Mortality and Morbidity Of 118 Cases of Acute Pyogenic Meningitis in Paediatrics Age Group

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One hundred eighteen cases of acute pyogenic meningitis were admitted in the department of paediatrics Liaquat Medical college Hospitals Jamshoro/Hydrabad during one year period with a prevalence of 1.57% of total admissions. Thirty one were neonates and 87 were of post neonatal age group. Gram negative micro-organisms responsible for (66/118) 55.93% of cases with high fatality rate, whereas E.coli was responsible 13/31 (41.93%) in neonates with fatality rate of 58.33% (7/12). In post neonatal period streptococcus pneumoniae responsible for 31/878 cases with fatality rate of 44% (11/25), and H.influenzae prevalence was 17.24% with fatality rate of 28% (7/25) and Niseria meningitidis was responsible for 28.73% (25/87) cases with fatality rate of 8% (2/25). The overall fatality rate (mortality + morbidity) was 31.35% (37/118) various factors responsible for fatality are poor nutritional status, delay in referring the cases and to start of optimal therapy, lack of prompt laboratory aids for identification and sensitivity of micro-organisms, the modified clinical pictures as a result of inadequate treatment before admission.

Key words: Acute pyogenicmeningitis, paediatrics, mortality, morbidity

Meningitis is an acute inflammation of the covering of the brain, spinal card, and the fluid residing in the space. It may organize to form adhesions and produce obstruction to the free flow of C.S.F leading hydrocephalus and damage to the cranial nerves at the base of brain (Iqbal SM, 1989 and Taj MM. Et al 1993). Pyogenic meningitis is a common serious diseas in children accounting for 1.5% to 3% of total admissions (Bhutta ZA, 2000). This serious disease has 8-20% mortality. If not treated properly and promptly neuro-developmental sequelae may occur in 10-20% of the cases (Butta ZA 2000, Mackracken G.H.Jr 1999). Approximately 5000 deaths in infancy and almost twice as many handicapped cases in infants occur every year in Pakistan (Dodge PR, et al 1999).

The success of treatment is not only depends upon the type of micro-organisms, but also other different variable associated with the disease at the time of admission.(Azam M;1999). A knowledge of the prevalent organisms in the community in different age as well other variables can help the physician to manage the cases more easily and appropriately. (Tanner DJ; 1999). The prognostic points when identified can hellp to make the policies to reduce the fatality in the disease.

Material and methods:

This study was conducted in department of paediatrics Liaquat Medical College Hospitals Jamshoro/Hydrabad. All the 150 cases suspected of meningitis were admitted, of which 22 suspected cases included 12 neonates and 10 of post neonatal group who during investigation process left against medical advise and attendant of 10 cases had refused for lumber puncture.

In this study 118 cases of acute pyogenic meningitis were studied, among these 66 were male and 52 were female, 31 were neonates and 87 were of post neonatal period. Fifty 42.37% had positive gram staining and thirty 25.47% had positive C.S.F Culture and Sensitivity, only in5/31 (16.12%) neonates blood culture was positive, whereas latex agglutination was positive in 106 (89.83%) cases. Ninety patients parent belonging to low socio-economic class and 16 neonates (51.62%) were low birth weight , whereas 73.45 % of post neonatal group patients were malnourished.

From 0-2 months of age most of patients presented with non specific symptoms such as Reluctance to feed, fever instability, irritability, lathergy, fits, vomiting, temperature instability, diarrhea, cough and bleeding. Patients with post neonatal period mostly presented with fever, irritability, seizures , vomiting, lathergy , headache , reluctance to feed, cough, photophahia , diarrhea, diphlopia and constipation.

The patients were properly investigated including blood sugar, blood complete picture, blood culture, CSF cytochemical analysis, C.S.F culture and latex agglifinaltim test were performed.

Streptococcus pneumoniae was the major pathogen isolated in 34/118 (28.81%) cases, niesseria meningitides in 25/118 (21.18%), E. coli in 18/118 (15.25%). H. influenzae in 5/118 (12.71%) pseudomonas 5/118 (4.23%),Staphylococcus aureus 3/118 (2.54%) group B-streptococcus 3/118 (2.54%) klebsella pneumoniae in 3/118 (2.54%), and in 12/118 (10.16%) cases the organisms were not isolated. However, the clinical presentations, signs and CSF findings were compatible with diagnosis of bacterial meningitis in 13/18 (72.22%) cases, E. coli were under one month of age and staphylococcus aureus 3/3 (100%) were under 1 month of age too. The haemophilus influenzae 13/15 (86.68%) cases were between 6 to 24 months of age and none in neonate. 22/34 (64.70%) cases of streptococcus pneumoniae were under 24 months of age of which 3 cases were seen in neonatal age group Whereas cases with

N. meningitides 20/25 (80%) were in between 2-12 years of age and non in neonatal age group.

Results:

The mortality rate of studied cases was 13.35% (16/118), of which 10 patients died with in the first 2 days of admission and 6 died with in the first week of admission. In neonatal age group 6/31 (19.35% was the mortality rate, of which 3/6(50%) were due to E.coli, 1/6 due to streptococcus penumoniae and 2/6 (33.33%) cases died of unidentified micro-organisms, whereas 19/31 (61.29%) improved (Table 1,2)

Table 1: Outcome acute ppyogenic meningitis according to the age.

