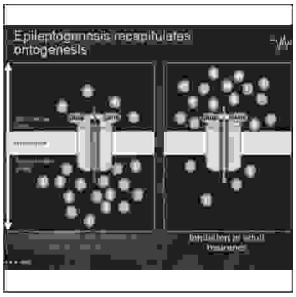
ORIGINAL PROF-1041

NEONATAL SEIZURES;

ETIOLOGY, CLINICAL TYPES AND OUTCOME



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ABSTRACT... Introduction: Seizures in the neonates are quite different from those in older children and adults, whereas seizures in preterm differ from those of term infant. Neonatal seizures are poorly organized and at times inconspicuous, they also differ in origin from those of older children as they frequently arise in subcortical areas while in older children they arise from cortex. **Objective:** To find out the frequency of seizures and determine the frequency of various types of neonatal seizures among newborns admitted to Nishtar Hospital, Multan. **Material and Methods: Setting:** Pediatric Unit-I, Nishtar Hospital, Multan. **Duration:** From May 1998 to December 2000. **Sample size:**200 cases. **Results:** Out of these 200 cases, 162(81%) were male and 38(19%) were female. Among the babies with seizures, 163(81.5%) were full term, 25(12.5%) were preterm and 12(6%) were post-term. In relation to time of presentation, 40(40%) patients presented within 24 hours, while 65(32.5%) within 72 hours of birth and remaining 55(27.5%) patients after 72 hours of birth. Among the etiological factors noted there were 100(50%) patients with birth asphyxia, 40(20%) with infections, 30(15%) with metabolic problems, 18(9%) with intra-cranial hemorrhage and 6(3%) patients had kernicterus. Cerebral malformations were noticed in 4(2%) cases and 2(1%) patients were diagnosed as pyridoxine dependency. Regarding the type of seizures multi focal clonic seizures occurred in 100(50%) cases, generalized tonic seizures in 56(28%) cases and subtle and focal clonic seizures in 22(11%) each. Sixty one 30.5%) patients died during their hospital stay. **Conclusion:** Neonatal seizures indicate significant underlying disease. Recognition of etiology is often helpful in prognosis and treatment.

Key words: Clonic, Multi Focal, Kernieterus, Intra-cranial Hemorrhage, Neonatal Seizures.

INTRODUCTION

Seizures in the neonates are quite different from those in older children and adults, whereas seizures in preterm differ from those of term infants. Neonatal seizures are poorly organized and at times inconspicuous, they also differ in origin from those of older children as they frequently arise in subcortical areas while in older children they arise from cortex[1].

Neonatal seizures are one of the few beibatak neurological emergencies where prompt diagnostic and therapeutic plans are necessary; a delay in therapy often results in poor neurological outcome[2]. A seizure is defined as sudden, paroxysmal discharge of a population of neurons that cause transient alteration in neurologic

function. This alteration may involve abnormal motor activity, sensory symptoms, a change in level of alertness, in autonomic function or any combination of these. They often represent the most distinctive signal of neurological disease in the newborn period and these convulsive phenomena are the most frequent of overt manifestations of neurological disorders[3].

The incidence of seizures in infants born at term is 1.5:3 per 1000 live births; the incidence is even higher in preterm infants, ranging from 50-150 per 1000 live births[4]. These are probably underestimations as these figures only include clinical and electro clinical seizures. The exact incidence of electro graphic, clinically silent seizures is as yet unknown. Sex incidence is reported as male to female ratio of 3:2[5]. Marshall et al[6] have mentioned that 50% of neonatal seizures begin during first day of life and 75% by third day. Within 72 hours of age, majority of cases are due to asphyxia, intra cranial hemorrhage and hypoglycemia and cases after 7th day of age are mostly due to sepsis, meningitis and genetic factors. The middle peak consists of primary hypocalcemic fits[7]. Marked seizure variation is noted in seizures due to metabolic disorders[8].

Most patients only require brief treatment for convulsions. Phenobarbitone is the most used drug as first line of treatment to control seizures and its efficacy ranges from 35-85%[9].

PURPOSE OF STUDY

To determine the relative incidence of different causes of neonatal seizures in hospitalized newborns.

To find outcome of seizures in relation to etiology.

MATERIAL AND METHODS

Setting

Pediatric Unit-I, Nishtar Hospital, Multan.

Duration

From May 1998 to December 2000.

Sample size

200 cases.

