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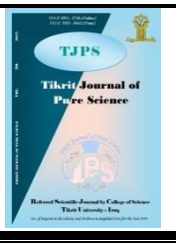

Bacteriological study of the cerebrospinal fluid(CSF) of children with meningitis in Baghdad

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Abstract

The study included 92 samples of CSF taken from children aged 1day to 10 years with meningitis. The study was conducted in the hospitals of Medical City in Baghdad. The samples were obtained by a specialized staff. Conventional direct Gram stain and culture tests were performed. The study sample were categorized into three group a (1day to 2 years), (2 to 6 years) and (6 to 10 years).

The results of the culture test showed that 62 samples out of 92 samples were free of bacteria while 30 samples contained bacteria (43%). Among the positive culture group , 43% were gram positive bacteria and (57%) were Gram negative bacteria.

Escherichia coli (43.4 %) was the predominant organism. The second bacterial agent is *Staphylococcus aureus* (20%) followed by *Streptococcus pneumonia* (13, 3%). The fourth bacterial isolates were *Streptococcus agalactia* (10%) and *Neisseria meningitidis* (10 %).The fifth bacterial agent was *Klebsiella pneumonia* (3.3%).

The most common age group for bacterial meningitis was the first age group (1 to 2 years old) with Escherichia coli being the main bacterium (40%).

Introduction

Bacterial meningitis, an infection of the membranes (meninges) and cerebrospinal fluid(CSF) surrounding the brain and spinal cord, is a major cause of death and disability worldwide [1,2]. In recent years, despite improvements in antimicrobial therapy and intensive care support, the number of deaths worldwide due to meningitis is estimated at 170,000 people per year [3,4]. The occurrence and microbial etiology of meningitis varies according to geographic region, with degrees of endemicity. Global surveillance of confirmed meningococcal cases, including surveillance of the diversity of causative strains, is essential to managing disease and developing vaccines [5,7,8]. This study was undertaken to find out the rate of bacteria pathogens of meningitis through isolation and identification of the pathogens by conventional methods.

Materials and Methods

The study was conducted in the hospitals of Baghdad Medical City for 92 CSF samples of sick children of different ages from one day to ten years divided into three age groups : the first group (from the age of the one day - 2 years),second group (2 years - 6 years) and the third group (6 years - 10 years). All CSF specimens were centrifuged for 10 minutes at a speed of 1000 rpm under sterile condition and the sediment were inoculated in MacConkey agar, blood agar and chocolate agar. The plates were incubated overnight at 37 °C aerobically and the chocolate plates were incubated up to 48 hours at 37°C in 5% CO_2 atmosphere. Then a direct smear of all CSf specimens was made for examination by Gram staining to prevent contamination. The bacterial growth obtained was examined for colonial as well as Gram staining characteristics and identification was done following standard microbiological methods recommended by American Society for Microbiology [2, 6]. Analytical Profile Index System (API 20) is used of bio Merieux Co. for final identification of the isolated bacteria.

Results and discussion

In the present study done on 92 samples of CSF, positive culture were detected in 30 (32.6%) of patients while culture was found to be negative in 62 (67.4%) of patients (Table 1). Among the 32 positive

culture group, 13 (43.3%) of the isolates were found to be of Gram positive bacteria whereas 17 (56.7%) of them were Gram negative bacteria.

Table (1) shows the results of positive and negative bacterial growth

Samples tested		Negative bacterial growth		Positive bacterial growth	
Number	%	number	%	number	%
92	100	62	77.4%	30	32.6%

The relative high percentage of negative bacterial growth (67.4%) may be attributed to many reasons, including the possibility that the infection is viral or due to prior use of antibiotics before lumbar puncture that lead to decrease number of the causative pathogenic bacteria present in the CSF sample [9]. There is the rare possibility that fungal or parasitic agents are the causes ofmeningitis that cannot be identified by using specific bacterial medium. It a well-known fact that fungal and parasite need special medium that were not included in this study. Another cause may be technical errors in the processing of the samples or in preparation of the media [7,10].