	No. of cases		IMPROVED		SEQUELAE		DEATHS	
Age	Total	%age	Nos. of cases	%age	No. of cases	%age	Nos. of cases	%age
0-1 months	31	26.27	19	61.39	06	19.35	06	19.35
2-12 months	46	38.98	30	62.21	08	17.39	08	17.39
2-5 years.	21	17.79	16	76.19	04	19.04	02	4.76
6-12 years.	20	16.94	16	80	03	5.0	-	.0
Total	118	100	81	68.64	21	17.79	16	13.55

Table 2: Outcome of acute yogenic meningitis, according to the organisms involved.

Organisms	Nos. of cases	Improved	Neurological Damage	Deaths
E.Coli	18	09	05	04
Group B, streptococcus	03	02	01	-
H.influenzae	15	08	05	02
S.pneumoniae	34	22	06	06
N.meningitidis	25	23	01	01
S. aureus	03	03	-	-
Pseudomonas	05	04	01	-
Klebsella	03	03	-	-
Unidentified	12	07	02	03

Table 3: Statement showing nos. of total deaths. Deaths due to acute pyogenic meningitis and Nos. of cure cases from acute pyogenic meningitis.

	Total	Neonatal	%age	Beyond Neonatal Period	%age
Nos. o f total admission during study	7480	305	4.07	7175	95.92
Deaths during the study period.	501	110	21.95	391	78.04
Deaths due to the acute pyogenic meningitis (studied)	16	06	37.5	10	62.5
Completely cured from acute pyogenic meningitis.	81	19	23.45	62	76.54

Table 4. Complications of acute pyogenic meningitis during hospitalization and on follow up. SIADH

Complications	Total Nos.	Neonatal Age	Post Neonatal 2-12 Months	Age 2 years and above
Hydrocephalus Isolated	04	02	02	-
Hydrocephalus with deafness.	01	-	-	01
Subdural effusion.	03	01	01	01
Hemiparesis Isolated.	01	01	-	-
Hemiparesis associated with deafness	01	-	-	01
Hemiparesis associated with SIADH.	01	-	01	-
Paraparesis	02	01	01	-
Monoparesis	01	-	01	-
Fits.	02	-	01	01
Facial nerve palsy.	01	-	-	01
Squint.	01	-	-	01
Developmental delay.	01	01	-	-
Behavior changes	01	-	01	-
Arthritis	01	-	0	01

Table 5: Causes of prolong fever in 10 cases during our study period.

Cases of Prolong Fever	Nos. of Cases	Percentage
Subdural effusion	02	20%
Hydrocephalus	02	20%
Otitis media	01	10%
Phlebitis	01	10%
Pneumonia	01	10%
Urinary tract infection	01	10%
Drug fever (rashes)	01	10%
Unknown	01	10%

In two to twelve months of age the mortality rate was 8/46 (17.39%), of which 3/8 (37.51 %), were due to streptococcus pneumoniae, 2/8 (25 %) deaths were due to H.influezae, 1/8 (12.5 %), died of niesseria meningitides, 1/8 (12.5%) due to E.coli and 1/8 (12.5 %) deaths due to unidentified micro-organisms. In 2 to 5 years of age mortality rate was 2/21 (9.52%) and both deaths due to streptococcus pneumoniae, in 6 to 12 years of age there was no mortality (Table No.1-2)

The mortality rate of the total admission during the study period was 6.69% (501/7480), of which 21.95% (110/501) were in neonatal period and 78.04% (391/501) cases were in the post neonatal period. Mortality due to acute pyogenic meningitis was 3.19% (16/501) in total which includes 5.45% (6/110) mortality due to acute pyogenic meningitis in neonatal period and 2.55% (10/391) mortality due to acute pyogenic meningitis beyond neonatal period (Table No 3).

Explanatory Note:- Figure in parenthesis shows percentage of disease out of the total cases of the same disease.The highest mortality 87.50%, was seen under one year of age where 14 cases died. Mortality rate in 1 to 5 year of age was 12.50% (Table No. 1)

Discussion:

Acute pyogenic meningitis is still a fatal disease, not only takes lives of so many children, but also leaves a large number of the handicapped, crippled, deaf and blind; causing a lot of problems for the family community as well as the country. (Khichi Qasim Ghulam et al ; 2003)

In our study mortality rate was 13.55% with highest rate (6/31) 19.35% in neonatal age of which 50% was due to the E.coli and in post-neonatal period under one year of age the mortality rate was (8/46) 17.39% of which 6.52% was with streptococcus pneumoniae and 4.34% with H.influenzae. From one year onward mortality reduced to (2/41) 4.87% with the streptococcus pneumoniae as responsible micro-organism.

