Gram-positive diplococci in a cerebrospinal fluid gram stain

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A 5-month-old girl presented with meningitis after receiving amoxicillin for bilateral otitis media. The cerebrospinal fluid (CSF) Gram stain suggested *Streptococcus pneumoniae*: Gram-positive diplococci with a surrounding clear area indicative of a bacterial capsule. Her CSF and blood cultures grew penicillin-resistant *S. pneumoniae* serotype 35B. This serotype is not included in the 13-valent pneumococcal conjugate vaccine (PCV-13) and has been identified as a cause of invasive pneumococcal disease in the post-PCV-13 era.

**Keywords.** Gram stain; meningitis; *Streptococcus pneumoniae.*

Marked declines have occurred in invasive pneumococcal serotypes included in or related to the 13-valent pneumococcal conjugate vaccine (PCV-13) in both children and adults (through herd protection) in the United States. Previously uncommon serotypes are now responsible for an increasing proportion of invasive disease, and serotype 35B was the fourth most common invasive isolate (8%) among United States children under 5 years of age in 2012–2013 [2]. Overall, antibiotic-resistant invasive pneumococcal cases declined significantly among young children by 3 years after PCV-13 licensure [2]. In a study of invasive and noninvasive pneumococcal isolates from across the United States in 2012–2013, serotype 35B had become the most common penicillin-nonsusceptible serotype (24.8%).

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**Figure 1.** Cytospin-prepared Gram stain of the patient's cerebrospinal fluid (original magnification, ×1000).
and the fourth most common multidrug-resistant serotype (6.4%) [3].

Cells of *S pneumoniae* are elongated (“lancet-shaped”) cocci that are surrounded by a polysaccharide capsule and predominantly organized in pairs (diplococci). Other Gram-positive organisms that cause meningitis in neonates and infants include *Streptococcus agalactiae* (Group B *Streptococcus*), a coccus ordered in pairs and chains, and *Listeria monocytogenes*, a short rod.

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