Table (2) Gram positive negative and negative bacterial species

Gram positive + vebacteria	number	%	Gramnegative– vebacteria	number	%
Staphylococcus aureus	6	20 %	*Escherichia coli*	13	43.4%
Streptococcus pneumoniae	4	13.3%	*Neisseria meningitidis*	3	10 %
Streptococcus agalactia	3	10 %	*Klebsiellapneumoniae*	1	3.3 %

A total of 6 types of bacterial isolates were detected as shown in Table (2).
Escherichia coli (43.4%) was the predominant organism which was isolated in this study. It was isolated mainly in the first age group.
The second bacterial agent is *Staphylococcus aureus* (20%) and was mainly found in the first group followed by *Streptococcus pneumonia* (13, 3%) with a highest incidence in the third group. The fourth bacterial isolates were *Streptococcus agalactia* (10%) and *Neisseria meningitides* (10%) with a predominance of both of them in the first age group. The fifth bacterial agent was *Klebsiella pneumonia*e (3.3 %) and was isolated from a patient from the second group as shown in Table (3) and Figure (1).

Table (3) Comparison of the results of bacterial isolates among the three age category s under study

Bacterial Species	The first age category		Second age category		Third age category	
	number	%	number	%	number	%
Escherichia coli	12	40 %	0	0%	1	3.3%
Neisseria meningitidis	3	10%	0	0%	0	0%
Klebsiellapneumoniae	0	0%	1	3.3%	0	0%
Staphylococcus aureus	3	10%	2	6.8%	1	3.3%
Streptococcus pneumoniae	0	0%	1	3.3%	3	10%
Streptococcus agalactia	3	10%	0	0%	0	0%
Total bacterial isolates	21	70%	4	13.4%	5	16.6%

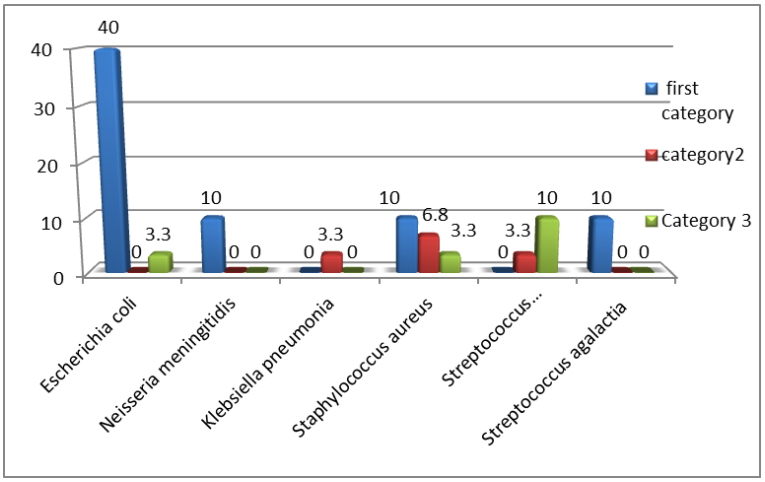

Figure (1) Comparison results of positivegrowth bacterial isolates by Age Category

Conclusion

The bacterial meningitis is abundant in children up to 10 years of age as revealed in the present study. A variety of Gram positive as well as Gram negative organisms was documented. Bacterial meningitis is a medical emergency. Although CSF culture is considered the diagnostic reference standard for bacterial meningitis, and bacterial isolation is important for antimicrobial susceptibility testing. However, there is a need for adjuvant test like direct

antigen detection. We also recommend health education of the public to improve awareness on adequate immunization and appropriate drug management

References

1- Erdem, I.; Hakan, T.; Ceran, N. and *et al*. (2008). Clinical features laboratory data, management and the risk factors that affect the mortality in patients with postoperative meningitis. J. Neurol India

2 -Pagana. K. D; pagana. T. J (2010)" Mosbys manual of diagnostic and laboratory tests 5th ed " Pennsylvania

