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Original Research Article

Clinical profile of neurological disorders in children: a hospital-based experience of a tertiary care centre in Kashmir

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ABSTRACT

Background: Neurological disorders in paediatric age group constitute a major cause of hospital visits both elective and emergent. Due to fast maturity of nervous system within the first few years of life they are more prone to neurological disorders, which mostly can be preventive and rehabilitative in nature. Purpose of this study was to know the pattern and spectrum of neurological disorders among children presenting to a tertiary health care facility in Kashmir.
Methods: This was a retrospective analysis of the data of all the children in the age group 1 month to 18 years admitted with neurological disorders over a period of 12 month. Diagnosis was made on the basis of history, physical examination and relevant laboratory and radiological investigations.
Results: Out of 21732 patients admitted during this study period, 562 patients had neurological disorders, an occurrence rate of 25 per 1000 hospitalized patients, with a male female ratio of 1.4:1. The most common neurological disorder was seizures followed by cerebral palsy and CNS infection.
Conclusions: Neurological disorders constitute one of the common reasons for childhood hospitalization, implying a comprehensive must be set up in place to deal with these neurological problems as is existing elsewhere in our country, and in developed world for appropriate delivery of health care.

Keywords: Children, Encephalopathy, Infections, Nervous system, Seizures

INTRODUCTION

Neurological disorders are a major cause of disability among the children in the developing world including our country.[1,2] These children face the added burden of poverty, inadequate health facilities, lack of community services, and rehabilitative care.[3] Although genetic factors, chromosomal abnormalities, metabolic disorders are known to play a significant role in neurological disorders among children but in the resource poor countries lack of obstetric care, poverty, infections, ignorance, inadequate immunisation, malnutrition and poor living conditions have been reported as major risk factors in the aetiology of paediatric neurological disorders.[4-6] There is a paucity of data about the prevalence of neurological disorders from the developing countries due to lack of quality of health data and awareness about these disorders. In India, a diverse and vast population with multiple ethnicities, there is need to plan services in a socio culturally appropriate manner with major emphasis on cost effectiveness for which epidemiological data including incidence and pattern of diseases distribution among the communities forms a basic prerequisite. Keeping this in view, the present study was conducted to assess the spectrum and burden of neurological disease among children of Kashmir valley as an initial step to improve neurological health care.

METHODS

This was a retrospective study, conducted at post graduate department of paediatrics, GB Panth Hospital, an associated hospital of government medical college Srinagar. The medical records of all patients admitted from January 2019 to December 2019, with neurological disorders were analysed.

Inclusion criteria

All children in the age group of 1 month to 18 years admitted with neurological disorder, files having complete data and conclusive diagnosis of neurological disorder were included in the study.

Exclusion criteria

Patients with neurological disorder below 1 month of age and patients with grade 4 malnutrition, patients with clinically significant systemic illness (any systemic illness more than 1 month duration) excluded from study.

Data collected and entered in micros0ft excel worksheet. Descriptive details were done and data was analysed in terms of percentage and numbers. Besides clinical details and first line investigations, analysis of advance tests like electroencephalogram (EEG), electrophysiological studies like nerve conduction velocity (NCV)/electromyographic (EMG) studies, computerised tomography (CT) scan of head, magnetic resonance imaging (MRI) of brain, biochemical studies like tandem mass spectrometry (TMS), gas chromatographic mass spectrometry (GCMS), genetic tests retrieved.

RESULTS

Out of 329727 out-patient visits, 21732 were hospitalized, among whom 562 were suffering from neurological disorders, giving us the disease occurrence rate of 25 patients per 1000 hospitalized children. There were 325 males and 235 females with a male/ female ratio of 1.4:1. Majority of children 258 (46%) were in <1 year age group (Table 1).

Most common clinical diagnosis among the studied patients was childhood seizures which accounted for 240/562 (42.7%) patients, out of which 76 patients had febrile seizure, 57 patients had acute symptomatic seizure and seizure disorder/epilepsy syndrome was present in 107 patients. Cerebral palsy was the risk factor for seizure disorder in majority of cases (n=42) as depicted in Table 3. Various neurometabolic disorders are shown in Table 4 among which organic academia's was the most common (n=7). Autism spectrum disorder was seen in 30 (5.3%) patients. 22 (3.9%) patients had developmental delay, 14 (2.5%) patients had demyelinating disease, out of which GBS was seen in 10 patients, facial palsy in 2 patients and 2 patients presented with ADEM. The 12 (2.1%) had various congenital anomalies.

Table 1: Age distribution of study patients, (n=562).

