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Frequency and Outcome of Meningitis in Pediatric Intensive Care Unit of Pakistan

Amna Jawaid¹, Surriya Bano¹, Anwar-ul-Haque² and Khubaib Arif¹

ABSTRACT

Meningitis is a leading cause of morbidity and mortality worldwide in intensive care settings. The aim of this study was to assess the frequency and outcome in children with meningitis through a retrospective chart review done in pediatric intensive care unit of a tertiary care hospital from January 2000 to December 2014. During these 14 years, 64 patients were admitted with meningitis in pediatric intensive care unit. Out of 64, 36 were diagnosed with pyogenic meningitis, 18 patients with viral meningitis, and 10 with tuberculous meningitis. Most complications were observed in the initial 48 hours. Most common presentation was altered level of consciousness in 50 (78.1%), seizure in 38 (59.4%), and shock in 23 (35.9%) patients. Ventilatory support was required in 30 (46.9%) patients and inotropic support in 26 (40.6%). During stay in pediatric intensive care unit, there was 7.8% mortality. Although meningitis was an infrequent cause of hospitalization at the study centre, but it was an important infectious cause of mortality and morbidity in pediatric age group and associated with high neurological sequelae.

Key Words: Meningitis. Children. Complication. Pediatric intensive care unit.

Meningitis is one of the important causes of childhood febrile illness. Despite advances in diagnosis, treatment and vaccine development, meningitis remains a devastating problem in children age group.¹ According to World Health Organization, bacterial meningitis affect 1.2 million people worldwide, causing 135,000 deaths.² Mortality is 100% in untreated patient; and even with modern treatment and intensive care unit management, mortality is 5 - 10%.³ Outcome of disease depends on factors like age, early diagnosis, early treatment, duration of treatment, and microorganism. These are important in relation to outcome.⁴ Complications of meningitis like multiple organ system failure, as well as shock and acute respiratory distress syndrome should be managed in pediatric intensive care unit. Singhi *et al.* reported significant decrease in mortality of meningitis with the start of intensive care services in their hospital.⁵ Multiple studies have been done in Pakistan regarding meningitis. But there is scanty of data about outcome of meningitis in pediatric intensive care unit. The objective of this retrospective study was to identify indicators, outcome, and mortality of meningitis in pediatric intensive care unit at the Aga Khan University Hospital, Karachi.

This was a retrospective, chart review. All the pediatric patients aged 1 month to 16 years, who were admitted in pediatric intensive care unit from January 2000 to

December 2014, were included in the study. After ERC approval, the data was retrieved through medical record as three components of demographic, clinical and outcome data. Data was collected on the proforma and transferred into SPSS for analysis. Percentages and frequencies were used for qualitative variables; whereas mean and standard deviation/median IQR for quantitative variables.

During those 14 years, 64 patients with meningitis were admitted in the pediatric intensive care unit. Fifty (78.1%) were males and 14 (21.9%) females. The minimum age was 1 month and maximum age was 14 years with median (IQR) of 31 months (7.00 - 82.50). Sixty-seven percent of them were below 5 years. Bacterial meningitis was diagnosed in 36, viral meningitis in 18, and tuberculous meningitis in 10 on the basis of investigation. Cerebrospinal fluid culture was not done in 3 patients. Out of the 36 patients labelled as bacterial meningitis, 4 (11.11%) had positive cerebrospinal fluid culture. Latex particle agglutination was not done in 24 patient; so out of 40 patients, it was positive in 9 (22.5%) patients. *Streptococcus pneumoniae* was positive in 5 and *Hemophilus influenza* was positive in 4 patients.

Most of the complications were observed in the initial 48 hours of admission, in children less than 5 years of age with bacterial meningitis. The commonly observed complications were altered level of consciousness in 50 (78.1%), seizure in 38 (59.4%), and shock in 23 (35.9%) patients. Ventilator support was required in 30 (46.9%) and inotropic support in 26 (40.6%) patients. Outcome of meningitis seen in terms of patient survival and length of stay. The minimum length of stay was 1 day and maximum was 45 days with median (IQR) of 10 days

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Table I: Characteristics of patients with meningitis.

Variable	n (%)
Age	
< 5 years	43 (67)
> 5 years	21 (33)
Median(IQR)	31 (7.00-82.50)
Gender	
Male	50 (78.1)
Female	14 (21.9)
Diagnosis	
Bacterial meningitis	36 (56)
Viral meningitis	18 (28)
Tuberculous meningitis	10 (16)
Complications	
Altered level of consciousness	50 (78.1)
Seizure	38 (59.4)
Shock	23 (35.9)
Ventilatory support	30 (46.9)
Inotropic support	26 (40.6)
Length of stay(days)	
Minimum	1
Maximum	45
Median(IQR)	10 (4-13)
Outcome	
Survive	59 (92.2)
Expire	5 (7.8)

(4 - 13). Mortality observed in 5 (7.8%) patients in pediatric intensive care unit. These children were of less than 5 years and had multiorgan dysfunction thus required high modality treatment.

Males were the predominant population in this study, as also shown by Farag *et al.*⁶ As shown by others, younger patients with meningitis were admitted to pediatric intensive care unit in this study. This could be due to the fact that in the local population, immunity is low because of malnutrition, poor hygiene and lack of immunization.⁷ Most of the complications were observed in initial 48 hours, in patients with bacterial meningitis. The most common complication was altered level of consciousness; but unfortunately, the studied pediatric intensive care unit is not equipped with intracranial pressure

monitoring device. Other observed complications were seizures and shock, which required life support measures in the form of invasive monitoring, inotropic support and mechanical ventilation. Delay in recognition of meningitis at primary and secondary levels, lack of immunization against preventable diseases like *Hemophilus influenza*, and *Pneumococcus* organisms, which were higher in our population, could be the possible reasons. This study reported mortality as 7.8%. Commonly affected population was children less than 5 years with bacterial meningitis, had more severe illness in the form of low Glasgow coma scale.

As this was a retrospective chart review, with small sample size, so actual indications for pediatric intensive care unit care admission was not known. Secondly, the authors could not measure the functional outcome of survivors. So this study should be repeated over multiple centres with large sample size.

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