Original article

NEUROLOGICAL CASES ADMITTED INTO A GENERAL PEDIATRICS WARD

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ABSTRACT

Objectives: To see presentation of neurological cases admitted into a general pediatrics ward and review the findings, investigations, complications and treatment provided.

Methodology: This is a retrospective analysis of patients admitted during the year 2006 in Pediatrics ward of Civil Hospital Karachi. All patients older than one month of age with a final diagnosis of a neurological problem were included. Patients with metabolic fits and neonates were excluded from the study.

Results: A considerable proportion of all patients admitted into the pediatrics ward are neurological illnesses (67/687 or 8.9%). Commonest neurological problems were CNS infections (42/67 or 62.5%). Other causes of hospitalization were cerebral palsy with complications (7/67, 10.4%), febrile fit (5/67 or 7.5%) and epilepsy (7/67;10.4%) etc. Commonest symptom was fever with or without seizures (59; 87.9%). All patients suspected of a CNS infection were treated with intravenous antibiotics. Patients with cerebral malaria were treated with intravenous quinine.

Conclusion: Neurological problems in children less than five years of age are an important reason for hospital admission, infections being most frequent. Bacterial infections of the nervous system are more common than viral or protozoal infections. This study results will help in better planning regarding management of such patients in wards and in emergency.

KEY WORDS: Children, Childhood, Encephalitis, Meningitis, Cerebral malaria, Tuberculous meningitis, Neurological complications, Neurological deficits.

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INTRODUCTION

Neurological problems are serious illnesses which are important because of morbidity, mortality and sequelae. CNS infections including meningitis, encephalitis and cerebral malaria are an important cause of admission into a paediatric ward. Their early identification, prompt and appropriate treatment will help in reducing complications and deaths. Understanding the pattern of different neurological diseases and their demographic distribution will help in better planning regarding their management in wards and in emergency.

Three organisms Strep Pneumoniae, H Influenzae and N.Meningitidis are the commonest cause of bacterial meningitis in children older than 5 years.[1,2] H Influenza was the commonest cause of meningitis beyond the neonatal period in the United States in the eighties.

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Its incidence has decreased considerably in the countries where routine immunization with HiB conjugate vaccines is carried out.[3] In our country this illness can still occur as routine immunization is not done. It is suspected that up to 50% of survivors of acute bacterial meningitis develop some form of sequelae.[4]

A number of viruses can cause encephalitis. The severity and outcome of encephalitis depends upon a number of factors which is basically an undue virulence of the organism and undue susceptibility of the host.[5] In a large study from Finland where viral PCR was carried out on over 3000 CSF samples Varicella Zoster virus (VZV) was found to be the commonest cause of Encephalitis occurring in 29% of cases.[5]

Cerebral malaria is a grave and serious complication of severe falciparum malaria. The definition of cerebral malaria covers of unarousable coma with a GCS <7 in a patient with a blood smear positive for P. Falciparum. The incidence of sequelae following cerebral malaria is described to be in the range of 10%.[6] Quinine is the traditional therapy for cerebral malaria and artemesins are found to be similar to quinine in efficacy.[7]

Tuberculous meningitis is another grave and serious infection of the nervous system. Six factors are said to be independently predictive of tuberculosis of the nervous system i.e history of more than five days, headache, total CSF white cell count of <1000/cmm, lymphocyte proportion of more than 30% and protein content of more than 100 mg%.[8]

Febrile seizure is defined as a provoked convulsion caused by a fever without evidence of CNS pathology that occurs in children most commonly between 6 months and 5 years of age. There is often a family history of febrile convulsions.

The objectives of this study were:

1) To see the proportion of neurological cases admitted into a general pediatrics ward.
2) To see the spectrum of these problems.
3) To see their presentation, complications and treatment provided.

METHODOLOGY

A retrospective analysis of the patients admitted during the year 2006 into a general Pediatric Unit of Civil Hospital, Karachi was performed. All patients with a final diagnosis of a neurological problem were included. Patients with metabolic fits and neonates were excluded.