Age (years)	N
<1	258
1-5	196
5-10	70
>10	38

Table 2: Spectrum of neurological disorders among studied patients, (n=562).

Diseases	N (%)
Seizure disorder	240 (42.7)
Febrile seizures	76
Acute symptomatic seizure	57
Seizure disorder and epilepsy syndromes	107
Cerebral palsy	74 (13.1)
Infections	62 (11)
Nutritional/IEBB	42 (7.46)
Neurometabolic	30 (5.3)
Autism	30 (5.3)
Developmental delay	22 (3.9)
Demyelinating disorders	14 (2.5)
GBS	10
Facial palsy	2
ADEM	2
Congenital anomalies	12 (2.1)
Neuromuscular disorders	12 (2.1)
DMA	5
SMA	3
LGMD	2
FSHD	1
Congenital myopathy	1
Cerebrovascular accidents	7 (1.2)
Arteriopathy	3
MCA infarct	2
CSVT	1
Hemorrhagic stroke	1
Autoimmune encephalitis	5 (0.8)
Movement disorder	4 (0.7)
Neurocutaneous syndrome	4 (0.7)
Chromosomal disorders	2 (0.3)
ICSOL/intracranial space occupying lesion	2 (0.3)

*GBS (Gullen Barry syndrome), ADEM (acute disseminated encephalomyelitis), DMD (duchenes muscular dystrophy), SMA (spinal muscular atrophy), LGMD (limb girdle muscular dystrophy), FSHD (facioscapulohumeral dystrophy), MCA (middle cerebral artery), CVST (cerebral sinus venous thrombosis).

Cerebrovascular accidents observed in 7 (1.2%) patients, 3 patients had arteriopathy, 2 patients had MCA infarct, 1 patient had CVST and another 1 patient had hemorrhagic stroke. Neuromuscular disease was seen as main clinical presentation in 12 patients, out of which most of the patients (5) had DMD, 3 patients had spinal muscular atrophy, 2 patients had LGMD, 1 patient has FSH

dystrophy and congenital myopathy seen in another 1 patient.

Table 3: Clinical spectrum of seizure disorder and epilepsy syndromes in study patients, (n=107).

Epilepsy/epilepsy syndromes	N
Cerebral palsy	42
West syndrome/dravet/ LGS	28
Idiopathic generalised	18
Absence	5
Benign (Rolandic)	5
Juvenile myoclonic	5
Panayiotopolous	2
CSWS/continuous spike and wave during slow wave sleep	2

LGS (lennox gastaut syndrome).

Table 4: Neurometabolic disorders among the study patients, (n=30).

Neurometabolic disease	N (%)
Organic academia	7 (23.3)
Methymalonic academia	3
Propionic academia	2
Glutaric academia	2
Lysosomal storage disease	6 (20)
Gauchers disease	2
Niemanpick disease	1
GM1 gangliosidosis	2
GM2 gangliosidosis	1
Neurodegenerative disease	5 (16.6)
Canavans disease	1
Krabbes disease	1
Metachromatic leukodystrophy	2
Adrenoleukodystrophy	1
Glycogen storage disease	4 (13.3)
Mucopolysaccharidosis	3 (10)
Mitochondrial disorder	2 (6.6)
Aminoacidopathy/PKU	2 (6.6)
Fatty acid oxidation disorder	1 (3.3)

DISCUSSION

The prevalence of neurological disorders among hospital admissions was 2.5% which is comparable with studies from other parts of our country study like a study by Devi et al from Bangalore and by Kumar et al from Lucknow has reported a prevalence of 2.6% and 2.8% respectively.[7,8] However a study from Nigeria by Lagunju et al and from the United states by Jacqueline et al had reported a prevalence of 20% and 10.7% among paediatric admissions which was quite contrary to our study.[9,10] This may be due to of poor disease characterization, poor referral rate and sociocultural belief system which was quite prevalent here in our country. Neurological disorders in children were a common cause for referral to tertiary care hospital. Although hospital medical statistics did not necessarily reflect the true prevalence of a particular disease in our setting as ours being a government run hospital where at times overlap of clinical presentation may lead to inaccurate figures.

