Healthcare Improvement Scotland | SAPG Safeguarding antibiotics

Phenoxymethylpenicillin recommended first line when antibiotics are required for acute dento-alveolar infections

Situation

Dental abscesses should be treated in the first instance by using local measures, such as, extraction or drainage, with removal of the cause where possible. Antibiotics are only required if immediate drainage is not achieved or in cases of spreading infection (significant extra-oral swelling, cellulitis) or systemic involvement (fever, sepsis). Currently amoxicillin accounts for 68% of antibiotics prescribed in dental practice in Scotland 2018 (1).

Phenoxymethylpenicillin (penicillin V) has a narrower spectrum of antimicrobial activity than amoxicillin, but has equivalent efficacy and clinical outcomes in acute dento-alveolar infections (2). Limiting unintended consequences of antimicrobial use is a key principle of antimicrobial stewardship and since amoxicillin has a broader spectrum of activity than penicillin V, it has a greater impact on selection of resistance in the host micro-flora (3). **The Scottish Antimicrobial Prescribing Group and its Dental sub-group have considered the evidence and advise that when antibiotics are unavoidable then penicillin V should be recommended as first line in acute dento-alveolar infections**

Background

Penicillin V was the first line antibiotic for acute dento-alveolar infections in the UK for many years. In some countries, such as Norway and Sweden this is still the case. During the 1990s, broad-spectrum antibiotics were considered superior and penicillin V was gradually replaced by amoxicillin in UK dental practice. The adverse effects of broad-spectrum agents on the gut flora and impact on antimicrobial resistance (AMR) were less well recognised than they are today.

Assessment

The majority of oral penicillins are absorbed, so that they yield peak levels 1-2 hours after ingestion with approximately 60% and 75% absorption following oral administration for penicillin V and amoxicillin respectively (4). Penicillin V is most active against non-ß-lactamase producing Gram-positive bacteria such as *viridans* group *Streptococci*, *anginosus* group *Streptococci*, anaerobes and selected Gram-negative cocci, which are all commonly isolated from acute dento-alveolar infections (5).

Gram-positive bacteria inhibited by natural penicillins in general are more susceptible to penicillin V than to semi-synthetic penicillins like amoxicillin (6). Amoxicillin possesses a similar spectrum as penicillin V, but is more active against Gram-negative cocci and members of the family Enterobacteriaceae, such as *E. coli* (7), but Enterobacteriaceae are not commonly found in acute dento-alveolar infections.

Accurate estimations of AMR in bacterial populations isolated from acute dental infections are difficult to interpret. Although resistance rates are reported to vary between 9-54% (5) these data are confounded by changes in bacterial taxonomy, methods of susceptibility testing and breakpoints (definitions of resistance) used.

The British National Formulary states that, “Phenoxymethylpenicillin is effective for dento-alveolar abscess” and “Amoxicillin is as effective as phenoxymethylpenicillin but is better absorbed; however it may encourage emergence of resistant organisms.” (8)

Recommendations

- **Antibiotics do not cure toothache and should be reserved for cases with signs and symptoms of spreading infection.**
  https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/813026/national_pain_relief_poster_including_child_doses_v29.pdf
- **Phenoxymethylpenicillin (penicillin V) should be used as first line therapy with amoxicillin reserved for patients where compliance is likely to be more challenging.**
- **Recommended dose of phenoxymethylpenicillin (penicillin V) in adults is 500mg 6 hourly for 5 days duration. https://bnf.nice.org.uk/drug/phenoxymethylpenicillin.html**
- **There is no evidence to suggest that addition of a second antibiotic, such as metronidazole, improves clinical outcome.**
- **For severe odontogenic infections requiring hospital admission for incision and drainage with IV antibiotics the first choice antimicrobials remain benzyl penicillin and metronidazole. The use of phenoxymethylpenicillin as a discharge antibiotic should be considered first choice.**
- **Specimens from severe odontogenic infections should be submitted to local hospital microbiology laboratories and empiric antimicrobials modified accordingly.**

References

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