

Evaluation of IMCI Indicators of Acute Bacterial Meningitis in Central Teaching Hospital for Child

Mayada Mohamed Ali Alansari , Adel Albadri

ABSTRACT:

BACKGROUND:

Acute bacterial meningitis [ABM] remains an important cause of death and neurological sequel in children, the clinical feature of meningitis is often nonspecific may overlap with those of other infection. Early diagnosis and appropriate treatment are perhaps the most important steps in management, but published data suggested that fewer than half of the cases of meningitis are identified at first assessment ^[1,2].

OBJECTIVE:

Was to evaluate the clinical indicators of ABM of IMCI [integrated management of childhood illness] referral criteria of meningitis include [lethargy, unconsciousness, in ability to feed, neck stiffness, seizures] and other symptoms and sign.

PATIENT AND METHODS:

By prospective study done at central teaching hospital for child for one year from 1st of September 2006-31 Of August 2007, all admission were included, L p was done for 110 cases who got one or more of meningial signs and IMCI indicators and other symptoms and sign.

RESULTS:

From 110 cases who have one or more of IMCI indicators and other signs, 75 got meningitis including 68 only who meet all referral criteria for meningitis sensitivity 90%, specificity 60%, other 13 cases got one or more of independent indicators of meningitis which include, lethargy, impaired consciousness, in ability to feed, neck stiffness, seizures, anterior fontanel bulging, cyanosis, others, while independent indicators of absence of meningitis were the absence of high fever.

CONCLUSION:

Not all cases of meningitis meet all IMCI criteria but may have one or more of them and other criteria as seizure outside febrile convulsion age, repeated short fit, diarrhea, and dehydration; however careful observation and assessment may be the practical way to identify most cases of meningitis

KEYWORDS: ABM, IMCI of meningitis

INTRODUCTION:

History: Meningitis was first described in the 1020s in Avicenna's The Canon of Medicine ^[9] and again more accurately by Avenzoar of al-Andalusia in the 12th century. ^[10] Symptoms of the disease were also noted in 1805 by the Swiss Gabinetto Vieusseux (a scientific-literary association) during an outbreak in Geneva, Switzerland. In 1887, Dr. Anton Weichselbaum (1845-1920) of Vienna became the first to isolate the specific germ, meningococcal. ^[11]

Acute bacterial meningitis remain an important cause of death and neurological sequel in children in developing countries ^[1,2]. Half of all childhood death

from meningitis in world occur in Africa ^[3,4]. Meningitis is the inflammation of protective membrane covering central nervous system, meningitis may develop in response to number of causes, most prominently bacterial as streptococcus pneumoniae, Neisseria meningitidis, Haemophilus influenzae, Escherichia Coli Group B streptococci, viruses, physical injury, cancer and drugs ^[5]. Some cases of meningitis are mild resolve on their own; others causing serious neurological damage, ^[6,8,14,15] as intracranial hemorrhage, cerebral vein thrombosis, hydrocephalus, epilepsy, sense neural hearing loss, brain atrophy, minimal learning problem and even death. ^[8,9,10,14,15]

Central Teaching Hospital for Child

ACUTE BACTERIAL MENINGITIS

Clinically headache and fever are the most common symptom of meningitis [87%] followed by neck stiffness [83%] and unconscious, all these features are present in only 44% of all infectious meningitis, other sign irritability, seizure 20-40%. In infant 0-6 month old Anterior fontanel bulging may be presented sign [8]. Meningial sign of neck stiffness, kerning sign, Brudenzeke sign their sensitivity and specificity are Uncertain [9].

Meningitis is medical emergency if it is suspected on clinical examination early admission, investigation and treatment is recommended [8,9]. Investigation include CBC, GUE, blood gases, liver function, renal function, cerebral spinal fluid exam by spinal tap for cells, protein, sugar, Gram stain, culture, latex agglutination test [8,9,12]. Blood culture positive in 80% of patient, if previously untreated with antibiotic [12]. In study in Africa all IMCI criteria of meningitis were present in most of acute bacterial meningitis sensitivity 85% specificity 59% [1], headache and fever were the most common presentation followed by neck stiffness, disturb consciousness, then fit [1,2]. In other prospective study by Dr. Bandara Navasiaya Raa in Libya over 14 months period, incidence of ABM 0.8% of total admission, death 13%, 64% OF ABM were affected child below one year, M:F 1.2:1, [13]. Regarding the cause of ABM in study in Asia, H. INFLUENZA type B. was the commonest cause similar to Europe and America Study. [7, 11].

