



Agar Medium for Antimicrobial Susceptibility Testing of *Neisseria gonorrhoeae*

The organism

Neisseria gonorrhoeae is the etiological agent of gonorrhoea and is the second most common sexually transmitted infection (STI) in men and women [1]. In females *N. gonorrhoeae* is a major cause of pelvic inflammatory disease and can lead to tubal infertility, ectopic pregnancy and chronic pelvic pain [2]. In males *N. gonorrhoeae* can cause urethritis and many infections are often asymptomatic leading to further transmission of this disease within the population. Other sites of infection include the eyes, skin, joints and internal organs such as the heart and within the brain lining [3].

In England, the number of newly diagnosed cases of gonorrhoea increased by 25.0% from 16,835 in 2010 to 20,965 in 2011 [4].

Antimicrobial resistance

Reports of decreased susceptibility and resistance to cefixime, ceftriaxone and other extended spectrum cephalosporins (ESCs) and associated treatment failures continue to emerge globally [5]. The Gonococcal Resistance to Antimicrobials Surveillance Programme (GRASP), a national sentinel surveillance programme, was established in 2000 to monitor trends and drifts in susceptibility to antimicrobial agents used for the treatment of gonorrhoea in England and Wales. In 2011, there were no isolates showing decreased susceptibility to ceftriaxone or spectinomycin. Cefixime reduced susceptibility fell from 17.4% among GUM patients in 2010 to 11.0% in 2011 and among non-GUM patients from 10.6% to 3.8%. Azithromycin resistance remained stable at 0.5% in 2011 (as in 2010) [6].

Treatment

Ceftriaxone is the focus of current therapy guidelines (BASHH [7]) with single intramuscular 500mg dose for uncomplicated anogenital infection. Alternative regimes are cefixime, spectinomycin and other cephalosporins.

Antimicrobial susceptibility testing

MIC and disc diffusion breakpoint criteria are published by BSAC [8] and CLSI [9]. MIC breakpoints only are published by EUCAST [10]

Whilst MICs can be determined by agar dilution, broth microdilution or gradient strips, disc diffusion testing is the preferred primary method in most diagnostic laboratories. There are currently two susceptibility testing methodology guidelines published in the UK: BSAC guidelines and the GRASP action plan [11]. The major variance between the two guidelines is the type of medium used; BSAC recommend IsoSensitest + 5% horse blood agar whilst the GRASP action plan uses GC agar base + 1% Isovitalex agar. The evidence base for both these approaches is not robust.

Growth of the organism is a factor with both media, with some isolates growing well on one but not the other.



Recommendations

A pragmatic approach may be taken with regard to media choice for susceptibility testing *N. gonorrhoeae*; growth of the isolate to sufficient quantities for susceptibility testing should be the deciding factor. Whatever medium is used, the zone diameters breakpoints for interpretation of susceptibility should be based on correlation with BSAC MIC breakpoints.

Further work is being carried out at the Specialist Antimicrobial Chemotherapy Unit (SACU), Public Health Wales, Cardiff and the Sexually Transmitted Bacteria Reference Laboratory (STBRL), Public Health England Centre for Infections, London. All work is to be included in a European wide study planned to establish the most appropriate medium to use for susceptibility testing of *N. gonorrhoeae*.

References

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