Outbreaks of Meningococcal Meningitis during Hajj: changing face of an old enemy

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N. meningitides is the leading cause of meningitis worldwide and a significant public health problem in most countries. The worldwide incidence of meningococcal meningitis probably exceeds 100,000 cases per year. It has been estimated that in the third world countries >310,000 persons per year suffer from infections caused by N. meningitides, resulting in 35,000 deaths. Meningococcal disease usually presents as meningitis in 80-85% of cases, whereas in the remaining 15 - 20% cases, it presents with pure septicemia without meningitis. Even with timely antibiotic therapy, the case fatality rate for meningococcal meningitis is between 5 - 10%, and similar proportion suffers from long term sequelae. Case fatality rate for septicemia can, however, be as high as 70% in developing countries and 19% in developed countries. Among different serogroups of N. meningitides, serogroups A, B and C accounts for up to 90% of the disease. The serogroups B and C are responsible for the majority of cases in Europe and the Americas and serogroups A and C predominating throughout Asia and Africa.[1,2]

The annual pilgrimage to Mecca attracts approximately 2 million people from more than 140 different countries. Overcrowding provides the ideal condition for the transmission of infections like typhoid, cholera and invasive meningococcal meningitis. Outbreaks of typhoid and cholera have also been recorded during Hajj. Although most early cases of meningitis were reported in pilgrims, the outbreaks quickly spread to their immediate contacts and then to those with no pilgrim contact, and cases were continued to be identified even 3 to 4 months after the Hajj most likely as a result of pilgrims assimilating in the community and dispersing bacteria. There have been several epidemics of invasive meningococcal infection throughout the world in the past 15 years which have been clearly linked to Hajj pilgrimage.

The first reported international outbreak following the Hajj, caused by Neisseria meningitides serogroup A, occurred during 1987.[3] The epidemic emphasized the potentially high risk of transmission of N. meningitides during the pilgrimage. This prompted the Saudi authorities to implement compulsory vaccination policy with bivalent A/C vaccine for all pilgrims coming to Mecca. In 1992 another group A meningitis outbreak occurred in Mecca during Umera and Ramadan but this out break was not known to have spread beyond Saudi Arabia.[4]

Small outbreak of serogroup W135 occurred in

Text Box: Vol. 53 No.1, January 2003Mecca and Jeddah in 1993, mainly among people who did not receive vaccine. In March and April 2000, cases of meningococcal disease caused by a new serogroup W135, previously considered a minor subgroup of little clinical importance, were recognized by the health authorities of Saudi Arabia. In all >300 cases of meningococcal infection were reported in Saudi Arabia and 9 other countries among the Hajj pilgrims or their close contacts, with high fatality. This prompted enhanced surveillance in many European countries to monitor spread and virulence of the outbreak strain and to collect data on case characteristics. The number of

cases reported from England and Wales in 2001 was similar to the number reported during 2000, despite a change in recommendation for pilgrims to receive quadrivalent vaccine (against serogroups A, C, Y and W 135), instead of A/C vaccine recommended in 2000. The case fatality ratio remained high and sustained transmission of the virulent outbreak strain was seen. The quadrivalent A, C, Y, and W 135, vaccine is highly immunogenic in both children and adults and the reason for this apparent 'failure' of the vaccine was likely due to late availability of the vaccine prior to 2001 Hajj season. Although a small number of cases of meningococcal meningitis in Mecca during the 2001 Hajj week, >109 cases of meningococcal meningitis (predominantly Hajj pilgrims from outside Saudi Arabia), including 35 deaths, were reported cumulatively during the period 9th February - 22nd March 2001.[5-7]

There are a limited number of studies which looked at the nasopharyngeal carriage of meningococci among Hajj pilgrims. One such study, to assess the risk of meningococcal disease among returning pilgrims and non-pilgrims from Saudi Arabia and their close contacts, was conducted by CDC. It was found that the carriage of serogroup W135 among returning pilgrims and non-pilgrims was 0.8% and 0.9% respectively. On the basis of low rate of carriage in the study population, prophylactic antibiotics were not recommended for returning Hajjis.[8]

Another prospective study of meningococcal carriage was conducted in Singapore pilgrims before departing for Hajj, and in pilgrims and their household contacts two weeks after return from Hajj. Around 17% of the returning pilgrims were found to be meningococcal carriers. The prevalence of meningococcal carriage in the household contacts was 8.2% of whom 42% were carrying the W135 clone. This study clearly demonstrated high acquisition rate of serogroup W135 N. meningitides strain during 2001 Hajj and emphasized the importance of administering quadrivalent meningococcal vaccine to all the Hajj pilgrims. The findings of the study also raised an important issue of administering chemoprophylaxis to pilgrims before return to their home countries to eradicate carriage and thereby protect household contacts.[9]