PATIENT AND METHOD:

By prospective study all admission from 1st of Sept 2006- 1st of sept 2007 to central teaching hospital for child were included whose age, <60day LP was done

for any patient was suspected to have meningitis by clinical indicators include IMCI meningial signs and other symptom and sign by resident and supervised by consultant pediatrician LP was done for 110 cases [exclude neonatology and oncology cases].

LP was initially guided by unit policy including meningial signs and IMCI criteria [impaired consciousness, lethargy, inability to feed, neck stiffness, seizures]. Prostration inability to sit unassisted if age <9mon or poor feeding if age >9mon, seizure other than F.C [who recover within one hour].

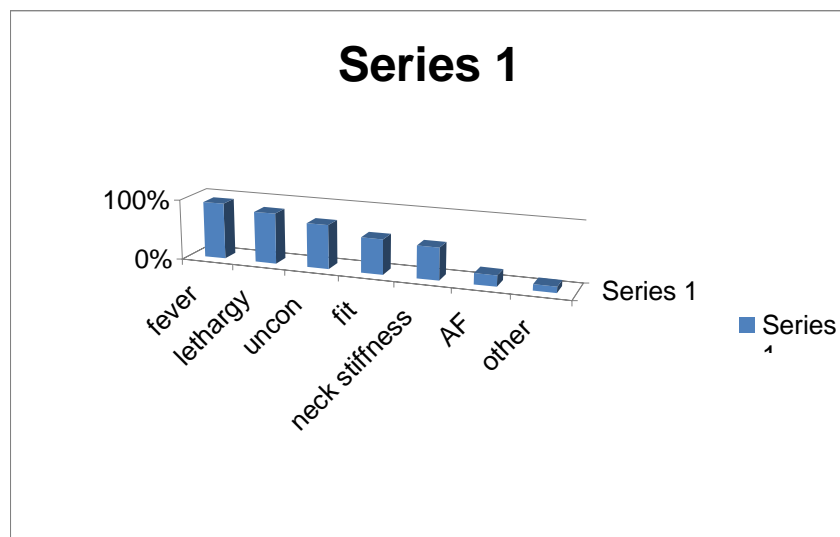
CSF was determined manually, cell count, protein, sugar, Gram stain, and culture, diagnosis was performed when CSF leukocyte >5-10 cell neutrophils, glucose level <50mg/dl and protein more than 40mg/ml, cell less than 10 cell was regarded negative. Other investigation was done, CBC, Blood film, blood urea blood gases serum creatinine, LFT, GUE, blood culture. The diagnosis value of clinical features and signs were carried according to CSF cell and culture.

RESULT:

LP was done for 110 cases, 75 cases got meningitis, 68 cases of ABM got most of IMCI criteria [lethargy, unconsciousness, inability to feed, neck stiffness, seizure], while 7 cases got only one or two criteria, 14 cases meet all IMCI but don't have meningitis, that mean sensitivity 90%, specificity 60%, as table 1 shows relation between IMCI and meningitis.

Table 1: Show the relation between IMCI criteria and meningitis Bartow gram show productive value of each symptom and sign

IMCI criteria	Meningitis	No meningitis	Total
Present all	68	14	82
One or two	7	21	28
	75	35	110



History of fever and lethargy 93%, meningitis seem less likely in the absence of fever. Unconsciousness productive value in 55 cases, 73%, however normal consciousness dose not exclude ABM. The fit as productive value for meningitis was 44 case 68%, there is no evidence that absence of seizure reliable indicator of absence of meningitis, repeated brief fit 6-8 time /day especially outside febril convulsion age

[9m-5y] were 15 cases. Neck stiffness were 40 cases 53%, AF bulging were 14 cases 18%, but absence of these sign don't exclude meningitis in infancy. We found seizure in 40 cases 30% of children with meningitis, but seizure alone with out other sign specially generalize with FC age of little productive value as table 2 show:

Table 2 : Show relation between age febril convulsion and meningitis

meningitis	Febril convulsion age [9m-6yr]	Non febril convulsion age
75	40	35

Half of cases below one year, mean age 31 month, M: F 2: 1

13 cases of ABM more than 6 years, 1/3 of cases were with WBC >15000cell/ml

Blood culture was positive in 11 cases only Regard prognosis, there were 3 deaths, 6 cases with ABM got complication as hydrocephalus, ICH.

