Case Report

A misleading urethral smear with polymorphonuclear leucocytes and intracellular diplococci; case report of urethritis caused by Neisseria meningitidis

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The primary pathogens found in men with urethritis are Chlamydia trachomatis and Neisseria gonorrhoeae. Rapid diagnosis of N. gonorrhoeae infection can be made based on a Gram- or methylene blue-stained urethral smear. We describe a case of a man with purulent penile discharge, in which microscopic examination led to the presumptive diagnosis of gonorrhoea. A nucleic acid amplification test was negative for N. gonorrhoeae but positive for C. trachomatis. Culture showed Gram-negative diplococci which were identified as Neisseria meningitidis. N. meningitidis can be sporadically pathogenic in the genito-urinary tract and mimicks gonococcal urethritis, and appears identical by microscopy. When a gonococcal urethritis is suspected based on clinical signs and microscopic examination, but investigatory tests cannot confirm the diagnosis, a N. meningitidis infection should be considered.

Introduction

Urethritis in men is caused, in the majority of cases, by the sexually transmitted diseases (STDs) chlamydia and gonorrhoea and is characterized by discharge and/or dysuria but may be asymptomatic (especially in cases of a chlamydial infection). Microscopically, an excess of polymorphonuclear leukocytes (PMNLs) can be observed in a smear obtained from the anterior urethra. A Neisseria gonorrhoeae infection can be transmitted through vaginal, oral or anal sex. Unlike chlamydial infections, gonococcal infections are often symptomatic in males (rates between 45% and 90%, depending on the population) (Bignell & Fitzgerald, 2011). Nowadays diagnoses in men are usually made by a nucleic acid amplification test (NAAT) on first void urine (Parra-Sánchez et al., 2012). Rapid diagnosis of gonorrhoea can be made by microscopy, based on a Gram- or methylene blue-stained urethral smear with an increased number of PMNLs with intracellular Gram-negative diplococci. However, culture is still of importance to determine antimicrobial resistance. We describe a case of urethritis, in which microscopic examination led to a presumptive gonorrhoea diagnosis but additional tests revealed an N. meningitidis infection.

Case report

A 53-year-old man presented to our STD clinic with penile discharge and dysuria for a few days. He had anonymous unprotected receptive oral sex with other men; the last contact had been 5 days previously. On physical examination, a purulent yellow-green discharge from the urethra was present. No anal or oral abnormalities were observed. An urethral smear, with methylene blue staining, showed numerous PMNLs with intra- and extra-cellular diplococci; see Fig. 1. An infection with N. gonorrhoeae was assumed and he was treated on the spot with ceftriaxone 500 mg intramuscularly and azithromycin 1 g orally (for possible co-infection with C. trachomatis, according to our protocol).
Routine STD screening was performed, including NAAT from a urine specimen for \textit{N. gonorrhoeae} and \textit{C. trachomatis}. Syphilis, human immune deficiency virus and hepatitis B serology were negative. NAAT (Aptima combo 2 assay, Gen-Probe) showed a \textit{C. trachomatis} infection, but no \textit{N. gonorrhoeae} infection. Gram-negative diplococci were cultured (Culture Media, bioMérieux) and the species \textit{N. meningitidis} was identified by classical methods (API-NH, bioMérieux). No further subtyping was performed. The isolated bacterium was tested with a direct DNA probe (Accuprobe \textit{N.gonorrhoeae}, Gen-Probe) and an rRNA PCR (Aptima combo 2 assay, Gen-Probe) for exclusion of \textit{N. gonorrhoeae}; both tests gave negative results.

The final diagnosis was \textit{N. meningitidis} and \textit{C. trachomatis} urethritis. When we contacted the patient week later, the symptoms had resolved.

**Discussion**

Infections with \textit{N. meningitidis}, can cause several diseases, such as pneumonia and septic arthritis, but meningitis is the most common (Rosenstein \textit{et al.}, 2001).

\textit{N. meningitidis} can be sporadically pathogenic in the genito-urinary tract, as first reported in 1939 (Murray, 1939). During the sexual revolution in the 1970s, an increase of urogenital infections was reported, probably caused by oral sex becoming more common. \textit{N. meningitidis} is isolated from the nasopharynx in 5–15\% of the population, with a higher proportion in homosexual men and patients with anogenital gonorrhea.

In the urethra, the prevalence of \textit{N. meningitidis} ranges from 0.03–0.07\% in the general population to 0.7\% in male-sex-with-male populations (Nebreda \textit{et al.}, 1999).

Urethral \textit{N. meningitidis} infection can be asymptomatic or symptomatic mimicking a gonococcal urethritis with the characteristic purulent penile discharge (Katz \textit{et al.}, 2011). The same treatment is recommended for both \textit{N. meningitidis} and \textit{N. gonorrhoeae} infections (Hook & Handsfield, 2008) Both methylene blue/gentian violet stain and Gram stain can be used for direct microscopic gonococcal diagnostics (Taylor \textit{et al.}, 2011), but the specificity for \textit{N. gonorrhoeae} is not 100\%, as other \textit{Neisseria} species may have an identical microscopic appearance. Definitive diagnosis can only be made with additional laboratory tests (Ng & Martin, 2005).

In our practice we annually diagnose more than 100 cases of gonococcal urethritis based on positive urethral smears with intracellular diplococci, later confirmed by NAAT. This was the first case of urethral \textit{N. meningitidis} in our clinic.

**Conclusion**

When a gonococcal urethritis is suspected based on clinical signs and microscopic examination, but investigatory tests cannot confirm the diagnosis, an \textit{N. meningitidis} infection should be considered.

**References**


