ORIGINAL ARTICLE

ETIOLOGICAL SPECTRUM AND ANTIBIOTIC SENSITIVITY IN CHILDREN WITH ACUTE PYOGENIC MENINGITIS

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ABSTRACT

Objective: To determine the frequency of causative organisms and their sensitivity spectrum in newly diagnosed acute septic meningitis.

Material and methods: This study was conducted at department of Pediatrics and Child Health, Khyber Teaching Hospital, Peshawar, Pakistan from June 2017 till December 2017. A cross-sectional descriptive study design was used and 88 patients presenting with clinical signs and symptoms of acute septic meningitis were selected through non randomized convenient sampling. Before enrolling the patients informed consent was taken from the attendant.For every patient a proper record was maintained on a standardized proforma.Detailed history and examinationwas done with a special emphasis on signs and symptoms suggestive of meningitis were documented. Lumber puncture was performed under aseptic technique and samples were sent for analysis and culture to the Khyber Medical College Pathology Department. Where the CSF culture was performed by Bactec Machine using special culture bottle and the sensitivity pattern was determined against commonly used antibiotics. Patients age less than 15 years with clinical features suggestive of Acute Septic Meningitis were included in the study while those who have taken IV Antibiotics in the last 24-48 hours and Patients with TBM or Viral meningitis were excluded.

Results: Out of 88 patients with meningitis 7 (7.9%) patients had positive CSF Culture. 10 patients had staphylococcus Epidermidis growth which was considered contamination. Out of 7 positive culture 3 (3.4%) patients had MRSA positive CSF Culture, 2 (2.2%) patients had Staphylococcus Aurius and 1 (1.1%) patients each had Streptococcus Pneumonie and E.Coli in CSF Culture.

Conclusion: In our study it was found that MRSA is the commonest cause of septic meningitis comprising 3 (3.4%) patients followed by Staphylococcus Aurius in 2 (2.2%) and 1 (1.1%) patient each had Streptococcus Pneumonie and E.Coli. Septic meningitis is a serious condition and inappropriate or delay in the management may result in serious fatal complications therefore aggressive and appropriate antibiotic therapy is vital for better outcome.

Key Words: Acute, Pyogenic Meningitis, Cerebrospinal fluid (CSF)

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INTRODUCTION

Acute bacterial meningitis (ABM) is a life threatening illness that is prevalent worldwide. It is a medicalemergency that needs early diagnosis and aggressive therapy. Despite advances in management and vaccination, bacterial meningitis remains a severeinfection with high rate of mortality and long termneurological disabilities[1]. It has increased mortality and morbidity in the developing countries due to poor health facilities, poor living conditions and lack of access to appropriate preventive and curative services[2,3]. In recent years, despite improvements in Antimicrobial therapy and intensive care support, overallmortality rates related to bacterial meningitis is around 20 to 25% reported by major centers[4]. Early clinical suspicion and implementation of appropriate antimicrobial therapy are critical to minimize adverse outcomes, Therefore accurate diagnosis is necessary regarding the important etiological agents to ensure appropriate management[5]. As meningitis is a serious emergency, rapidexamination of cerebrospinal fluid (CSF) is consideredan essential and critical step in early diagnosisand management of the patients[6]. Meningitis is mainly diagnosed on the basis of history, clinical examination and cerebrospinal fluid examination. Conventional culture methods, though gold standard diagnostic technique, cannot be relied upon in certain situations, due to delay in results availability

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and relatively limited bacterial growth on culture that is reported worldwide specially in situations where prior antimicrobial therapy was administered[7]. Accurate information on important etiologic agents and populations at risk is needed todetermine public health measures and ensure appropriate management of acute bacterial meningitis[8]. Most cases of bacterial meningitis occur in childhood and its pathogens are varied in different age groups. Streptococcus pneumoniae, Neisseria meningitidis, and Haemophilus influenzae type b are among the prevalent bacterial pathogens of this disease.[9] Introduction of Streptococcus pneumoniaeand Haemophilus influenzae type bvaccines recently have changed the epidemiology of acute bacterial meningitis.[10] There has been a decrease in the incidence of H. influenzae type b and S. pneumoniae meningitis in countries where vaccination plan is generally performed against the two bacteria[11].