In this issue of JPMA Talal M. Karima et al. reported clinical, epidemiological, and laboratory features of 105 confirmed cases of meningococcal meningitis from King Faisal Hospital, Mecca, Saudi Arabia during Hajj 2000. About 1/3 of the cases also had meningococcemia. The overall case fatality rate was significantly high (34%) despite appropriate antibiotic use. Some of the factors identified in the study, for higher than expected mortality were delay in diagnosis, delay in the administration of antibiotic, older age group, and patients with serious concurrent medical problems. Interestingly the mortality was highest among Hajjis from the Indian sub-continent (33%) including maximum number of deaths among Pakistani Hajjis (18%). Majority of the isolates (44) belonged to serogroup A, followed by W 135 strain (19). As documented in previous outbreaks with W 135 strain, this particular study also found W 135 strain to be more invasive and more fatal. Another important question raised in the study is the reliability of A & C vaccination and vaccination certificates received by the pilgrims especially in Pakistan and India.[10] This is certainly a very valid concern by the authors and must be looked in to seriously by the ministry of health and local health authorities.

The risk of contracting meningococcal disease is greatest (1 in 30) among people who live in the same household than other members of the community; the attack rate is increased by about 500 to 1200 times. The risk is highest in the first seven days after a

case and fall rapidly during the following week. The incubation period is 2 to 10 days, and for practical purposes a 7-day period is considered sufficient to identify close contacts for prophylaxis. Antibiotic prophylaxis should be given as soon as possible after diagnosis of the index case. The drug of choice is Rifampicin 600mg BID for 2 days, but single dose of ciprofloxacin 500 mg or an IM injection of ceftriaxone 250 mg may also be used. The protection lasts for several days to a few weeks. The risk for contacts is indeed still significant after two weeks and may persist for six months or even longer. Therefore immunization should be considered. The ideal protection is provided by simultaneous administration of the anti-infective drug and quadrivalent meningococcal vaccine. This approach is particularly suitable for outbreaks because of prolonged risk of transmission.[11]

Unfortunately mass vaccination of the population

An accurate epidemiological surveillance system is vital if epidemics are to be detected early. The ministry of health and local health authorities must be on alert and more proactive in providing adequate training to local health workers, ensure prompt communication to the local physicians in the community and make provision for experienced and properly equipped diagnostic laboratory facilities. Public awareness among Hajjis and in the community about the seriousness of this issue should be enhanced by educational campaigns through media, highlighting the seriousness of this problem and availability of quadrivalent vaccines and chemoprophylaxis for prevention of this life threatening disease. Also it is very important for the health authorities to make sure that all Hajjis receive vaccination certificates only after mandatory immunization.

References

1.Ziad AM. Meningococcal disease and travel.Clin Infec Dis 2002;34: 84-90.
2.Rosenstein NE, Perkins BA, Stephens DS, et al. Meningococcal disease. N Engl J Med 2001; 344:1378-88.
3.Moore PS, Reeves MW, Schwartz B, et al. Intercontinental spread of an epidemic group A Neisseria meningitides strain. Lancet 1989;2:260-63.
4.Al Gahtani YM, El Bushra HE, Al-Qarawi SM, et al. Epidemiological investigation of

an outbreak of meningococcal meningitis in Makkah (Mecca), Saudi Arabia, 1992. Epidemiol Infect 1995;115:399- 409.
5.Samuelssen A, Handysides S, Ramsay M, et al. Meningococcal infection in pilgrims returning from Haj: update from Europe and beyond. Eurosurveil lance Wkly, 2000;17:1-5.
6.Center for Disease Control and Prevention. Serogroup W 135 meningococcal disease among travelers returning from Saudi Arabia: United States 2000. MMWR Morb Mortal Wkly Rep 2000;49:345-46.
7.World health Organization. Outbreak verification list. Geneva: WHO, 2001.
8.Public Health Dispatch. Update: assessment of risk for meningococcal disease associated with Hajj 2001. MMWR Morb Mortal Wkly Rep 2001; 50: 221-22.
9.Wilder-Smith A, Barkham MS, Earnest A, et al. Acquisation of W135 meningococcal carriage in Hajj pilgrims and transmission to household contacts: prospective study. Brit Med J 2002; 325:365-66.
10.Kama TM, Bukhari SZ, Fatani Ml, et al. Clinical and microbiological spectrum of ofrneningococcal disease in adults during Hajj 20(10: an implication of quadrivalent vaccination policy. J Pak Med Assoc 2003;53:2.
11.Cartwright KAV, Stuart JM, Robinson PM. Meningococcal carriage in close contacts of cases. Epidemiol Infect 1991;106:133-41.