SHORT COMMUNICATION

Clinical Profile of Group A Meningococcal Outbreak in Delhi

URMILA JHAMB, V CHAWLA AND S KHANNA

From the Department of Pediatrics, Maulana Azad Medical College and LN Hospital, New Delhi, India. Correspondence to: Urmila Jhamb, Professor, Department of Pediatrics, Maulana Azad Medical College and LN Hospital, New Delhi, India. ujhamb@hotmail.com
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We present a retrospective analysis of clinical profile of 100 children admitted to a Government hospital at Delhi between April 2005 and December 2006 with group A meningococcal infection. Maximum children presented in late winter and spring.Younger children were less affected (5% children < 1 year). Fever (86%), vomiting (64%) and rash (63%) were the most common presenting symptoms. All children presented within 5 days of onset of symptoms and 52% within 24 hours. 67 % children had meningococcal meningitis; 20% had meningococcemia; and 13% had both. Overall mortality was 17%. Altered sensorium and shock at presentation significantly increased the mortality. All culture positive cases had group A *Neisseria meningitide*s. All meningococcal isolates were sensitive to penicillin/ampicillin, ciprofloxacin, ceftriaxone, chloramphenicol and erythromycin except, one each resistant to ampicillin and erythromycin.

***Keywords**: India, Meningitis, Meningococcemia, Neisseria, Outbreak.*

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Meningococcal infection is reported sporadically from all parts of India and epidemics occur at regular intervals. In Delhi, it has been causing recurrent epidemics since 1966. Till date, all outbreaks in Delhi have been caused by serotype A(1).

In 2005-2006, there was sudden increase in cases of meningococcal infection in Delhi and an outbreak was declared. This study describes the disease spectrum during this outbreak.

METHODS

This is a descriptive retrospective study of children admitted with meningococcal infection between April 2005 and December 2006 in a tertiary care Government hospital at Delhi. At admission, blood and CSF (cerebrospinal fluid) were collected using aseptic precautions and sent to the laboratory immediately for culture sensitivity and serological testing. CSF cytology and Gram staining was also done. The case sheets of all these children were subsequently retrieved and reviewed. Meningococcal infection was classified according to standard case definitions given below(1).

Probable meningococcal meningitis: A child with sudden onset fever (axillary temperature >38°C or rectal temperature >38.5°C) with neck stiffness (except in children below one year) and turbid CSF, during ongoing epidemic or Gram stain showing gram negative diplococci or petechial/purpural rash.

Confirmed meningococcal meningitis: A child who has suspicion of probable meningococcal meningitis and in addition *N. meningitides* or its antigen in blood and/or CSF is detected. In our study we categorized patients as probable meningococcal meningitis if CSF had polymorphs (irrespective of neck stiffness) and positive Gram stain or rash (not just because of presentation during the outbreak).

Probable meningococcemia: A child presenting with sudden onset fever with or without shock and either rash (petechial or purpural) or positive Gram stain (of scrapings from rash).

Confirmed meningococcemia: A child with suspicion of probable meningococcemia becomes

confirmed if *N. meningitides* or its antigen in blood and/or CSF is demonstrated.

Patients were treated with injection ceftriaxone as first line therapy given for 7-10 days along with supportive care and monitoring.

RESULTS

A total of 100 children were admitted with maximum in late winter and spring. 82% children were between 5-12 years of age, 5% were <1 year and there were no neonates. The male: female ratio was 1.8:1. Most cases were from the walled city (43) and east Delhi (25). There were 9 cases from central Delhi, 13 from south Delhi, 4 from north Delhi and 6 from Uttar Pradesh.

***Table* I** shows clinical features at admission and observed complications. 52% children had symptoms for <24 hours, 21% for 24-48 hours, 26% for 2-5 days and 1% for >5 days. Meningococcal meningitis and meningococcemia was diagnosed in 67 and 20 children, respectively with a corresponding mortality of 4.5% (3/67) and 25% (5/20). Thirteen children presented with both meningococcemia and meningitis; of these 9 died (mortality 69%). Of 67 children with meningitis, 45 had probable meningitis while 22 were confirmed.