MATERIAL AND METHOD

This study was conducted at department of pediatrics, Khyber teaching hospital, Peshawar from June 2017 to December 2017. A cross-sectional descriptive study design was used and 88 patients presenting with clinical signs and symptoms of acute septic meningitis were selected through non randomized convenient sampling. Before enrolling the patients informed consent was taken from the attendant.For every patient a proper record was maintained on a standardized proforma.Detailed history and examination was done with a special emphasis on signs and symptoms suggestive of meningitis were documented. Lumber puncture was performed under aseptic technique and samples were sent for analysis and culture to the Khyber Medical College Pathology Department. Where the CSF culture was performed by Beckitic Machine using special culture bottle and the results were received and interpreted. The cases were then managed according to the standardized management criteria.

RESULTS

In our study Total 88 patients with clinical suspicion of meningitis were included out of which 7 patients(7.9%) had positive CSF Culture. 10 patients had staphylococcus Epidermidis growth which was considered contamination. Out of 7 positive culture 3 patients (3.4%) had MRSA positive CSF Culture, 2 patients (2.2%) had Staphylococcus Aureus and 1 patient (1.1%) each had Streptococcus Pneumoniae and E.Coli in CSF Culture. All MRSA growths were sensitive to Linezolid and 2 to Vancomycin, while all were found resistant to Ciprofloxacin. Both S. Aureus growths were sensitive to Ciprofloxacin, Linezolid and Gentamycin while one was resistant to Clindamycin and other to Erythromycin and Levofloxacin. S. Pneumoniae was found sensitive to Vancomycin, Meropenem and Doxocycline while resistant to Amikacin, Clindamycin, Ciprofloxacin and Gentamycin. E. Coli growth was found to be sensitive to Amikacin, piperacillin/tazobactam and Meropenem while resistant to Cefotaxime, Ceftriaxone, Ciprofloxacin and Levofloxacin. Out of 88 patients 42 (47.7%) were male and 46 (52.3%) were female and 3 (7.1%) and 4 (8.6%) patients were found culture positive respectively. 42 (47.7%) patients were below 1 year, 1-5 years and above 5 years patients were 23 (26.1%) in each group. 2 patients (2.2%) were culture positive in below 1 year age group while 4 (4.5%) and 1 (1.1%) patient from 1-5 years and above 5 years group respectively. Fever was found to be the commonest finding in 84 (95.4%) patients, followed by fits in 44 (50%) patients, up going planters in 40 (45.4%) patients, neck stiffness in 32 (36.3%) and altered sensorium in 27 (30.6%) patients.

DISCUSSION

Bacterial meningitis, an infection of the membranes(meninges) and cerebrospinal fluid (CSF) surrounding thebrain and spinal cord, is a major cause of death and disability worldwide[12]. The mortality rate of acute bacterial meningitis remains significantly high in developing countries and is found to be around 16-32%[13,14]. The current standard for the identification of bacterial meningitis in developing countries remains to be microscopic examination and consequent culture of CSF[15]. In our study a total of 7.9% patients had culture positive CSF while its reported to be 13.7% by Attia et al[16] and 6.7% by Maleehaetal[17]. In our study the commonest organism isolated was MRSA (3.4%) followed by Staph Aurius (2.2%), Staph Pneumonia (1.1%) and E. coli (1.1%) in contrast to coagulase negative staphylococci (5.5%), S.Pneumoniae (2.5%) and H. Influenzae (1%) by Attia etal16 while in another study Staph Pneumoniae (1.5%), E.coli (1%) and coagulase negative staphylococci (1%) were reported by Maleehaetal[17]. In our study 47.7% patients were below 1 year of age which is similar to a study conducted by Dharubajjoti et al which reported 46.8% of hospitalized children with meningitis below 1 year while it has been reported 68.3% by Attia et al[15,18]. In our study 47.7% patients were male while 52.3% patients were female, in contrast to 63.8 % male and 36.2 % female reported by Attia et al while Rajani et al reported 55.2 % males and 44.8 % females[15,19]. In our study Fever was found to be the commonest finding in 84 (95.4%) patients, followed by fits in 44 (50%) patients, up going planters in 40 (45.4%) patients, neck stiffness in 32 (36.3%) and altered sensorium in 27 (30.6%) patients, while another study by Fahmi Y K et al reported fever in 94% patients, fits in 19.7%, neck stiffness in 26.5%, and altered sensorium in 47% patients[20].

CONCLUSION

There is a change in pattern of organisms involved in causing acute bacterial meningitis in children at Peshawar. MRSA is the commonest organism which was sensitive to Lonziolid more than Vancomycin and children below 1 year age were the most effected age group. Fever and fits were found to be the commonest

presenting complaints.

RECOMMENDATIONS

Patients receivedwith fever, altered sensorium, fits and the clinical signs suggestive of meningitis mentioned above should be hospitalized, Antibiotic cover for meningitis is to be started immediately,cerebrospinal fluid routine examination and culture should be sent urgently to avoid the complications of meningitis.

