Streptococcus pneumoniae meningitis in a child vaccinated with pneumococcal heptavalent conjugate vaccine

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SUMMARY

Pneumococcal meningitis is still today a life threatening disease among children under-5 worldwide. Although the heptavalent vaccine has demonstrated its ability to reduce the incidence of pneumococcal disease its efficacy is limited due to the restricted number of serotypes included. We report a case of a child with a *Streptococcus pneumoniae* meningitis despite the use of heptavalent conjugate vaccine.

KEY WORDS: Heptavalent conjugate vaccine, Pneumococcal meningitis, *Streptococcus pneumoniae* serotypes

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Pneumococcal meningitis remains a life-threatening disease among children under-5 worldwide (WHO, 2007). Moreover, pneumococcal meningitis frequently leads to chronic sequelae and incurs substantial direct and indirect costs.

Another important issue is the emergence of beta-lactam multi-drug resistant *Streptococcus pneumoniae* which represents a growing problem. In this context some improvements have been achieved with regard to pneumococcal infection, with development of the conjugate vaccines (Giebink, 2001).

At the moment, prevention of pneumococcal diseases is possible through 23-valent PS vaccine and a heptavalent conjugate vaccine. Although the heptavalent vaccine has demonstrated its ability to reduce the incidence of pneumococcal disease caused by vaccine-related serotypes in children, its efficacy is limited due to the restricted number of serotypes included.

In October, 2006, a previously healthy 4-year-old girl was admitted to the Department of Pediatrics, Ospedali Riuniti, Foggia, Apulia, Italy with vomiting and high fever (39°C). On admission the patient was pale, lethargic, and positive for Brudzinsky's sign.

Previously she had received two doses of heptavalent vaccine according to the schedule recommended by the Italian Ministry of Health. The antigen detection performed by latex agglutination test on cerebrospinal fluid (CSF) (Directigen Meningitis Combo Test, Becton Dickinson, Italy) was positive for *Streptococcus pneumoniae*. The CSF culture on Columbia agar supplemented with 5% sheep blood grew alpha-haemolytic colonies which were identified as *Streptococcus pneumoniae* (Phoenix 100 System, Becton Dickinson, Italy).

The isolate was susceptible to penicillin (MIC<0.03125), cefotaxime (MIC<0.5), meropenem (MIC<0.0625), and vancomycin (MIC<0.5), and resistant to erythromycin, lincosamide, and

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streptogramin B as it was determined by Phoenix 100 System (Becton Dickinson, Italy). The strain was typed as *Streptococcus pneumoniae* type 15B at the Istituto Superiore di Sanità, Rome, Italy. Clinical response to antibiotic therapy was successful and the child's fever resolved two days after admission to hospital. A third lumbar puncture performed at 7th day of hospital course was sterile and the patient was discharged home in good condition.

Our report further highlights the possibility that the efficacy of heptavalent pneumococcal conjugate vaccine might be limited by the restricted number of serotypes included. *Streptococcus pneumoniae* serotype 15B isolated from our patient does not belong to serogroups 14, 6, 19, 18, 23, 9 and 4 which are considered most often responsible for invasive pneumococcal disease among children.

Moreover, this serotype was not detected either in a survey assessing the prevalence of *Streptococcus pneumoniae* serotypes in the nasopharynx of healthy Italian children (Marchisio, *et al.,* 2002) or among nasopharyngeal pneumococcal strains isolated from a pediatric population in the Apulia region (Mosca, *et al.,* 2003). The case we report suggests the importance of continuing active surveillance programmes focused on the changing distribution of serotypes even in the light of the increase in infections caused by serotypes not included in the vaccine (Kyaw, *et al.,* 2006).

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