Age of the patients ranged from one month to 12 years. Patients were divided according to their age into young infant (1-2mths), infant (2 months - 1 year), 1-5 years and more than 5 years. Age and sex distribution, symptoms or and signs at presentation, investigations performed, and treatment carried out was noted. Total number of patients admitted to the ward were compared with those suffering from neurological disorders.

RESULTS

Total number of patients admitted in this pediatric unit was 687. Those with neurological disorders accounted for 67 i.e. 8.89% of all cases. Most patients, forty one (61%) were males, while maximum number of patients thirty two out of sixty seven (48%) were between 1-5 years of age. Overall, 81% (54/67) of patients were less than 5 years of age.

Details of patients admitted with neurological disorders are given in Table-I. CNS infections, including bacterial meningitis (14/67;20.89%), encephalitis (10/67;14.9%), cerebral malaria (9/67;13.4%), tuberculous meningitis (5/67;7.45%), ventriculitis (2/67;3%) and brain abscess (2/67;3%) were the commonest neurological cause of hospital admission together comprising 62.5% (42/67) of all cases.

Seven children were of cerebral palsy who came with an array of problems like pneumonia, sepsis, uncontrolled seizures, etc. All of these patients had a motor deficit. Six had microcephaly, intellectual retardation and epilepsy. A history of birth asphyxia was present in five out of seven patients with cerebral palsy. Symptomatology of admitted patients with neurological problems is summarized in

Table-I: Details of patients admitted with neurological problems (n: 67)

Case	*N0.*	*%*
Bacterial Meningitis	14	20.90
Encephalitis	10	14.9
Cerebral Malaria	9	13.4
Cerebral Palsy with complication	7	10.43
Epilepsy	7	10.43
Tuberculous meningitis	5	7.50
Febrile fit	5	7.50
Brain Abscess	2	3.00
Rheumatic Chorea	2	3.00
Hepatic encephalopathy	2	3.00
Ventriculitis	2	3.00
Muscular dystrophy	1	1.50
Guillian Barre Syndrome	1	1.50

Table-II: Symptomatology in patients with neurological problems

Symptom	*No.*	*%*
Fever	59	87.91
Seizures	49	73.01
Altered Consciousness	21	31.29
Cough, Breathlessness	10	14.97
Weakness	9	13.41
Delayed Milertones	9	13.41
Reluctance to feed	6	8.94
Loose motions	6	8.94
Excessive crying	4	5.96
Enlarging head	2	2.98
Jaundice	2	2.98

Table-II. In these patients fever with or without seizures was the commonest symptom, being present in 59 patients (87.9%). Altered consciousness in twenty one (31.3%) and weakness in nine (13.4%) were other common symptoms. Patients presenting with weakness or paresis included known CP and muscular dystrophy. Some patients presented with general symptoms like breathlessness, loose motions, reluctant to feed and excessive cry. Patients with ventriculitis presented with enlarging head (Table-II).

Signs in patients with neurological disorders is given in Table-III. Altered consciousness as assessed by the decreased Glasgow Coma Scale was present in 36 patients (53.7%) of cases. Presence or absence of signs of meningeal irritation helped in differentiating between meningitis, encephalitis, etc. A cerebrospinal fluid Gram stain was positive in four patients of bacterial meningitis (25%), while culture was positive in three cases (19%), identifying Strep Pneumoniae and Klebsiella. CT scan was done in 18 cases. It was normal in 6 and identified pathologies including brain abscess, ventriculitis, hydrocephalus, cerebral edema in the rest.

Neurological deficits in patients with CNS infections are summarized in Table-IV. At least one documented neurological deficit was present in 5 patients (35.7%) with bacterial meningitis, three patients (30%) with viral encephalitis and one patient with cerebral malaria (11%). Sixty percent of patients with TBM (3/5) and all patients with brain abscess had neurological deficit. Commonest neurological deficit was motor deficit. Others were cranial nerve palsies, seizures, speech loss, cortical atrophy.

