Canterbury District Health Board
Te Poari Hauora o Waitaha

Antimicrobial Stewardship Bulletin

CDHB Antimicrobial Stewardship Committee
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September 2019 027

Moxifloxacin usage at CDHB and Pink Book antimicrobial guidelines update

This bulletin outlines recent audit findings on moxifloxacin that shows poor compliance with CDHB and PHARMAC Hospital Medicines List (HML) requirements for this valuable antimicrobial agent. It also describes changes to Pink Book Antimicrobial Guidelines for community-acquired pneumonia and pyelonephritis/complicated urinary tract infection.

Moxifloxacin

- Moxifloxacin is a fourth-generation quinolone with broad activity against many Gram-negative (e.g. *E. coli*) and Gram-positive aerobes (e.g. *S. pneumoniae*), as well as anaerobes and atypical organisms (e.g. *Legionella* spp.,).
- Quinolones have a significant adverse effect profile and there are concerns about resistance as highlighted in our previous Antimicrobial Bulletin: Quinolones (No. 026, Aug 2019).
- To help safeguard its effectiveness, moxifloxacin is restricted by PHARMAC to specific indications and specialities (Table 1).

Table 1: PHARMAC HML restrictions for moxifloxacin

Pneumonia*
• Recommended by Infectious Diseases or Clinical Microbiology, **and either** – immunocompromised patient with pneumonia failing first-line treatment, **or** – pneumonia (or other invasive disease) due to multiresistant *S. pneumoniae*.
Penetrating eye injury
• Recommended by Ophthalmology, **and** • Prophylaxis of penetrating eye injury, **and** • 5 days maximum.
Mycobacterial infection
• Recommended by Infectious Diseases or Respiratory Medicine, **and either** • Active tuberculosis (see specific sub-criteria), **or** • Mycobacterium avium-intracellular complex (see specific sub-criteria), **or** • Close contact with confirmed multi-drug resistant tuberculosis in a child < 5 years
Mycoplasma genitalium
• Nucleic acid amplification test confirmed and symptomatic, **and** • Tried and failed azithromycin **or** lab confirmed azithromycin resistance, **and** • 7 days maximum.

**Not funded for pneumonia in the community – consult pharmacist for a discharge supply if needed.*

- Total antibacterial use in CDHB adult inpatients has been stable across this decade at a median (range) of 722 (703 – 771) defined daily doses per 1000 bed days; moxifloxacin comprises 0.2 – 0.4% of antibacterial use. However, the broad-spectrum, favourable pharmacokinetics and adverse effect profile of moxifloxacin together with growing antimicrobial resistance concerns mean that vigilance about appropriate use is needed.

Moxifloxacin audit

- We audited CDHB's hospital moxifloxacin use between 01 January and 30 June 2019 for PHARMAC compliance (Table 1). This was a repeat of a moxifloxacin audit conducted five years ago in 2014.
- We identified 36 patients (~50% male) with a median (range) age of 62 (10 – 89) years who received moxifloxacin; nearly 80% were under Ophthalmology (17/36 i.e. 47%), General Medicine (7/36 i.e. 19%) or Respiratory (4/36 i.e. 11%) services.
- Moxifloxacin was given orally in 92% (33/36) of cases and IV (single doses only) in 8% (3/36) of cases.
- Most (32/36 i.e. 89%) moxifloxacin use was for eye or respiratory tract (including tuberculosis) conditions:
  - Eye conditions: 19/36 (53%) cases; 13 for prophylaxis of penetrating eye injuries. PHARMAC compliance = 68% (13/19).
  - Respiratory infections: 10/36 (28%) cases: pneumonia (8/10), bronchiectasis (1/10) and COPD (1/10). PHARMAC compliance = 1/10 (10%), due to use for non-pneumonia indications (n=2) and non-compliance with pneumonia sub-criteria (Table 1), such as in patients with β-lactam allergy (n=7).
  - Other: tuberculosis (n=3), meningitis (n=2), other/unknown (n=2).
- Overall PHARMAC compliance was 49% (17/35, indication unknown in one case), compared with 33% (7/21) in 2014.
- Of the 18 non-compliant moxifloxacin prescriptions, none had a 'Rapid Hospital Assessment' form completed in the patient's electronic clinical record (Table 2).

Table 2: CDHB requirements for use of medicines outside of the PHARMAC HML

- CDHB requirements for use of medicines outside of the PHARMAC HML are described in a prior Clinical Pharmacology Bulletin: Use of medicines outside PHARMAC HML restrictions (013-13).
- Prescribers who want to treat a patient with a medicine that is not on the HML or is outside of HML restrictions must follow one of two paths:
  1. Medicine is not needed within 5 working days: apply to PHARMAC using a Named Patient Pharmaceutical Assessment application.
  2. Medicine is needed urgently (within 5 days): complete a 'Rapid Hospital Assessment' in the patient's Health Connect South record (select 'Add document', then 'Add Medication Note').
- CDHB is obliged to follow PHARMAC HML rules. Failure to do will jeopardize our unique clinically led prescribing system and may mean medicines are not available until they are approved (or denied) by a therapeutics committee (as occurs in other DHBs).

- In conclusion, moxifloxacin is used infrequently at CDHB with around half being compliant with the PHARMAC HML. Clinicians using moxifloxacin outside of PHARMAC restrictions must fulfil CDHB requirements (Table 2) and consult with Infectious Diseases/Microbiology for respiratory indications.

Acknowledgments:
Brendan Luu (audit), Sheryl Priest (e-support).

Pink Book antimicrobial guidelines changes

Community-acquired pneumonia (CAP)

- **Mild (CURB 0 – 1) CAP** is usually treated empirically with a β-lactam (amoxicillin or cefalexin) alone. Azithromycin is added if risk factors for *Legionella spp.,* (updated, as below) are present. If microbiological testing identifies the likely pathogen, adjust antimicrobial therapy (e.g. stop unnecessary agents) accordingly.

Legionella risk factors:
- Season (spring and summer).
- Gardening – recent history of using potting mix or compost, or tipping or trowelling of potting mix, or hand-to-face touching (eating, drinking or smoking) before handwashing.
- Water – exposure to potentially contaminated water sources such as humidifiers, air conditioners or hot-water systems

Acute pyelonephritis/complicated UTI

- After initial ceftriaxone IV, the recommended empiric oral follow-ons have changed for patients with severe renal failure and those who are pregnant (adjust based on susceptibilities).
- **Severe renal failure** (eGFR < 20 mL/min): oral cefalexin is first-line and ciprofloxacin is second-line. Trimethoprim should not be used as *E. coli* resistance is high (~24%).
- **Pregnancy**: oral cefalexin is first-line; high doses (1000 mg four times daily) are needed to reach adequate concentrations against Gram-negative bacteria in the blood, kidneys and urine. After 14 weeks' gestation (if susceptible), trimethoprim+sulfamethoxazole is now preferred over trimethoprim alone, to ensure effective concentrations at all three potential sites of infection.