhage, CNS infections, metabolic disorders, congenital malformations, familial neonatal seizures, drug withdrawal etc. (1–3)

Recognition of the etiologies of neonatal seizures would enable us to identify the important etiologies in our circumstances. Moreover, this will also provide an opportunity to plan effective strategies for the reduction of morbidity and mortality caused by the neonatal seizures in our

settings. Our objective is to determine the etiology of neonatal seizures along with the frequency of causes of seizures in neonates who presented to the pediatric department of Benazir Bhutto Hospital (BBH) and Holy Family Hospital (HFH), Rawalpindi.

Materials and Methods

It is a descriptive study which was carried out in pediatric departments of Benazir Bhutto Hospital and Holy Family Hospital, Rawalpindi, Pakistan from 1st of October 2017 to 15th of December 2017. Using WHO sample size calculator, keeping the level of confidence 5%, absolute precision 5% and anticipated proportion of population 0.5032”, minimally required sample size came out to be 385, but we included all 400 patients. Sampling Technique was non-probability consecutive sampling technique. Informed consent from parents of neonates was taken in all cases. We included term, preterm and postterm neonates (< 28 days) suffering from fit or seizures presenting or developing fit during the stay in the pediatric department of BBH and HFH, Rawalpindi. Fits and seizures were clinically diagnosed and were differentiated from nonepileptic conditions (6).Detailed history, examination and investigation like Blood Complete Profile with reticulocyte count, Blood sugar level, serum Electrolytes (Serum Calcium, Magnesium, Sodium, Chloride), liver function test, renal function tests, CSF examination, fundoscopy, cranial ultrasound was done in all patients. EEG, Blood culture, screening for metabolic defects, TORCH screening, peripheral film, comb test CT scan was done in selective patients depending on history and examination. We excluded those neonates who were suspected of tetanus. Patients' files and records were reviewed and information was recorded in structured Performa.

SPSS version 21 will be used for data entry and analysis. For all categorical variables like gender,

causes of seizures, frequencies along with percentages will be calculated. The range is given for continuous variables.

Results

During the study period, 400 patients were selected. There were 285 (72.25%) males and 115 (27.75%) females. The male to female ratio was 2.48:1. The age and weight of study participants were 4 to 11 days and 2.35 to 2.88 kg, respectively. The maturity of neonates is shown in table 1.

The most common cause of fits was birth asphyxia (52.25%), followed by metabolic causes (19.25%) and sepsis with meningitis (17.75%). The other causes of fits are given in table 2. No cause was identified in (3.5%) of patients.

The maturity of neonates is shown in table 1.

Etiology of Seizures in neonates who presented in Rawalpindi Teaching Hospitals is shown in table 2

Discussion

Seizures are the most common neurological disorder in the neonates. (1–3). They have a worldwide prevalence of 0.1 to 0.5% in term neonate and 10 to 23 % in preterm neonates. (1,2) In order to treat this pathology, a cause directed therapy is a must after emergency rescue therapy of seizures.

The total numbers of neonates in our study were 400. There were 285 (72.25%) were males and 115 (27.75%) were females. The male to female ratio was approximately 2.5:1. Our study showed that the proportion of male patients was higher

Maturity	Neonates (Percentages)
Preterm	137 (34.25%)
Term	263 (65.75%)
Postterm	0 (0%)

which is also found in the literat

ure. (1,7,8). This might have a relation to the types of injuries sustained and the possibility that males were more prone to developing seizures. (7) Moreover, neonatal seizures are more common in preterm neonates but in our study, we have found that neonatal seizure to be more common in the full-term neonates. These results are comparable to Malik et al and Najeeb et al, who also found seizure more common in term neonates as compare to preterm neonates. (2,7)