Detailed information was obtained in all cases either from the mother or attendant of the baby regarding age of onset of seizures, frequency, duration and pattern of seizures. Other symptoms inquired included fever, jaundice, refusal to feed, cyanosis, vomiting etc. a detailed prenatal, natal and postnatal history was taken and relevant information was recorded in the proforma. Family history especially inquired about cousin marriage, neonatal deaths in the family and seizures in the siblings, was recorded.

RESULTS

Out of these 200 cases, 162 (81%) were male and 38 (19%) were female (Fig-1). Among the babies with seizures, 163 (81.5%) were full term, 25 (12.5%) were preterm and 12 (6%) were post term as shown in (Fig-2).

In relation to age at the time of presentation, 80 (40%) patients presented within 24 hours, while 65 (32.5%) patients presented within 72 hours of birth and remaining 55 (27.5%) patients after 72 hours of birth (Fig-3).

Among the etiological factors noted in the sample, there were 100 (50%) patients with birth asphyxia, 30 cases (15%) with metabolic problems, 40 cases (20%) with infection, 18 patients (9%) with intra-cranial hemorrhage (Table I).

Table-I. Etiological factors associated with seizures

Diagnosis	No. of pts	%age
Birth asphyxia	100	50.0
Infections	40	20.0
Hypoglycemia	30	15.0
Intracranial hemorrhage	18	09.0
Kernicterus	06	03.0
Brain malformation i. Dandy walker syndrome ii. Hydrocephalus	04 02 02	02.0
Pyridoxine dependency	02	01.0
Total	200	100.0

Table-II. Different type of seizures		
Types of seizures	**No. of pts**	**%age**
Multifocal colnic	100	50.0
Generalized tonic clonic	56	28.0
Focal clonic	22	11.0
Subtle	22	11.0
Total	200	100.0

Regarding clinical types, multi focal convulsion were most common in birth asphyxia (54/100) and metabolic seizures (21/30), while infection and kernicterus were mostly associated with tonic convulsion. (Table II).

Relationship of seizure type to etiology is shown in (Table III). Etiological factors in relation to outcome are summarized in (Table IV).

Table-III. Relationship of seizure type to etiology					
Etiology	**Multifocal**	**Tonic**	**Subtle**	**Focal**	**Total**
Birth asphyxia	54	24	12	10	100
Infections	12	18	06	04	40
Hypoglycemia	21	04	02	03	30
Intracranial hemorrhage	07	06	02	03	18
Kernicterus	02	04	-	-	06
Brain malformation	02	-	-	02	04
Pyridoxine dependency	02	-	-	-	02
Total	100	56	22	22	200

Table-IV. Etiology factors in relation to outcome					
Etiology	**No. of cases**	**Survival**		**Died**	
		n	**%age**	**n**	**%age**
Birth asphyxia	100	60	60.0	40	40.0
Infections	40	30	75.0	10	25.0
Hypoglycemia	30	30	100.0	-	-
Intracranial hemorrhage	20	12	60.0	08	40.0
Kernicterus	06	04	66.0	02	33.0
Brain malformation	02	01	50.0	01	50.0
Pyridoxine dependency	02	02	100.0	-	-
Total	200	139	70.0	61	30.0

Fig-1. Sex distribution of patients with neonatal seizures

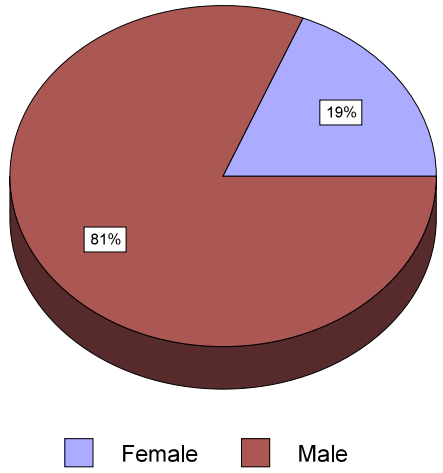
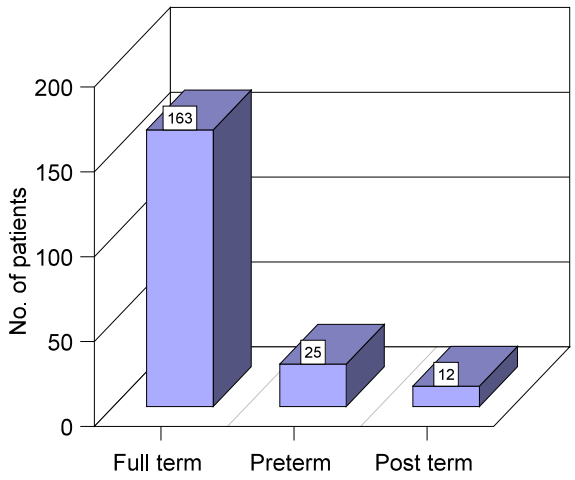


