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Clinical And Bacterial Profile Of Pyogenic Meningitis in Children

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ABSTRACT

AIM

To describe the clinical,bacterial and epidemiological profile of Pyogenic meningitis(PM) in children aged between 3 months to 15 years.

METHODS

We conducted a retrospective study of all cases of pyogenic meningitis collected in the Department of pediatrics of Adichunchanagiri Institute of medical sciences, during a period of June2012-May2014.Thirty cases of pyogenic meningitis based on inclusion and exclusion criteria were recorded and their profile analyzed retrospectively.

RESULTS

Majority of the cases (92%) occurred during infancy. The most frequent organisms were Streptococcus pneumonia(43%) and Haemophilus-influenza(40%) followed by Neisseria meningitides(6%) . The main clinical manifestations were fever (100 %), seizures (28 %) and vomiting (22 %). Bulging fontanel was noted in 15cases (55 %), somnolence in 11 cases (40 %) and axial hypotonia in 12 cases (44 %). 29% of the children were found to have post meningitis sequel

INTRODUCTION

Pyogenicmeningitis(PM) in children remains a important pediatric problem because of their impact on morbidity andmortality 1,2. In recent years, significant changes in the epidemiology of bacterial meningitis in children are observed. They are a consequence of the introduction of vaccines against the bacteria involved in meningitis . The objectives of our study were to describe the PM profile in our region and specify the latest treatment recommendations of PM in children.

Methods

We conducted a retrospective study of all cases of PMadmitted in the Department of Pediatrics of Adichunchanagiri Institute of medical sciences, during a period of June2012-May2014.The inclusion criteria were: a)age 3 months - 15 years;b) identification of the organism by direct examination of cerebrospinal fluid (CSF) and / or the presence of soluble antigens positive in CSF and / or CSF cultures. Infants under 3 months were excluded. We retrospectively analyzed the records collected during the study period for clinical,bacterial and epidiomological profile of all 30 cases included in study.Then we analyzed the results by software SPSS Type-15 Descriptive statistics were used to summarize the data. Categorical variables were expressed as frequency while quantitative variables were expressed as means and standard deviations. The correlations between the variables were tested by the test chideux. The significance level was set at0.05.

RESULTS

Epidemiological Study : Hospital incidence of PM was 1.8 / 1,000 hospitalizations. We found a clear winter predominance (52%). The majority of our patients (92%) were infants with average age at diagnosis one year 6 months with a male predominance and a sex ratio of 1.7. All patients were vaccinated according to the national immunization schedule but none of them received vaccine againstHaemophilusinfluenza andS.Pneumonia.

Clinical study : The average time taken for consulting the doctor after onset of symptoms was2.8 days. Fever(63%) was a constant cause of consultation and was usually between 39 °C and 40 °C (63%).and associated with vomiting in 15 cases (50%) and seizures in 8 cases (28%). Initial examination showed drowsiness (40%), axial hypotonia (44%), a bulging fontanelle (55%), stiff neck (29%) and signs of kerning and Brudzinski (7 %). Blood examination showedneutrophilic leukocytosis in 24 patients (80%). CRP was positive in 28 patients (93%).

Bacteriological study : CSF was cloudy in 28 cases (93%). Cell count more than 100 / mm3 was noted in 27 patients (90%) which was predominantly neutrophils in 90% of children and lymphocyte in 3 patients who received prior antibiotics diffusible across the blood-brain barrier. CSF glucose was low in 26 cases and was less than 2 mmol / l in 48%. CSF Gram staining was positive in 23 cases (76%) of which11 each were Gram-negative bacilli and gram-positive diplococciand one was Gram-negative cocci. The search for soluble antigens performed in 12 cases, was positive in 4 cases. The culture was positive in 27 cases (90%). It showed: a Haemophilusinfluenzae b (HI) (12 cases), Streptococcus pneumoniae (SP) (13 cases) and Neisseria meningitidis (NM) (2 cases). The culture was negative in 3 patients. We collected 28 cases of PM in infants. The cause was identified in 25 cases of which 12 were H.Influenzameningitis(HIM), 11 S.Pneumonia meningitis(SPM) and 2 N.Meningococci meningitis(NMM). The 2 cases ofPM in older children were secondary to SP.

Pneumococcus was sensitive to Penicillin G in 10/13 cases, ampicillin in 11/13 cases and cefotaxime and vancomycin in all cases. Haemophilusinfluenzae b had an intermediate sensitivity to Peni G in 3 cases / 11 and it was resistant to amoxicillin in 3 cases.

