Neisseria meningitidis Serogroup X Sequence Type 767 in Turkey

Neisseria meningitidis is a common inhabitant of the nasopharyngeal tracts of healthy humans and is a significant cause of invasive infections such as meningitis in young children and adolescents worldwide (14). N. meningitidis has been classified into 13 serogroups on the basis of antigenic variation of the capsule, but only serogroups A, B, C, Y, and W-135 have commonly caused invasive infections (8). In Turkey, W-135 has been the most frequently reported serogroup since an international outbreak was reported following the annual Hajj seasons in Saudi Arabia in 2000 and 2001 (10). During the years 2003 to 2008, 17 serogroup W-135 strains (from eight meningitis cases) were isolated from Turkish recruits vaccinated with A+C polysaccharide meningococcal vaccine (10–12).

We describe here the first meningococcal meningitis case caused by a serogroup X N. meningitidis strain in Turkey. The patient was a 22-year-old male soldier, working in a military unit, who was admitted to the emergency department with complaints of a 1-week history of fever (39°C), cough, and vomiting on 10 January 2010. There was little petechiae rash on his chest and a lower leg. The laboratory evaluation at that time revealed a leukocyte count of 3,700/μm³, a hemoglobin level of 13.4 g/dl, and an erythrocyte sedimentation rate of 5 mm/h. The patient was then admitted to the infectious disease service with a diagnosis of meningococcal meningitis based on the clinical symptoms and results of confirmatory laboratory tests, including blood culture and cerebrospinal fluid analysis. He was given ceftriaxone (4 g/day) for 10 days and then discharged from the hospital in good condition. Oropharyngeal swab specimens were obtained from the patient’s close military personnel contacts, and one person was found to be positive for an N. meningitidis serogroup X strain. He was given a single dose of 500 mg ciprofloxacin immediately.

Clinical and oropharyngeal swab specimens were inoculated immediately onto BBL-modified Thayer-Martin medium plates (MTM II; Becton Dickinson Microbiology Systems) and Thayer-Martin medium with VCAT selective supplement (SR10B; Oxoid, Hampshire, England). After incubation, suspect colonies were identified by Gram staining and oxidase reactivity testing and the identification was confirmed by the API NH system (bioMérieux) (4). An antibiotic susceptibility test was performed by the Etest method (AB BIODISK, Solna, Sweden) for ciprofloxacin, ceftriaxone, cefotaxime, penicillin, and chloramphenicol (3). The strains were susceptible to the antibiotics tested, except penicillin, with a MIC of 0.75 μg/ml. Serogrouping of the meningococcal isolates was performed by a slide agglutination technique as recommended by Difco Laboratories (Detroit, MI). porA variant region sequencing was performed using the standard primers and identified by querying the respective databases hosted at http://neisseria.org. Multilocus sequence typing (MLST) was performed using the standard primers listed at the Neisseria MLST website (http://pubmlst.org/neisseria/). The isolates had the strain designation X: P1.5-1,10-1: sequence type 767 (ST-767) (cc167). ST-767 meningococci have been found previously among N. meningitidis serogroup A and Y strains in Europe and Africa between 1999 and 2008 (http://pubmlst.org/neisseria/). PFGE typing of Nhel-digested DNA was performed by a modification of a previously described method (12). The clinical and carrier isolates had the same genotypic pattern.

N. meningitidis serogroup X strains were first described in the 1960s and have been isolated from a few cases of invasive meningococcal diseases in North America, Europe, Australia, and China (2, 6, 7). Outbreaks of N. meningitidis serogroup X strains have been reported in Niger (1), western Kenya (13), and northern Ghana (5). N. meningitidis serogroup X strains were reported to be very efficient in colonization among military recruits in the United Kingdom (9). Before May 2009, eight invasive meningococcal disease cases caused by serogroup W-135 were reported in Turkish soldiers who had been vaccinated with A+C polysaccharide meningococcal vaccine; four of these were fatal. Since that time, a quadrivalent meningococcal polysaccharide vaccine (against A/C/Y/W-135) has been successfully introduced into the Turkish recruit expanded immunization program. We describe here the first meningococcal meningitis case caused by a serogroup X strain in our recruits since the introduction of the quadrivalent vaccine. It was reported that repeated mass vaccination in many African countries might have contributed to colonization by and meningococcal diseases due to serogroup X strains and might result in a changed profile of meningococcal disease (5). We suggest that comprehensive conjugate vaccines including X polysaccharides should be developed. In addition, these data highlight the need for further epidemiological surveillance to carefully monitor the pattern of incidence of meningococcal diseases caused by serogroup X strains and to inform future public health strategies.

REFERENCES


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