The mortality rate in unidentified micro-organism meningitis cases was (3/12) 25% out of which 16.66% was in neonatal age and 8.34% was in infancy period. A total mortality rate of 14.3% by Azubuick JC et al, in 1990, and 19.8% by Louvis J et al, in 1991 was shown in their studied. Roff HV et al, 1988 showed 50% mortality by gram negative micro-organisms in neonatal bacterial meningitis and 65% mortality was reported by Butler Ian J 19 74 and 27.3% by Y Akbani Y, due to gram negative micro-organisms out of total mortality in neonatal pyogenic meningitis. Where as the whole fatality rate was28% by Taj MM et al ; 1993.

Streptococcus pneumoniae was associated with high mortality of 5/10 (50%) in post-neonatal period in our study. In a series of 107 cases of meningitis by Swartz, cited by Friedman Allan, 1980 showed that streptococcus pneumoniae was responsible for 30% of mortality rate. In our study 61% mortality rate was in males and 39% in females. Akbani,Y et al, 1988 showed 66.7% mortality in males and 33.3% in females, it may be due to the high incidence of meningitis in males.

In our study (13/16) 81% mortality was seen in those patients, who were admitted late in the course of illness. Haqani et al 1966 also showed (23/34) 68% mortality in those cases who came late for admission.

Complications:

The total morbidity rate in cases included in our study was 21/118 (17.79%). In neonatal age group it was 6/31 (19.35%), in 1 month to 12 months of age it was 8/46 (17.39%) and in 2 to 12 years of age it was 7/41 (17.07%). The following were the complications noted during stay in the hospital or on follow up which was limited (Table 4 and 5):

Occurrence of sequelae during or after the disease process also remained a contributing factor for increase fatality rate. In our study (21/118) 17.79% cases were observed to have sequelae during admission or on follow-up. The highest prevalence of sequelae (14/21) 66.66% were observed under one year of age. In neonatal age group gram negative micro-organisms were the culprit for (5/6) 83.33%, where as after neonatal age streptococcus pneumoniae (6/15) 40% and H.influenzae (5/15) 33.33% were responsible. Bell W.E et al, 1982 showed the highest incidence of sequelae due to gram negative micro-organisms in neonatal age group and Jadarji et al, 1987 observed 57% sequelae due to streptococcus pneumoniae. Despite early diagnosis prompt initial treatment and the use of newer generation antimicrobial agents, bacterial meningitis continues to cause significant mortality (13.55%) and morbidity (17.79%). Thus over all fatality rate of 31.35%, is not a satisfactory situation which we have tried to anaylyse and would comment on various causes failure in the treatment of meningitis. In our study 51.27% of neonatal cases were of low birth weight, 74.39% cases were malnourished and belonged to the low socio-economic class, were related with hight fatality rates. Our hospital class children in pre-school age are grossly malnourished and in these group the rate of infectious disease are significantly higher as a result of malnutrition. Bell AH et al, 1989 also detected high fatality rate in low birth weight neonates with meningitis and Coovadia YM et al, 1989 also noted that 67% of neonatal cases, with meningitis were low birth weight with high fatality rate. Haqani AK et al, 1966 showed that high fatality rate was associated with low socio-economic conditions and poor nutritional status.

The duration of illness before admission to the hospital appears to be a signaificant factor. In cases of our study who came to hospital early had cure rat of 80.26% and those who consulted late had 47.61% cure rate so the conclusion is obvious that longer the delay in starting the proper therapy worse is the prognosis. If all the above risk

factors are prevented there will be possibility for reduction of fatality rate.

Prolonged fever in meningitis was common problem in our studied patients, neither relapse nor inadequate response to the antibiotic was the cause for prolong fever. We concluded that in 8.47% (10/118) cases of prolong fever (2/10) 20% was due to subdural effusion and 20% due to hydrocephalus (Table No 4) which tally with results of Rutman DL et al, 1981 and Daud AD et al 1989 who concluded that prolonged fever in patients with bacterial meningitis is rarely caused by primary infection.

Conclusion:

Prolong duration of illness prior the admission leading to delay the diagnosis and initiation of effective and adequate management of the disease, disease under one year of age low birth weight nutritional status of the patients, while the growth of streptococcus pneumoniae from the same sample of C.S.F are significant variables of the fatal outcome in patient with acute pyogenic meningitis.

Recommendations:

The antibiotic alone do not cure the acute pyogenic meningitis, the importance of intensive care of patients during hospitalization, generally to improve the public awareness and Health Education Campaign at mass level and particularly to health workers is need to inform them about the early presenting complaints of the disease, for early reporting, at time of referral immunization programs specially against pneumococcus and H.influnzae, better nutritional status, with breast feeding these all will generally reduce the fatality rate in meningitis.

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