Treatment The first-line antibiotic therapy was usually guided based on direct examination was based to be replased by and was ceftriaxone (100 mg / kg / day in 2divided doses) in 6 cases and ceftriaxone (150 mg / kg / day in 2divided doses) associated with vancomycin (60 mg / kg / day in slow perfusions 4) in 24 cases. In uncomplicated purulent meningitis, average duration of antibiotics was 15days in SP, 11 days in case of HI and 10 days in case of NM. A corticosteroid dexamethasone at a dose of 0.15 mg / kg × 4 / d IV was prescribed in 26 cases (86%): HIM (12 cases), SPM (12 cases) and NMM (2 cases). The average length of antibiotic treatment was 17 days and ranged from 8 to 43 days. This time varied depending on the pathogens and the presence or absence of complications.

DISCUSSION

Epidemiological study There is a significant decrease in the frequency of hospital PM in children. This decrease in frequency is due to improved living conditions, early treatment of ENT infections and the introduction of the vaccine against the HI in the national immunization schedule. But since 2012, there was again an increase in the frequency of PM in our department ,where HIM (40%), SPM (43%) and NMM (6%) were

identified. All patients were vaccinated according to the national immunization schedule but none of them against HI and SP. In Europe, the decline in cases of HI serotype b due to vaccination introduced since the nineties, is estimated at over 90%, with an incidence of 0.01 / 105 in Denmark and Germany 0.74 in Switzerland.3,4,5 Similarly, the United States, the introduction of vaccination in 1990 antihaemophilus was followed by a 82% decrease in the incidence of Haemophilus meningitis in children under five years between 1991 and 19956 . In African countries7,8, Hib vaccine is not routine practice, S. pneumoniae and H. influenzae dominate bacterial etiologies of meningitis in infants and small children in these countries over the past ten years. In our series, the organism most frequently found was the SP (43%). The age group between 3 months to 2 year was the most affected. Similarly, a French study reported that 70% of cases of meningitis due to SP occur before the age of two years with a peak incidence between four and six months.9 In the United States, PCV 13 is recommended in all children under two years of age and for children 2 years to less than 5 years defined as high risk.10 The incidence of meningitis since the introduction of PCV , fell by 59% in children less than two years from an incidence of 10/105 to 4/105.10 In our study we collected only two cases of NMM. Similarly Mezghani11 who conducted a retrospective study between 1993 and 2001 of all PM cases collected in the microbiology laboratory of the University Hospital Habib-BourguibaSfax, reported that the PM in infant and small child was mainly due to HI (66%) and SP (23%). NM was isolated in 6% of cases. Serogroup B was the most common (81%) followed by serogroup C (19%).

Therapeutic Antibiotic therapy should be initiated at the latest within three hours, ideally within one hour of arrival at the hospital, regardless of the time elapsed since the alleged onset of meningitis. Initial antibiotic treatment of bacterial meningitis is guided by direct CSF examination.12 It includes a third-generation cephalosporin, or cefotaxime or ceftriaxone, with vancomycin if the initial orientation cannot rule out pneumonia. If the rapid implementation of antibiotics is the key element in the prognosis of meningitis, it appears that the administration of corticosteroids is also essential to improve the prognosis of certain pyogenic meningitis, provided that this corticosteroid is started before or concomitantly to the first injection of antibiotics. Only dexamethasone is recommended because it is the only steroid that has been evaluated as an adjunct to treatment of bacterial meningitis. The dose is 0.15 mg / kg intravenously, repeated every 6 hours for 4 days. The indications are: positive direct examination suggestive of HI or SP in children; cases of suspected bacterial meningitis, where the indication of brain imaging delay the completion of the lumbar puncture; where the cerebrospinal fluid is cloudy or purulent when direct examination is negative but the data from other laboratory tests of CSF and blood can retain the diagnosis of PM. Dexamethasone is not recommended in immunocompromised patients, in those who have previously received antibiotic parenterally, and meningococcal meningitis in children.13