Various causes of seizures are found in neonates. Our study showed that the most frequent cause was Birth asphyxia (52.25%) followed by metabolic disturbances (19.25%). Similar results were found by Malik et al, Najeeb et al, Shah et al who also described birth asphyxia as the most common cause of fits. (2,3,7) A study in Iran by Sabzehei et al also concluded Birth asphyxia as the most prevalent cause of the neonatal

Cause of Seizures	Neonates (Percentages)
Birth Asphyxia	209 (52.25%)
Metabolic causes	77 (19.25%)
Sepsis	71 (17.75%)
Kernicterus	10 (2.5%)
Intracranial haemorrhage	9 (2.25%)
Brain Malformation	7 (1.75%)
Post traumatic	3 (0.75%)
Unknown Cause	14 (3.5%)

seizure.(4) Moreover, birth asphyxia is the most prevalent cause of seizures worldwide in both term and preterm neonates. (9). This high incidence of neonatal seizures because of birth asphyxia suggests that this is a serious issue and need to be addressed quickly and efficiently. The incidences of neonatal seizures can be minimized by reducing the risk factors responsible for birth asphyxia and by proper training of doctors and paramedical staff regarding delivery and neonatal resuscitation.

Metabolic disturbances are an important cause of seizure in neonates. Hypoglycemia, hypocalcemia, hypomagnesemia, and sodium imbalance are commonly encountered metabolic disturbances leading to fits or seizures. Various studies describe metabolic abnormality as a cause of seizures in 5 – 23 % of neonates. (1–3) In our study we found it to be responsible for 19.25% of neonatal seizures. This second most prevalent cause also needs special attention and can be effectively addressed by the proper fluid administration and by electrolyte monitoring.

Sepsis is an important cause of neonatal seizures. Malik et al found 10% of neonatal seizures due to infection. (7) Najeeb et al found 29% suffering from infections in his study. (2) In our study, 17.75% of neonates had sepsis with meningitis. Neonates are prone to infection and special care should be given to them to prevent infections. Timely administration of antibiotics is very important in management sepsis, especially after culture and sensitivity report.

In our study, kernicterus was the cause of 2.5 % of neonatal seizures. Various local authors found kernicterus as a cause of seizures in 4.5- 6%. (1–3) Kernicterus can be easily managed by early reorganization of jaundiced neonates with timely referral to phototherapy in the hospitals. Brain

abnormality, intracranial hemorrhage, and trauma are found in 0.75 – 2.25 % of neonatal seizures. (1–3) Although they are less common but never the less they are important to address as effective management can save morbidity and mortality

Majority of the neonates the cause of neonatal seizures was identified. However, in 14 (3.5%) no cause was identified. This might be due to improper history by attendants or laboratory errors in the investigation which doesn't lead to a specific diagnosis. It is also important to mention that the prognosis of neonatal seizures is severely affected by the underlying cause of the seizure. Mortality has been reported to be around 10%-50% and half of them develop long-term complications like epilepsy, cerebral palsy and mental retardation. Patients with hypoxic brain injury, intracranial hemorrhage, and structural brain malformation have the worst prognosis. Patients with transient metabolic abnormalities, idiopathic and familial etiologies have the best prognosis. (2) This highlights the importance of this study in finding out the cause of neonatal fits.

In our study, we wanted to highlight the cause linked to neonatal seizures as this would help in the effective management of this pathology and minimizing morbidity and mortality linked to seizures. Our study attempted to determine the frequencies of the different causes of seizures in neonates. The weakness of our study is that it does not explore the risk factors, etiological factors or association with different cause of seizures. Cross-sectional analytic studies are recommended in our setting to explore these relationships which can contribute to the identification of potential etiological factors, pertinent to our Pakistani population. These can provide vital information that can play role in recommendations regarding the prevention and effective management of neonates' lives.

Conclusion

Our study shows that Birth asphyxia is the most prevalent cause of neonatal seizures (52.25%) followed by metabolic causes (19.25%) and sepsis with meningitis (17.75%).

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Conflict of interest:

None

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