Meningococcal Infection among Pilgrims visiting Madinah AI-Munawarah despite prior A-C Vaccination

Muhammad Yousuf (Department of Medicine, Post Graduate Medical Institute and Lahore General Hospital, Lahore.)
Ashraf Nadeem (Department of Pathology, King Abdul Aziz Hospital, Madinah Al-Munawarah, Saudi Arabia.)

Abstract

Objective: To study the profile of meningococcal infection among pilgrims depsite prior A-C vaccination. Setting: King ;\\bdul Aziz Hospital, \\ladinah Al—N unawarah, Saudi Arabia.
Subjects and Methods: Fifteen patients admitted to the hospital during the stydy period of April 1992 to June 1993 were evaluated prospectively regarding their clinical and laboratory features, culLure and antibiotic sensitivity and meningococcal serotypes.
Results: Twelve cases presented as meningitis while 3 cases had meningococcaemia Most (53.3%) were from Pakistan while rest were from 6 other countries. Clinical and laboratory features at presentation were similar as reported in the literature. In 13 cases where serotvping could be done, most belonged to group A (54%) and C (23%). i\\ntimicrobial sensitivity showed the isolates to be sensitive to most of the antibiotics commonly used to Ireat this infection. Mortality was 33% with the poorest outcome in patients with W135 infection.
Conclusion: This study underscores the need of further studies in Makkah and Madinah, Saudi Arabia to find out the serotypes and immunological factors responsible for meningococcal infection in A—C vaccinated pilgrims so as to explore the possibility of use of poly lent meningococcal vaccine (JPMA 50:184, 2000).

Introduction

Around two million Muslims gather in the I lolv cities of Makkah and Madinah in the Kingdom of Saudi Arabia for Haj pilgrimage every year. Apart from these, Muslims from all over the world visit these cities throughout the year for Um rah pilgrimage.
Despite the best health care facilities provided by the Saudi Government. this gathering is ati ideal ground for spread of epidemics. Upto twenty years ago, cholera was the main infection responsible for morbidity and mortality among pilgrims[1]. liven as recently as 1986. gastroenteritis was responsible for 76% of hospital admission[2]. Now pneumonia is the main infect ion in patients needing hospitalization[3]. An epidemic of group A men ingococcal infection occurred during the 19871 laj season with a high mortality[4,5] and another outbreak occurred in Makkah in 1992. Pakistanis comprised most of the affected pilgrims with mortality upto 26.7%[6]. A fter the introduction of compulsory vaccination against group A and C meningococci, although the number of cases of meningococcal infection has reduced, vet rare variants such as group W 135, are assuming increasing importance with high mortality[7]. However there is no information on the source and the type of sporadic meningococcal infection in such pilgrims with compulsory A and C meningococcal vaccination. This study describes our experience of meningococcal infection in pilgrims visiting Madinah AHM unawarah, Saudi Arabia in the post—vaccination era.

Patients and Methods

This study was conducted in King Abdul Aziz Hospital. Madinah A l-M unawarah Saudi Arabia from April 1992 to June 1993. This is the main hospital situated near the Holy Prophets mosque and provides emergency admissions to the pilgrims.
All pilgrims admitted during the above mentioned period. with a diagnosi of meningococcal meningitis or meningococcaemia were included in the study. Diagnosis of meningococcal infection was made on

the basis of clinical features. cerebrospinal fluid (CSF) examination and CSF smear for gram negative diplococci.

Cultures of CSE blood and scrapings from the petichae (where present) were done on chocholate agar media and a commercial latex agglutination kit (Welicome) was used fbr serotyping of the meningococci. In culture positive cases, antimicrobial sensitivity of the isolated meningococci was tested by using the various antibiotic discs available in the hospital. All Patients were treated with heavy doses of parenteral penicillin G alongwith either chloramphen icol or third generation cephalosporins. Other observations in pilgrims included age. sex, nationality, type of presentation, clinical features serotype of meningococci isolated and the outcome.

