Presentation of Acute Meningitis Over Five Years Study in Al-Yarmouk Teaching Hospital

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Abstract

Objectives : Acute meningitis is life threatening medical condition. This study is to evaluate the rate of acute meningitis over five years, causative microorganism, mortality rate and its relation to age group, its prognosis so we can reflect the health status of the hospital and how to improve it.

Methods : All patients were adults presented with full blown picture of acute meningitis admitted to Al-Yarmouk Teaching Hospital, infectious ward with isolation capability ,full investigations done and proved they had acute meningitis received proper therapy followed up during hospital admition and data studied and analyzed over 5 years (1\11\2011 – 1\11\2016) .

Results : Total patients were 130 patients, (69)53% of them were male patients and (61) 47% were female. According to The pathogenic causes viral meningitis (66)51% , bacterial meningitis (45) 39% and tuberculoses meningitis (19)15% so the highest rate were viral then bacterial meningitis and least causative were tuberculose .The higher rate of mortality were among viral meningitis 8(11%) then bacterial meningitis 3 (7%) and least were tuberculoses meningitis 2 (6.3%).The least number of patients were in 2011 and highest number were in 2016 .

Conclusion : Acute meningitis occur yearly in Baghdad capital city of Iraq that mean acute meningitis is endemic in Iraq. Viral cause is the most common cause then bacterial and least tuberculoses, there were no significant difference in male to female ratio, 13 (10%) patients died which considered as high percent in spite of rapid diagnosis and good treatment the highest rate of mortality were among viral then bacterial and least among tuberculosis meningitis. There were strong relation between occurrence of acute viral meningitis and epidemic of swine influenza .

***Key words** : meningitis,viral, endemic; Hospital*

Introduction

Acute meningitis is life-threatening inflammation of the tissue layers which surround the brain and spinal cord, and it is caused by infectious pathogens like viral, bacterial, tuberculoses and rarely by fungal or parasites, the last two usually occur in immunocompromised patients [(1,2)]. Symptoms develop over the course of a few hours to days that include headache ,vomiting, photosensitivity, disturb level of consciousness and fit may occur. the patient usually has nuchal rigidity demonstrated by neck stiffness and kernig ،s sign [(1-5)]. Fever is often present.

Most common causes of acute viral meningitis are entroviruses ,herpes viruses and influenza. In the management of acute meningitis most serious life threatening are acute bacterial meningitis and herpes

simplex virus (HSV) meningoencephalitis where they are must be treated rapidly to prevent the serious morbidity and high mortality [5,6]. lumbar puncture should be performed before antibiotic treatment, CSF must be sent as early as possible for study[7]. A CSF culture may be positive 4 hours after antibiotics, while treatment > 8 hours generally leads to negative culture[7]. Typical findings in bacterial meningitis include neutrophilia, elevated protein, and low glucose (less than 40% of a simultaneously sampled serum glucose)[1-9].The CSF study in viral meningitis includes a lymphocytosis, normal or elevated protein, and normal glucose[9,10]. The disease within less than 24 hours, HSV PCR may be falsely negative in over one-quarter of patients, and the CSF study may be absolutely normal[11,12]. So in case of high suspicion for HSV meningoencephalitis, empiric treatment must be continued and a second lumbar puncture is should be done after at least 3 days' to repeat the CSF study [13,14].

Tuberculous meningitis is most common in children aged 0 - 4 years and affects also adults and may have an acute presentation. Sometimes it may present with cranial nerve deficits, or it may have a more indolent course involving headache, meningism, and altered mental status. The prodrome is usually nonspecific, including headache, vomiting, photophobia, and fever. A high index of clinical suspicion is absolutely essential[15,16]. Diagnosis of TB meningitis is made by analyzing CSF (preferably 5 to 10ml), usually A spider web clot in the collected CSF is characteristic of TB meningitis, but is a rare finding , a high protein, low glucose and a raised number of lymphocytes. Acid-fast bacilli are sometimes seen on a CSF smear, but more commonly M. tuberculosis is grown in culture[16,17]. ELISPOT testing is not useful for the diagnosis of acute TB meningitis and is often false negative, but may paradoxically become positive after treatment has started, which helps to confirm the diagnosis. PCR is performed to detect mycobacterial nucleic acid[15-18].