REFERENCES

1. Namani S. Milenkovic Z, Koci B. A prospective study of riskfactors for neurological complications in childhood bacterialmeningitis. Jornal de Pediatria2013; (89):256-62.
2. R. Miller and K. Houlberg, Meningitis service age personnel. Journal of the Royal Naval Medical Service, 2015 (101), 63-68.
3. Gurley ES Hossain, M.J Montgomery SP . Etiologies of bacterial meningitis in Bangladesh: Results from a hospital based study.The American journal of Tropical Medicine and Hygiene, 2009: 81 (3). 475-483.
4. Durand ML, Calderwood SB, Weber DJ, Miller SI, Southwick FS, Caviness VS,et al. Acute bacterial meningitis in adults: A review of 493 episodes. N EnglJ Med. 1993;328:21–8.
5. Andersen J, Backer V, Voldsgaard P, Skinhoj P, Wandall JH. Acute meningococcalmeningitis: analysis of features of the disease according to the age of 255patients. Copenhagen Meningitis Study Group. J Infect. 1997;34:227–35.
6. Rao BN, Kashbur IM, Shembesh NM, et al. Etiologyand occurrence of acute bacterial meningitis inchildren in Benghazi, Libyan Arab Jamahiriya.Eastern Mediterranean Health Journal 1998; 4 (1):50-57.
7. Azmat A, Javaria I, Ahsan N. Infrequent isolates on culture of cerebrospinal fluid in patients with meningitis is adults.J Med Sci 2018; 26: (1) 9-13.
8. M. C. Brouwer, A. R. Tunkel, and D. van de Beek, “Epidemiology,diagnosis, and antimicrobial treatment of acute bacterialmeningitis,” Clinical Microbiology Reviews, 2010; 23(3),467–492,
9. El Bashir H, Laundy M, Booy R. Diagnosis and treatment of bacte¬rial meningitis. Arch Dis Child. 2003;88(7):615–20.
10. Davison KL, Ramsay ME. The epidemiology of acute meningitis in children in England and Wales. Arch Dis Child. 2003;88(8):662–4.
11. Gessner BD, Sutanto A, Linehan M, Djelantik IG, Fletcher T, Geru¬dug IK, et al. Incidences of vaccine-preventable Haemophilus influenzae type b pneumonia and meningitis in Indonesian children: hamlet-randomised vaccine-probe trial. Lancet.
12. World Health Organization (WHO) meningitis manual. : Laboratory Methods for the Diagnosis of Meningitis caused by Neisseria meningitidis, Streptococcus pneumoniae, and Haemophilus influenzae, second edition, 2011.
13. Mani R, Pradhan S, Nagarathna S. Bacteriological profile of community acquired acute bacterial meningitis: A ten year retrospective study in a tertiary neurocarecentre in South India. IJMM 2007; 25;108-14
14. Madhumita P, Gupta N. Clinical and bacteriological spectrum of community acquired acute bacterial meningitis in adults at a tertiary care hospital in northern India. IJNPND 2011; 1;194-200
15. Dunbar SA, Eason RA, Musher DM, Clarridge III JE. Microscopic examinationand broth culture of cerebrospinal fluid in the diagnosis of meningitis. J Clin Microbiol. 1998;36:1617–20.
16. Attia B, Fatima Z, Aiza Z ETAL. Childhood Acute Bacterial Meningitis: clinical spectrum,bacteriological profile and outcome. JCPSP, 2016, vol 26(10): 822-826.
17. Maleeha A, Rubeena H, M. Tahir. Bacterial meningitis: A diagnostic approach. Biomedica Vol.22(jul-dec 2006).
18. Dhubajyoti P, Debnath, Wanjpe A, Kakrani V. Epidemiological study of acute bacterial meningitis in admitted children below 12 years of age in a tertiary care hospital in Pune, India. India Med JDY Patil Univ 2012; 5:28-30.
19. Rajani G, Sarmila T, Shamshul A. Bacterial meningitis in children under15 years of age in Nepal. BMC Pediatrics (2015) 15:94
20. Khan FY, Abu-Khattab M, Almaslamani EA, Hassan AA, Mohamed SF, Elbuzdi AA, Elmaki NY, Anand D, Sanjay D. Acute Bacterial Meningitis in Qatar: A Hospital-Based Study from 2009 to 2013. BioMed research international 2017.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

Muhammad J: Main Idea.

Rehman Y: Statistical analysis.

Amir S: Screens of patients

Rahim F: Literature Search

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.