Most patients stayed for 7-10 days (mean 8.99 days, range 1-75 days). 17% children died. Almost all deaths occurred within or shortly after 24 hours (mean duration 1.11 days). Mortality was 80% in children <1 year and 13% in those aged 1-12 years. There was no correlation of mortality with duration of symptoms or rash. However mortality increased significantly with altered sensorium (31.7 % with altered sensorium *vs.* 6.7% with normal sensorium, P=0.002) or shock at presentation (53.8% with shock *vs.* 4% without shock, P=0.001).

All the 26 positive cultures (13/98 blood cultures and 13/89 CSF cultures) had group A *Neisseria meningitides*. All isolates were sensitive to penicillin/ampicillin (either of penicillin or ampicillin was tested), ceftriaxone, chloromycetin, ciprofloxacin and erythromycin; only one isolate each was resistant to ampicillin and erythromycin. Isolates were also sporadically tested to some of other antibiotics *e.g.*, cefuroxime, netilmycin, amikacin, cefotaxime, cotrimoxazole, meropenem, imipenem, amoxicillin and cloxacillin, and all were reported sensitive.

DISCUSSION

Meningococcal infection occurs worldwide with serogroup A more prevalent in developing countries and serogroup B and C in developed world(2). More than 80% of our children were above 5 years of age . In endemic meningococcal meningitis from USA, maximum cases were reported below 1-2 years of age(3). In epidemic outbreaks a shift to higher age occurs(4). In an outbreak of group A meningococcal meningitis in Sudan, 58% were above 5 years(5). Peak incidence was found in 10-14 yr old children in an outbreak of group A meningococcal meningitis in Ghana(6). Neonatal meningococcal meningitis is rare(7).

Mortality in our study was comparable to other studies(3-5,8). In our study mortality was not affected by duration of symptoms unlike Sudan

TABLE I CLINICAL FEATURES AND COMPLICATIONS OF MENINGOCOCCAL INFECTION IN CHILDREN

Clinical feature	2005 *n*=39	2006 *n*=61	Total *n*=100
Fever	35 (90%)	51 (84%)	86 (86%)
Vomiting	22 (56%)	42 (69%)	64 (64%)
Rash	33 (83%)	30 (49%)	63 (63%)
Neck rigidity	17 (43%)	30 (49%)	47 (47%)
Headache	9 (23%)	34 (56%)	43 (43%)
Altered sensorium	6 (16%)	35 (57%)	41 (41%)
Hypotension /shock	10 (26%)	16 (26%)	26 (26%)
Hepatomegaly	14 (36%)	12 (20%)	26 (26%)
Diarrhea	14 (36%)	9 (15%)	23 (23%)
Throat pain	17 (43%)	2 (3%)	19 (19%)
Seizures	9 (23%)	1 (2%)	10 (10%)
Purpura fulminans	1 (3%)	1 (2%)	2 (2%)
Complications	11 (28.2%)	5 (8%)	16 (16%)
Arthritis	10 (26%)	5 (8%)	15 (15%)
*Gangrene	1 (3%)	0 (0%)	1 (1%)

** requiring bilateral below knee amputations.*

WHAT THIS STUDY ADDS?

- During outbreak of group A meningococcal infection in Delhi, all isolates were sensitive to ciprofloxacin, penicillin/ ampicillin (except one), ceftriaxone and chloramphenicol.
- Altered sensorium and shock at presentation significantly increased the mortality.

outbreak, where it was higher in those presenting within 24 hours(5). Other studies also reported significantly higher mortality in patients presenting with shock or coma, as seen in our study(5,8).

This was a retrospective study on a small number of children during an outbreak, showing that early clinical suspicion, prompt treatment and prophylaxis can be life saving. Rate of isolation of meningococcus is not very high and antigen detection, Gram stain and clinical diagnosis based on standard case definitions are useful. At present *Neisseria meningitides* is sensitive to many antibiotics but continued surveillance is necessary for development of resistance and more prospective studies would be informative.

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