DISCUSSION:

The aim of this study was to find simple indicators of ABM, that would be useful as screening tool in practice rather than produce a complex productive model, the study confirm difficulties in early recognition of meningitis. Only 68 case of 110 case meet the simplified IMCI referral criteria, sensitivity 90%, while specificity 60%. The high sensitivity value make them productive for screening but other children seem to have other problem as sepsis, dehydration, electrolyte imbalance, febril convulsion,

thus clinician are initially diagnose one of these problems unless got specific meningial sign. In this study 90% of cases of meningitis could be identified a first assessment with out performing excessive number of LP, but still fail to identify some cases. There are 2 main weakness point in this study, first one still we concern the difficulty in finding golden standard for diagnosis ABM, as CSF culture highly specific, but lack sensitivity specially when antibiotic has been given before LP, [ideally CSF

culture positive in ABM 60-80% with out use antibiotic before LP, and Gram stain 70-90%]^[12], So when CSF culture is negative, cases are typically diagnosed by pleocytosis, but pleocytosis also can be caused by aseptic meningitis in early 8-12hrs or prolonged febril convulsion, further more proven ABM may present with clear CSF, so if we delay LP the diagnosis would be clearly biased were only culture positive cases included, so we chose to use cutoff for CSF count that we had previously determined to be strongly associated with culture, however the diagnosis in culture negative case is not absolutely clear cut. The second weakness point is the assumption that children who die with out LP or refuse to do LP don't have meningitis, so we either miss many cases or LP sensitivity would be over estimated. We performed LP in 2% of admission [110cases from 5100]; we had developed clinical policy with low threshold for LP because of difficulty to recognize meningitis.

In spite no routine vaccination for meningitis in Iraq but the number similar to that reported in European report^[19-20], as 1, 2% of admission got ABM. So the data suggest that LP for uncomplicated FC with out presence of major meningitis sign or other indicators is unjustified and lack of association between meningitis and fit parse within age of FC, while we found that 18% of admission with seizure outside the age of FC and 9% of local seizure had meningitis.

CONCLUSION:

It is difficult to have straight guide line or apply set of criteria for LP at admission that would lead to reduce delay diagnosis and missing cases and unnecessary treatment at the same time, but question remain regarding safety LP with impair consciousness without cranial CT.

IMCI criteria [lethargy, unconsciousness, inability to feed, neck stiffness, fit, especially outside of Febril convulsion age], local seizure, anterior fontanel bulging should be absolute indicators for LP. The aim of this policy is early diagnosis of ABM and to reduce neurological sequel and reduce the cost of unnecessary treatment at the same time.

REFERENCES:

1. James.A.Berkley. Indicators of acute bacterial meningitis in children at Rural Kenyan Distinct hospital American. Academy of pediatric 2000, 12.

2. Peltola. H.Burdenof meningitis and others sever bacterial infections of children in Africa, implication or prevention, clinical Infection Dies 2001; 32,64.
3. Green Wood BM, The epidemiology of acute bacterial meningitis in tropical Africa in William JP.Bernice. Jed's, Bacterial meningitis, London, United Kingdom Academic press 1987,61-91.
4. Tulloch J. integrated approach to child health in developing countries 1999 ;354 ,supp 12-1620.
5. Bacteriological profile of community acquired ABM at ten years. Manir, Indian journal of medical microbiology y 2007 ;25 issue, 42.
6. Predictors of long term neurological outcome in bacterial meningitis, Indian journal of pediatrics y 2007 ;74, issue^[4].
7. Pediatric infection disease. Journal 17^[9] supplement 1998;5159-5165, Yong Yon Hong – MD, SHEN XUZHUANG - MD.
8. Vanda beak D .de Gauss J. Spaniard, Weisfelt M, Retisma JB, Vermenlen M clinical feature and prognostic factors in adult with bacterial meningitis N, England. Med. 2004; 35,1849-59.
9. Patricia Skinner [2001], SSNANI -TIBBI, Encyclopedias of ALTERNATIVE MEDICINE.
10. Marten-Organza, Bustamante-MartineZ, C, Fernandez-Armayor, AJOV, Moreno-Martinez j .m [2002] Neuroscience in al-Andalusia and it is influence on medieval scholastic medicine, Reviota de neurologic 34 ,877-892.
11. In Weichsclbaums; memningococcus at Whohamedlt.
12. Central nervous system infection . Charles G. Prober. NELSON TEXT BOOK 2007; 2516, 40.
13. Etiology and occurrence of ABM in Benghazi, Libyan, Avaba, Jamahiny 1998;4, Issue 1, 50-57.Bandara Navasiaya Raa, Ibrahim Mahdi Kashrus.
14. Vasallo, G, TR Maryland [Juan 2004] neurological complication of pneumococcal meningitis Developmental medicine and child neurology vol.46 p.11.Retrieved on 2007-09-03.
15. Richardson MP, Reida. TarlowMJ, Rudd PT [1997] Hearing loss during bacterial meningitis Arch.Dis.child76 [2] 134.8.