3- Carbonnelle, E. (2009). Laboratory diagnosis of bacterial meningitis: usefulness of various tests for the determination of the etiological agent. J. Med. Mal. Infect

4- Brouwer, MC; Tunkel, AR; and Van de Beek, D.(2010).Epidemiology diagnosis, and Antimicrobial Treatment of Acute Bacterial Meningitis, American Society for Microbiology .Clinical Microbiology Reviews. J.ASM.org

5-Tunkel, AR. (2010). "Approach to the Patient with Central Nervous System Infection. In: Principles and Practice of Infectious Diseases". 7th ed., Mandell GL, Bennett JE, Dolin R. (eds.). Churchill Livingstone Elsevier, Philadelphia.

6-Mein J.; Lum G. (1999) Cerebrospinal fluid, bacterial antigen detection tests offer no advantage over Gram's stain in diagnosis of bacterial meningitis. Pathology.

7. Kala Y. (2014) Study of Bacterial Meningitis in Children below 5 Years with Comparative Evaluation of Gram Staining, Culture and Bacterial Antigen Detection.Clinical Diagnostic research. 2014 Apr; 8(4)

8. Chinchankar N, Mane M, Bhave S, Bapat S, Bavdekar A, Pandit A. Diagnosis and outcome of Acute Bacterial Meningitis in early childhood. Indian Paediatrics. 2002;39:914–21.

9. SWARNALI J, GAUTAM KUMAR JOARDAR, PANKAJ KUMAR MANDAL. Meningitis in Children: A Study in Medical College & Hospital, Kolkata. BANGLADESH J CHILD HEALTH 2012; VOL 36 (1): 20-25.

10. Ceyhan M, Yildirim I, Balmer P, Borrow R, Dikici B, Turgut M, et al. A prospective study of etiology of childhood acute bacterial meningitis, Turkey. Emerg Infect Dis. 2008;14:1089–96.

دراسة بكتريولوجية لسائل الدماغ ألشوكي لأطفال مصابين بالتهاب السحايا في بغداد

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الملخص

تضمنت الدراسة إجراء اختبارات ل 92 عينة من سائل النخاع ألشوكي لأطفال من عمر يوم إلى عشرة سنوات مرضى مصابين بالتهاب السحايا وقد أجريت الدراسة في مستشفيات مدينة الطب العاصمة بغداد وتم الحصول على عينات الدراسة من قبل كادر متخصص تم إجراء اختبارات مجهرية كصبغة كرام واختبارات الزرع واستخدمت طرائق تشخيصية غير تقليدية كما تضمنت الدراسة تأثير العمر الذي حدد بثلاث فئات من عمر (يوم إلى سنتين), (من سنتين إلى ست سنوات), (من ست سنوات إلى عشرة سنين). أظهرت نتائج اختبار صبغة كرام أنَّ 62 عينة من أصل 92 عينة خالية من البكتريا بينما 30 عينة حاوية على بكتريا منها 13(43%) عينة موجبة لصبغة كرام و 17 (57 %) عينة سالبة لصبغة كرام وكانت نتائج عزل النمو البكتيري موجب الزرع 30 عزلة تضمنت 13 (43.4%) عزلة لبكتريا *Escherichia coli* و 6 (20 %) عزلات لبكتريا *Staphylococcus aureus* و 4 (13.3 %) عزلات لبكتريا *Streptococcus pneumoniae* و 3 (10 %) عزلات لبكتريا *Streptococcus agalactia* و 3 (10%) عزلات لبكتريا *Neisseria meningitis* وعزلة واحدة (3.3%) لبكتريا *Klebsiella pneumonia* وكانت أكثر فئة عمرية معرضة لالتهاب السحايا البكتيري هي الفئة العمرية الأولى (من عمر يوم إلى سنتين)، وأظهرت النتائج أنَّ بكتريا *Escherichia coli* هي المسبب الرئيس بواقع 12 (40 %).