All patients suspected of a CNS infection were initially treated with empiric intravenous antibiotics. This included patients with febrile fits. Most of these patients were treated with a combination of ampicillin and chloramphenicol. Ceftriaxone was used as initial therapy when patient's condition at admission was quite serious. Other drugs used were ceftazidime and meropinem. In meningitis antibiotics were continued for 10 days. Acyclovir was only given in two instances, where herpes simplex encephalitis was confirmed and continued for 21 days. Patients with cerebral malaria were treated with intravenous quinine for 10 days. All patients responded well. Patients with TBM were treated with antituberculous drugs for a total of twelve months.

DISCUSSION

The results of this study indicated that CNS infections are the commonest neurological problems admitted into pediatrics ward. Bacterial infections were commonest followed by viral infections and protozoal infections ie

Table-III: Signs in patients with neurological problems

Signs	*No.*	*%*
Decreased Glasgow Coma Scale	36	53.64
Neck Rigidity	18	26.86
Motor Deficits	15	19.4
a) Rt. Hemiparesis	4	
b) Lt. Hemiparesis	2	
c) Spastic tetraparesis	8	
d) Spastic paraparesis	1	
II. Genral. Weekness Lower Neuron	2	
Microcephaly	6	8.94
Bulging Fontanelle	5	7.45
Cranial Nerve Palsy	5	7.45
Macrocephaly	2	2.98
Kernig's Sign, Brudzinki Sign	1	1.49

cerebral malaria. Literature review shows that viral infections are the most common CNS infections. The reason for this may be that some of the viral infections being very mild are missed. In our study, most patients were between one and five years of age. Dickinson and Perez[9] have also reported the highest incidence of bacterial meningitis in children between 1 and 5 years.

Fever, neck stiffness and mental state changes are present in less than 50% of adults with meningitis[10] and Kernig's and Brudzinski sign are present in only about 5% of adults with bacterial meningitis.[11] These signs are seen even less frequently in children. In our study, neck rigidity was present in eight out of fourteen patients (57%) with acute bacterial meningitis while Kernig's and Brudzinski sign were present only in one patient.

Literature search further revealed that as many as 80-90% of patients with untreated bacterial meningitis have a positive Gram stain.[12] In this study 25% positive gram stain in CSF reflects upon the injudicious use of antibiotics by GPs in our country. The same is true of low CSF culture yield. The yield of CSF culture decreases soon after antibiotic therapy.[13] In future more sensitive techniques such as amplification of the 16 S rRNA by polymerase chain reaction may help to diagnose patients pre-treated with antibiotics.[14]

In our set up first line therapy of bacterial meningitis in children beyond neonatal period is still ampicillin and chloramphenicol. However, latest recommendations for empiric therapy for meningitis beyond the neonatal period is Vancomycin plus a third generation cephalosporin.[15]

The incidence of sequelae following Cerebral malaria is described to be around 10%, which is similar to our figures. Long-term cognitive problems following cerebral malaria are recently being emphasized. In a recently published study by Boivin and associates[16] 21% of children had cognitive problems 6 months following it. These included impairment of working memory, and attention and this was more likely to occur in children who had a longer duration of coma and who had more seizures before admission. Our children should have a long-term follow up. Vaccines are being developed for malaria, of these MSP/RESA vaccine shows promise.[17]

In our study a history of birth asphyxia was present in five out of seven patients which is much higher to figures quoted in the international literature i.e. 3-21%.[18] This also points to the need for better obstetric services.

Table-IV: Neurological complications in patients with CNS infections.

Neurological Sequelae	*Bacterial Meningitis*	*Encephalitis Malaria*	*Cerebral Meningitis*	*Tuberculous Abscess*	*Brain*	*Total*
Motor Deficit	1	2	-	3	2	8
Cranial Nerve Palsy	1	1	1	1	1	5
Seizures	1	2	-	2	-	5
Hydrocephalus	2	-	-	3	-	5
Speech Loss	2	-	-	-	-	2
Cortical Atrophy	1	-	-	-	-	1

CONCLUSIONS

Neurological problems in children are an important cause for hospital admission, infections being most frequent. They are most frequent in males and in children younger than 5 years of age. Bacterial infections of the nervous system are more common than viral or protozoal infections. They most often present with fever or, fits. Altered sensorium is the commonest sign. Neurological deficits in CNS infections most frequently seen are motor deficits. This study will help in better planning regarding management of such patients in wards and in emergency.

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