The prognosis of meningitis depends on the cause and its severity. In those with severe bacterial meningitis or a very rapid onset of the disease, the mortality rate may be high as 90%. If the patient survives, even with good management[19], long-term disabilities may occur, like seizures or focal neurological deficit[18]. In patient with less severe condition of bacterial meningitis, the mortality rate may reach 25%[19] and Long-term disabilities are possible[19]. For a patients with viral meningitis, full recovery can take place in seven to 10 days[6-10]but the mortality rate in USA. Is about 25% [11].

Methods

All were adult patients presented with typical acute meningitis, admitted to the infectious ward in AL-Yarmouk teaching hospital which is the second hospital in Baghdad, within the period from 1\11\2011 – 1\11\2016, all were investigations including complete blood count and erythrocyte sedimentation rate, C-reactive protein, biochemistry study ,blood culture and sensitivity test, point of care urinalysis and stool examination ,brain CT-Scan and some of them needed magnetic resonance imaging, all patients did cerebrospinal fluid study(CSF) sent for white blood cell count and its differential study, biochemical study of the CSF including protein, sugar and LDH level, CSF culture for bacterial study and its antibiotic sensitivity, CSF study for AFB stain ,tuberculus solid and liquid media culture with CSF gene expert test for tuberculosis .Some cases polymerase chain reaction study (PCR) where it not always available and expensive. After that the patient received proper antibiotics for bacterial meningitis, Acyclovir for covering herpes meningoencephalitis and quadruple anti-tuberculus drugs for TB meningitis followed up in the infectious ward during course of inpatient treatment by neurologist and physician of infection specialty then followed up regularly after discharge from the hospital. All data over five years were studied and analyzed to make this paper. The statistical study done by Chi-square were used for significant association using EPI INFO VERSION 11, P-value less than 0.05 is considered as significant .There were limitation in our work because of unstable condition in Iraq some investigations were unavailable like PCR study and expensive, difficulty some times in getting proper antibiotics and many times we lose follow up of our patients due to many causes. The study was approved by the Human Research and Ethics Committee, of Anbar university related to Iraq ministry of higher education and scientific researches No. 45 in 8 may 2019.

Results

All cases are 130 adult patients.

Table 1: The sex distribution of the disease

Male patient	**69**	**53%**
Female patient sixty nine	61	47 %

Chi –square =0.9 Non significant .

P-value => 0.5 Non significant .

Table 2 : The distribution of the disease according to causative microorganism

Type of the disease	**Viral**	**Bacterial**	**Tuberculous**	**Total number**
Patient number	66	45	19	130
Percent	50.7 %	34.6 %	14.7	100%

Chi –square = 19.3

P-value < 0.0001 very high significant

Table 3: Number and rate of death of acute meningitis according to causative microorganism

Total patient 130 **Death patient 13**	**Viral 66** **8**	**Bacterial 45** **3**	**Tuberculous 19** **2**
10 %	6.15 %	2.3%	15.5 %

Chi square = 0.74 NS.P-value = > 0.05 NS.

Table 4: Disease according to age of fifty years

Age group	**Viral** **No.** **%**	**Bacterial** **No.** **%**	**Tuberculous** **No.** **%**	**Total** **No.** **%**
Patients age < 50 years	40 30	31 2.38	15 11.53	88 66
Patients age > 50 years	26 20	14 10.7	4 3	44 34
Chi- square P-value	3.22 0.07 NS.	13.16 0.00028 Highly Significant	12.74 0.00035 Highly Significant	29.33 < 0.000001 Highly significant

Table 5: Number and rate of patients over years

Total year	2011	2012	2013	2014	2015	2016	Total
Number of patient	9	20	25	21	30	25	130
Percent of patient	7%	15%	19%	16%	23%	19%	100%