Results

Out of fifteen pilgrims admitted with meningococcal infection 8 were visiting for Haj and 7 for Umrah pilgrimage.

Twelve patients presented as meningitis and three had meningococcaemia. Four were female and 11 male with a F:M ratio of 1:2.75. Majority of tile patients (53.3%) were from Pakistan and the rest from six other countries (Table 1).

Table 1. Nationality of patients (n=15).

Nationality	Number	%
Pakistani	8	53.3
Algerian	2	13.3
Indonesian	1	6.7
Thai	1	6.7
Zaire	1	6.7
Syrian	1	6.7
American	1	6.7

Most of them presented within 2 days of the onset of illness with fever and headache (Table 2).

Table 2. Symptoms at presentation.

Symptoms		No.	%
Duration of illness	<2 days	10	67
	>2 days	5	33
Fever		15	100
Headache		10	67
Neck stiffness		7	47
Rash		4	27
Sore throat		3	20
Drowsiness		2	13
Vomiting		1	7
Diarrhoea		1	7

Blood examination revealed polymorhonuciear Ieucocvtosis in 11 (73%) with normal counts in 4 (27%) cases. Lumber puncture was done in 14 patients. CSF examination showed polymorhonuclear picocytosis, low sugar and raised proteins. Positive cultures were mainly from blood and scraping of the petichae. Of 13 samples tested group A was the main serolype (Table 3).

Table 3. Physical signs on presentation.

Signs	No.	%
Drowsiness	11	73
Fever	15	100
Meningeal irritation		
Neck rigidity	11	73
Kerning's sign	9	60
Brudzinski's sign	4	27
Rash	3	20
Photophobia	3	20
Herpes labialis	1	7

All tlìe isolates were sensitive to the main antibiotics commonly used for meningococcal infection irrespective of the serotype (Table 4).

Table 4. Laboratory profile.

Parameter	Mean	Range
Blood Leucocyte count (10/1)	15.3	4.6-22.0
Platelet count (10/1)	259	33-486
CSF Sugar (mg/dl)	29	1-88
Protein (mg/dl)	276	15-900
WBC (10/1)	11.4	0.7-37.6
Positive cultures		
CSF	7/14	50%
Blood	11/15	73%
Petichae	3/3	100%
Serotype A	7/13	54%
C	3/13	23%
W135	2/13	15%
B	1/13	8%

Five (33%) patients died. These included two pilgrims from Pakistan, One each from USA. Thailand and Indonesia.

Table 5. Antimicrobial sensitivity of meningococci.

Antibiotic	Sensitive (%)
Penicillin	14 (100)
Ampicillin	14 (100)
Chloramphenicol	14 (100)
Rifampicin	14 (100)
Cephalotin	14 (100)
Tetracycline	10 (71)
Cotrimoxazole	7 (50)

Discussion

Since the introduction of compulsory meningococcal vaccination against serotypes A and C, the prevalence of cases of meningococcal disease among pilgrims has significantly decreased. However. 77% of cases were due to serotypes A and C, against which these pilgrims were reported to be vaccinated. This could be because of false certificates of vaccination or poor quality vaccine. This can also be due to deficiency of protein C and S8, complement deficiency could not be investigated in these patients. However, HIV test was negative in both cases with fatal meningoccaemia due to serotype WI 357. Clinical features in patients with meningitis included fever. headache and signs of meningeal irritation [13] but none of the patients with meningococcaemia had signs of meningeal irritation.

All patients who died were old males with a mean age 62 years. This was despite the fact that the antibiotics used had a high in-vitro sensitivity against meningococci. This could be attributed to delay in presentation to the hospital as the prognosis can be improved by prompt institution of antibiotic therapy in suspected cases of bacterial meningitis even before lumber puncture [14]. Just like in Makkah[6], Pakistani pilgrims were more commonly affected as compared to pilgrims from other countries.