Evolution The main element of poor prognosis, regardless of organism seems to be the delay in the initiation of antibiotic treatment.Death often depends on the causative agent. In the case of pneumococcal meningitis, mortality is 10-20%. Risk factors for death were the presence of convulsions, coma, pupillary asymmetry, hemodynamic disorders with need for ICU admission, pressor amines, assisted ventilation and a low glucose level (<0.4 g / l) . In the case of meningococcal meningitis, lethality is around 10%. It is higher ifpurpurafulminans is associated where it is 25%.14 Lethality seems lower for serotypes B, C and W 135; it is higher for serotype Y (about 26%). Sequelae encountered are partial or complete deafness in in 7 to 30%, major neurological in 12% of cases (mostly obstructive hydrocephalus, motor weakness) . The onset of effects depends on the causative organism. In the case of pneumococcal meningitis, the risk of neurological sequelae is of the order of 30-50% which may be: seizure disorders, severe development disorders or cognitive impairment detected at school learning. The most common sequelae remains deafness: 10-35% depending on the study. In the case of meningococcal meningitis, the risk of neurological damage is variable but seems smaller than for pneumococcus, on the order of 10%. In the case of meningitis caused by Haemophilusinfluenzae treated, neurological sequelae (seizure disorders, developmental delay, etc.) can occur in 20% of cases. Transient ataxia in the early days may appear and regress without sequelae.16 Deafness is also the main sequelae of meningitis caused by Haemophilusinfluenzae type b. The frequency of sequelae in case of Haemophilusinfluenzae type b is proportional to the concentration of bacteria in the CSF of the first lumbar puncture. In our series, the sequelae were observed in 8 cases (29%) which included 5 cases of SPM,2 of HIM and 1 case of NMM.

CONCLUSION

PM in our study was mainly due to HI and SP.HIM will definitely decrease in our country due to the introduction of the Hib vaccine in the national immunization schedule , We also hope that the pneumococcal vaccine is introduced into our national immunization schedule which could reduce the number of cases of SPM that are more formidable because of their high mortality and severe neurological sequelae

REFERENCE

1.Bourrillon A., Y. Aujard, Bingen E purulent meningitis of the newborn, infant, and child EMC Pediatrics and Infectious Diseases 2006; 4-210-B-10 | 2.17th Consensus Conference on Anti-infective Therapy Management of community-acquired bacterial meningitis (excluding newborns) Medicine and Infectious Diseases 2009; 39: 175-186 | 3.Peltola H. Worldwide Haemophilusinfluenzae type b disease at the Beginning of the 21st century: global analysis of the disease burden 25 Years After the use of the polysaccharide vaccine and a decade the after the advent of Conjugates. ClinMicrobiol Rev 2000 13: 302-17 | 4.Tzanakaki G, Mastrantonio P. aetiology of bacterial meningitis and resistance to antibiotics of causative pathogens in Europe and in the Mediterranean area. Int J Antimicrob Agents 2007; 29: 621-9. | 5.C. Levy, E. Bingen, Aujard Y., et al. National Observatory of bacterial meningitis in children in France: results of seven years of study Archives of Pediatrics 2008; 15: S99-S104 | 6.Mariani-Kurkdjian P, Bingen E. Epidemiology of bacterial meningitis in children. In: Edward B, editor. Community bacterial meningitis. Elsevier; 2001 27-40. | 7.Akoua-Koffi C, Anghui H, Faye-Ketté H, et al. Bacteriological aspects of purulent meningitis in the Yopougon university hospital, 1995-1998. Med Mal Infect 2001; 31: 482-7. | 8.Fonkoua MC, Cunin P, Sorlin P, et al. Meningitis of bacterial etiology in Yaoundé (Cameroon) in 1999-2000. Bull SocPatholExot 2001; 94: 300-3. | 9.Bingen E, Levy C, de la Rocque F, et al. Bacterial Meningitis Study Group. Bacterial meningitis in children: a prospective study French. Clin Infect Dis 2005 41: 1059-1063. | 10.Centers for Disease Control and Prevention. Direct and indirect effects of routine vaccination of children with 7-valent pneumococcal conjugate vaccine on incidence of invasive Pneumococcal disease. United States, 1998-2003. MMWR 2005, 54: 893-7. | 11.Mezghani Maalej S., M. Kassis, MahjoubiRhimi F., et al. Bacteriology community meningitis in the region of Sfax, Tunisia (1993-2001) Medicine and Infectious Diseases 2006; 36: 105-110 | 12.Sarlangue J, Levy C, Cohen R, et al. Epidemiology of bacterial meningitis in children in France. Arch Pediatr 2006; 13: 569-71. | 13.Snape MD, Pollard AJ. Meningococcal polysaccharide-protein conjugate vaccines. Lancet Infect Dis 2005 5: 21-30. | 14.Raffi F. Therapeutic management of bacterial meningitis Community: Following the Consensus Conference in November 2008 Antibiotics 2009; 11: 199-205 | 15.Floret D. Treatment of bacterial meningitis: antibiotics and adjuvant treatments Archives of Pediatrics 2011; 18: 96-97 | 16.Bosdure E. Bacterial meningitis in children and complications. In Pediatric Neurology, Medical-Sciences Flammarion; 3rd edition 2010: 411-417 |