Chi Square = 14 d.f. = 5 significant

P=value =0.014 significant

Discussion

This study was done in AL-Yarmouk teaching hospital. the second hospital in Baghdad the capital of Iraq, over five years. All cases admitted to infectious ward with cooperation of infectious physicians and neurologist, all patients were 130 cases the male patient 69 (53%) while female patients 61 (47%) the Chi square = 0.9 and P-value > 0.5 so the sex distribution of the disease statistically is insignificant that means the disease both sexes in similar level so sex variation of the disease is invariable .The prevalence of the disease according to its causative micro-organism were: The viral 66 (59%) ,bacterial 45 (32%) then tuberculous 19 (9%) cases . The highest prevalence were viral meningitis that agreed with international studies[1-12] because the viral infection is the commonest cause of upper respiratory system infection and it may cause viraemia then systemic infection and it may be complicated to acute meningitis and it is the most common infection all over the gob[1-18] and there are epidemic and pandemic viral infection over seasons of the year like H5N1 (Avian influenza) virus and H1N1 virus (Swine influenza)[5-15]. the prevalence of viral infection in the communities is higher than other micro-organisms so the prevalence of acute viral meningitis is higher than other types .The prevalence of acute viral meningitis according to WHO was 6.7 per 100 000 [16-18] while in Iraq from this study was 12 per 100 000 so the prevalence is about near double the national studies . The prevalence of viral meningitis were mildly increased below the age of 50 years 40 (30%) while 26 (20%) of cases above the age of 50 years, the Chi square is 3.22 and P-Value was 0.07, where it insignificant for age. Regarding acute bacterial meningitis it was (45) 34.6% cases made it the second causative factor for acute meningitis, it was more infectious to the age below 50 years. there was 31 cases (2.38%) below and 14 (10.7 %) cases above 50 years of age , Chi square 13.16 , P-value is 0.00028 so it is highly significant and this may be explained that the younger age group are more active in the communities and more susceptible to be contact with infected cases. Acute bacterial meningitis in this study was the second highest prevalence because it may occur secondary to acute viral infection and get entry to meninges and cause infection[16] or it may be due to decrease health hygiene status of the community as a sequel of many wars in Iraq . The mortality rate of acute bacterial meningitis is 3 patients of 45 patients (2.3 %) it was the least percent of mortality in compares with other causative microorganisms because good orientation of medical staff with early diagnosis and treatment .

tuberculosis meningitis is the third cause of acute meningitis 19(9%) cases. The age distribution of infection is 15 cases (11.53 %) below 50 years and 4 (3%) above the age of 50 years the Chi square were 12.74 and the P-value 0.00035 which is highly significant and this may be explained that the younger age group in our society are living under stressful conditions because the recurrent wars and many of them are heavy hand workers doing their job with low hygienic Status and do not care about their health and diet making them more susceptible to such infection. The mortality rate of these patients 2 of 19 cases (15.5 %) where it the second cause of mortality of acute meningitis. These case raised up and this due to decrease health hygiene status of the community as complications of wars in the country with reduce systemic immunity in the community with good orientation of medical staff about the disease and its management. This study done from 2011 -2016 where the highest prevalence were in 2015 cases 30 (23%) at that year there were epidemic outbreak of H1N1 viral

infection[16]and we think it may complicated to acute viral meningitis where the viral cause is the main cause of acute meningitis. The least prevalence of acute meningitis in the year 2011 where it were 9(7%) cases and it not associated with influenza outbreak at that year[16-19], while in 2013 and 2016 25 (19%) where the prevalence of acute viral meningitis in the community is the second number and in the percent over the year sequences and at that years it associated with HIN1 virus epidemicity[15-19] that it may lead to increase number acute viral meningitis as a complications of swine influenza. The number were less in the year 2012 ,2014 as 20 (15%) and 21 (16%) respectively it associated with less cases of swine influenza at that years no registration of swine influenza cases from WHO reports and Iraqi ministry of health reports at that years[16-19]. So there were strong relationship between prevalence of acute viral meningitis and swine influenza epidemic that may indicate that H1N1 viral infection may complicated to acute viral meningitis but may need further study in this field. When swine influenza occur it involve upper and may involve lower respiratory system and cause viremia and both has good chance to get through meninges and infect it and this may related to increase prevalence of mortality over acute viral meningitis 8 (6.15%) cases because swine influenza associated with high mortality in high comorbid cases and extreme of ages and chronic lung diseases. No study proved that viral infection increase the incidence of tuberculosis but it occur in immunocompromised patient or in direct contact patient so the prevalence of tuberculous meningitis were it less 19 (9%) .So acute meningitis is endemic in Iraq like Hydatid cyst[20] and brucellosis[21].

Limitation

Some data might have been missed, some time we have difficulties in investigations and some proper antibiotics due to unavailability in general hospital due to reduce infrastructure in the country after many wars .

Conclusion

Acute meningitis presentation is endemic in Iraq. There were strong relationship between swine influenza outbreak and acute meningitis rate as a complication which in turn may be related to increase mortality in acute viral meningitis so we need further study in this field .

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq

Conflict of Interest: Non

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