With the availability and effectiveness of polyvalent meningococcal vaccine against group A,C,Y and W135[15], there is a need to use such a vaccine for intending pilgrims to avoid any future epidemics by rare and fatal types of meningococcl. Respiratory viruses and mycoplasma have been implicated as cofactors for group A meningococcal [16].

Our study is a small one and future larger and long term studies in Mad inah and Makkah are needed to validate the our findings. It it also necessary to study the possible immune deficiency in pilgrims, having infection with serotypes for which they have been vaccinated. This study also underscores the

necessity to study the serotypes and antimicrobial sensitivity pattern of memngococcal infections in Pakistan, because most of the pilgrims were from Pakistan.

Reference

1. Ataur—Rahim M. Pilgrimage and cholera epidemic in Saudi Arabia; a bibliographic survey front 1813-1979. I Iamdard Medicos, 986;29: 121—25.
2. Ghaznawi HI, Khalil MIl. I Icaitli hazards and risk factors in the 1406(1986) Haj season. Saudi Med J., 1988;9:274-82.
3. Yousuf M, AI-5audi DA. Sheukh RA, et at. Pattern of medical problems among 1 Iaj pilgrims admitted to King Abdul Aziz I Hospital Madinah Al— Munawarah Ann. Saudi Med., 1995;1 5:619-21.
4. Novelli VM, Lewis RO, Dagwood ST. Epidemic group A meningococcal disease m Haj pilgrims. Lancet 1987;2:863.
5. Barlas S. Safdur MUR, Chaudhry SA. et al. Meningococcal disease clinical profile of 99 patients. Ann. Saudi Med , 1993;13237-41.
6. Al-Gahtani YM, El-Bushra HE, Al-Qarawi SM, et al. lipidemiological investigation of an outbeak of menmgococcal meningitis in Makkah (Mecca). Saudi Arabia, 1992. Epidemiol Infect., 1995; 115:399-109.
7. Yousuf M. Nadeem A. Fatal meningococcaemia due to goiip Wi 35 amongst I-Iaj pilgrims: implications for future vaccination policy. Ann. Trop. Med. Parasit., 1995;89:321-22.
8. Fourrier F. Lestavel P. Chopin C, et al. Meningococcemia and purpura fulminans in adults: acute deficiencies of proteins C and S and early treatment with antithrombin lii concentrates. Intensive Care Med 1990:16:121—24.
9. Fermandez-Sola J, Monforte R, Ponz E. ci at. Persistent low C3 levels associated with meningococcal meningitis s and membranoproliferative glomerulonephrit s. Am. J. Neplirol., 1990:10:426-30.
10. Nagata M. Hara T, Aoki T, ct at. Inherited deficiency of ninth component of complement: an met eased risk of meningococcal menigitis 3. Pediatr., 1989;114:260-64.
11. Morris iT, Kelly WJ Recurrence of neisserial meningococcemis due to deficiency of terminal complement component. South Med. J 1992;85: 1030.
12. Castagliuolo PP Nisin R, Quimiti I, et al. I mmunoglobulin deficiencies and tneningococcal disease. Ann. Allergy. 1986;57:6S-70.
13. Chaudhry SA. Meningococcal meningitis. Postgrad. Doct., 1994;17:340-43.
14. Thlan DA, Hoffman JR Yoshikawa IT, et al. Role of empiric parenteral antibiotics prior to lumbar puncture in suspected bacterial meningitis State of Rev. Infect. I)is., 1988;10:365-76.
15. Urundage .JF, Zollinger WD. Evaluation of meningococcal disease epidemiology in the US army. In: Vedros NA ed. Evaluation of ineningococcal disease. Vol I. Roes Raton FL, CRC press. 1987, pp. 5-26.
16. Moore PS, Hierholzer J, DeWitt W, et al. Respiratory viruses and mycoplasnia as cofactors for epidemic group A meningococcal meningitis. JAMA, 1990;264.1271-75.