Orthopaedic Surgical Antibiotic Prophylaxis Guideline - Adult Elective and Trauma Cases

- All antibiotic doses are for adults of average size with normal hepatic and renal function.
- Prophylactic doses should be given ≤ 30 minutes before incision and at least 10 minutes prior to tourniquet inflation if used.

Procedure	**First line**	**Second line- for patients with severe allergy to penicillin/cephalosporins OR Patients who are MRSA positive/high risk for MRSA OR Patients with multiple risk factors for *C. difficile* (see table below) OR Day case patients**
Prosthetic joint replacement	Cefuroxime 1.5g IV on induction, then two further doses of 750 mg at 8-hourly intervals.	Teicoplanin* 10mg/kg as a single dose on induction (round to nearest 200mg, max. dose 800mg). **PLUS** Gentamicin** 3mg/kg as a single dose on induction (max. dose 300mg)
Internal fixation of closed fractures	Cefuroxime 1.5g IV on induction. Give two further doses of 750 mg at 8-hourly intervals **if high risk patient.**	Teicoplanin* 10mg/kg (round to nearest 200mg, max. dose 800mg).
Spinal surgery.	Cefuroxime 1.5g IV on induction. If no implant, give a single dose. If implant, then give two further doses of 750 mg at 8-hourly intervals.	Teicoplanin* 10mg/kg (round to nearest 200mg, max. dose 800mg).

***For intravenous teicoplanin, consider administering as infusion over 30 minutes instead of bolus, to reduce risk of anaphylactoid reactions.**

Open Limb Fractures (discuss with microbiology if unusual environmental exposure)	**No penicillin allergy**	**Non- severe penicillin allergy** - Non-immediate reaction without systemic involvement	**Severe penicillin allergy** immediate rapidly evolving reaction or non-immediate reaction with systemic involvement	**MRSA positive OR high risk for MRSA**
Start as soon as possible after injury (ideally within 1 hour) and continue until 1st wound excision	Co-amoxiclav 1.2g IV 8-hourly	Ceftriaxone 2g once daily. Add metronidazole IV 500mg 8-hourly if soil contamination.	Clindamycin 600mg IV 6-hourly **PLUS** Gentamicin 3mg/kg** (max. dose 300mg) for Gustillo type III.	**Add** Teicoplanin* 10mg/kg (rounded to nearest 200mg, max. dose 800mg). Repeat after 12 hours. Further doses may be required depending on the timing of surgery.
On induction at first excision of the wound	A single dose of gentamicin 3 mg/kg** (unless they have received gentamicin in the past 16 hours). Further intra-operative doses of co-amoxiclav or clindamycin should be given if there is major blood loss (>10% blood volume) or if the procedure lasts more than 3 hours. Do not give additional doses of once-daily antibiotics, e.g. gentamicin** or ceftriaxone unless it has been more than 16 hours since the last dose. **Continue antibiotics for 24 hours after wound excision.**			
On induction at the time of skeletal stabilisation and soft tissue coverage	A single intravenous dose at induction of teicoplanin* 10mg/kg (round to nearest 200mg, maximum dose 800mg) if it has been more than 12 hours since the last dose **PLUS** gentamicin** 3 mg/kg if it has been more than 16 hours since the last dose. This is to provide cover for organisms selected out from initial prophylaxis and for nosocomial pathogens. No further postoperative antibiotics are required.			

Risk factors for *c. difficile (c. diff):*

See risk factors below; ones in red are most significant. In patients with multiple risk factors for *c. diff,* select a prophylaxis regime which avoids the use of cefuroxime and clindamycin.

- Previous *C. difficile*
- Age > 65 years
- GDH positive
- Recent antibiotic use
- Nursing or residential home patient
- NG or PEG tube
- PPI
- Recent GI surgery

Risk factors for MRSA:

- Previously MRSA positive
- Nursing or residential home patient
- Transferred from another health care facility (including abroad)

****INTRAVENOUS GENTAMICIN:**

- Contraindicated in myasthenia gravis.
- Usual maximum dose 300mg when using 3mg/kg. Dose to be rounded to nearest 40mg.
- Check all charts, paper and electronic before giving gentamicin.
- In patients with CrCl<10mL/min, gentamicin at dose of 3mg/kg is not normally recommended. Discuss with renal team or pharmacy.
- All doses should be administered via an infusion pump over 30 minutes.
- Avoid NSAIDs for 24hrs if possible, in patients given gentamicin.

Documentation Controls

Version	V5
Development of Guidelines:	Ellie Birnie- Lead Antimicrobial/OPAT Pharmacist Dr James Hutchinson- Orthopaedic Consultant Kayleigh Lehal- Lead Antimicrobial Pharmacist Dr James Lewis- Orthopaedic Consultant Dr Peter Slovak- Consultant Microbiologist Aiysha Ul-Haq- Advanced Pharmacist- Antimicrobials
Consultation with	Orthopaedic consultants, microbiology consultants, renal consultants, antimicrobial pharmacists
Changes from V4	• Second line treatment option to include Daycase patients • Myasthenia gravis added as contraindication to gentamicin. • Teicoplanin administration details added. • *C.diff* risk factors table updated and re-structured. • Gentamicin table re-structured. • Creatinine clearance and maximum dose of gentamicin amended in line with Renal Drug Database and literature.
Approved By:	Surgery 23.07.24 AMSG 27.08.24
Review Date:	August 2027
Key Contact:	Kayleigh Lehal- Lead Antimicrobial Pharmacist Ellie Birnie- Lead Antimicrobial/OPAT Pharmacist

References

1. Best Practice for Hip/Knee Arthroplasty July 2019 Surgery Documentation https://www.boa.ac.uk/resources/best-practice-hip-arthroplasty.html
2. NICE guideline [NG157] June 2020: Joint replacement (primary): hip, knee and shoulder https://www.nice.org.uk/guidance/NG157
3. NICE guideline [NG125] on surgical site infections https://www.nice.org.uk/guidance/NG125
4. The American Academy of Orthopaedic surgeons (AAOS) http://www.orthoguidelines.org/guideline-detail?id=1509&tab=by_stage
5. Bone Joint J 2019;101-B(6 Supple B):9–15.2019 John Charnley Award: Increased risk of prosthetic joint infection following primary total knee and hip arthroplasty with the use of alternative antibiotics to cefazolin
6. Perioperative Antibiotic Prophylaxis in Total Joint Arthroplasty: A Systematic Review and Meta-Analysis J Bone Joint Surg Am 2019 May 1;101(9):828-842. https://pubmed.ncbi.nlm.nih.gov/31045673/
7. PHE Surveillance of surgical site infections in hospitals April 2018 – March 2019 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/854182/SSI_Annual_Report_2018_19.pdf
8. Srisung et al Surgical prophylaxis with gentamicin and acute kidney injury: a systematic review and meta-analysis *Ann Transl Med* 2017;5(5):100
9. BAPRAS /BOA guidelines standards for management of open fracture https://oxfordmedicine.com/view/10.1093/med/9780198849360.001.0001/med-9780198849360 accessed 14/05/2024.
10. Electronic Medicines Compendium (2024). *Gentamicin 10mg/ml Solution for Injection or Infusion - Summary of Product Characteristics (SmPC) - (emc)*. [online] Available at: https://www.medicines.org.uk/emc/product/2407/smpc#gref.

11. Medusa Injectable Medicines Guide (2022) Gentamicin monograph. https://medusa.wales.nhs.uk [Accessed 14/05/2024]