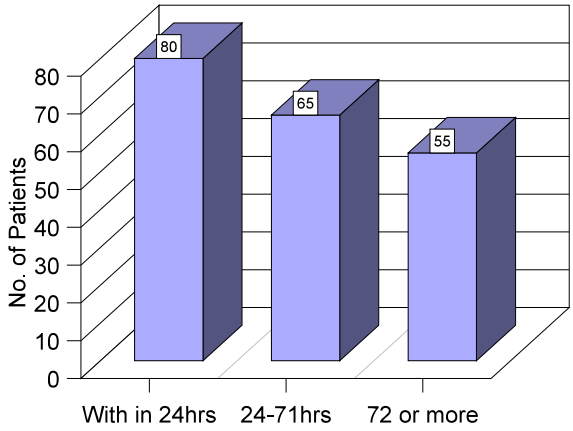
Fig-2. Frequency of neonatal seizures in relation to gestational age



DISCUSSION

Incidence of newborn seizures in our study was 17.35% of total admissions. The incidence reported in literature by other has varied greatly. Scher[9] has found incidence of 0.16% in term babies and 22.7% in the preterm. The higher incidence of neonatal seizures in this study can be attributed to the selection of study population, which includes obviously sick babies referred from other maternity hospitals for intensive care.

Fig-3. Time of onset of neonatal seizures



During the first 24 hours 31.6% newborns had seizures, which were mainly due to birth asphyxia and metabolic causes. Cases due to kernicterus and infections were mostly presented after 72 hours of age, which constituted 34.7% of all admitted cases. Among the etiological factors, birth asphyxia remained the single most common cause. This finding compares with Malik[10] who also found birth asphyxia (35%) in their study as the most common cause of neonatal seizures. Metabolic factors were responsible for 11.7% cases of neonatal seizures while Sood reported metabolic abnormalities in 16.94% of cases with seizures, most common being hypoclacemia followed by hypoglycemia[11].

Infection both sepsis and meningitis constituted 20% cases of neonatal seizures while Legido[12] who found 10-15% due to infections both intrauterine and postnatally acquired CSF infection.

Mizrahi found intra-cranial hemorrhage as a frequent cause of neonatal seizures accounting for 15-25% of cases[13]. In this study 9.5% cases were associated with intra-cranial hemorrhage. Mostly were due to hypoxic ischemic encephalopathy and 22% were due to hemorrhagic disease of newborn.

In this study most common seizures noted were multi focal clonic constituting 50% of all cases, while generalized tonic seizures were present in 25.26% and subtle seizures were present in 12.63% cases. Sono et al reported that most common type noted was tonic seizures (37.5%) and subtle seizures in 25% babies[14].

The mortality observed in present study was 34.7%, which is comparable to the study conducted by Legido[12] in which mortality was 33%. The mortality rates are high in both preterm and very preterm infants (58%) than those in term infants, though morbidity remains high in both groups.

Regarding the prognosis 46.4% patients with seizures were cured without any neurological deficit at the time of discharge, which is comparable to the study conducted by Bergman[15]. In present study 12.6% patients had persistent seizures and were kept on anticonvulsant therapy. The patients who were kept on anticonvulsant therapy had severe birth asphyxia at the time of presentation and one case was of cerebral malformation diagnosed on CT as Dandy Walker syndrome with multiple CNS abnormalities.

CONCLUSION

Neonatal seizures typically indicate significant underlying disease. They are poorly classified, under recognized and often difficult to treat. Recognition of etiology is often helpful in prognosis and treatment; the most common is hypoxic – ischemic encephalopathy. The worst outcome was found in metabolic birth asphyxia, intracranial hemorrhage and infection. On the other hand no mortality was seen with metabolic abnormality, which carries good prognosis. Commonest type of seizures recorded was multi-focal clonic followed by generalized tonic clonic and subtle seizures. A comparatively lower incidence of subtle seizures could be attributed to failure to identify this convulsive disorder.

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