Male to female ratio in our study was 1.4:1. The predominance of boys with neurological disease was similar to other studies by Lagunju et al and Burton et al.[9,11] Majority of the children were in less than 1 year (46%) and 1-5 years age group (35%) similar to other studies.[9]

However, while exercising maximum caution, we found seizure disorder in 240 (42.7%) patients as the most common clinical problem faced by growing population, which is similar to a study by Mohammad et al and Burton et al reporting seizure disorder as the common neurological problem in 47.7% and 57% respectively.[11,12] A significant proportion of these patients were having associated cerebral palsy and other epilepsy syndromes (44%), febrile seizures (31.6%) and acute symptomatic seizures in 23.7% leading to overlap between the clinical diagnosis. Another reason for the high prevalence of seizure disorder may be due to increasing awareness that epileptic seizures are medical conditions which are treatable as opposed to old beliefs. However, study by Asindi et al reported seizures to be the second most common neurological disease (25.35%).[13]

Cerebral palsy constitutes the second biggest group with 74 (13.1%) patients which was similar with other studies.[12,14] Significant improvement in neonatal care services had resulted in increased survival of very low birth weight and premature babies. Both perinatal asphyxia and prematurity constitute a major risk factor for cerebral palsy. Also, after the establishment of DEIC centre in our hospital, referral of CP patients in our hospital had increased which further accounts for their larger number among hospitalised patients. Epilepsy occurred frequently in children with cerebral palsy and its prevalence in children and adults with CP was between 15-55%.[15] In our study 42 (39.2%) patients with cerebral palsy had accompanying epilepsy. Children with cerebral palsy often require special care and rehabilitative services which was not available for majority of children in developing world. So, reallocation of resources and manpower was essential towards better management of these children.

CNS infection (bacterial/viral/tuberculameningo-encephalitis or meningitis) were the third commonest cause of hospitalization seen in 62 (11%) patients. In underdeveloped countries due to improper sanitation, poor pneumococcal vaccine coverage and prevalent tuberculosis, CNS infections still accounts for large number of emergency visits. Among various nutritional causes, IEBB (infantile encephalitic beriberi) was most common cause of hospital admission (n=42) This disorder is very rare in developed countries but common in infants from developing countries exclusively

breastfed by thiamine deficient mothers.[16] It usually presented in the age group of 1-6 months. Majority of these had history of irritability, regurgitation before presentation. Characteristic features were blepharoptosis, seizures, vacant stare, aphonia, right heart failure, shock. Response to intravenous thiamine was dramatic.

Neurometabolic conditions constitute another group with 30 (5.3%) patients. Although individually they were rare, however combined as a group, they constitute significant burden of childhood neurological disorders. Being an ethnic province high consanguineous marriage rate adds to their common occurance.[17] In our study 14 (5.8%) patients with metabolic disorder presented with seizures which was concordant with a study by Mohamed et al whereas study by Karimzadeh et al showed that 36.5% children with neurometabolic disease presented with seizure.[18,19] Organic acidemias and amino-acidopathies constitutes 30% in our study where as in a study by Mohamed et al these two disorder make up 12.5% of the metabolic disorder.[18]

Autism spectrum disorder was another group with 30 (5.3%) patients. These children frequently had comorbid neurological disorder such as developmental delay and epilepsy leading to their admission. Diagnosis was made using different scales like DSM IV, ISAA/Indian scale for assessment of autism, M-CHAT. A systemic review on South Asian population by Hossain et al reported a prevalence ranging from 0.09-1.07%.[20] Such low prevalence of this disorder in our region was due to lack of application of fully validated autism diagnostic tool.

Developmental delay was the presenting complaint in 22 (4%) patients. Congenital anomalies of CNS constituted 12 (2.1%) cases which was consistent with other studies showing low prevalence of congenital anomalies. Study by Lagunju et al showed congenital anomalies as presenting complaint in 2.5% cases and 6.2% cases shown by Mohamed et al.[9,12] Their small proportion was likely due to the fact that most of such children are seen in the neurosurgical unit of hospital and did not necessarily suggest that these disorders were rare in this centre.

Although we had tried to reflect the burden of neurological disorders but like in any other resource poor setting, the authors have faced lack of proper paramedical support services, man power, infrastructure for neurology care services and process of data accessibility and retrieval which may have leads to missed entries.

CONCLUSION

Paediatric neurological disorders are common reasons for hospitalization, where treatable convulsive disorders are commonest one. Parents in general are extremely apprehensive while witnessing these events and report to the hospital without resorting to local remedies. Establishment of DEIC has resulted in increased admission patients of cerebral palsy for rehabilitative and diagnostic purposes.

Although services for paediatric neurological disorders in our province are still just basic. There are very few Paediatric neurologists, occupational therapists and paediatric psychologists, psychiatrists and psychiatric nurses to handle them. Impact of malnutrition (thiamine deficiency) and infections (bacterial and tubercular meningitis) still results in significant admission in underdeveloped countries.

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