ADULT ANTIBIOTIC PROPHYLAXIS IN ORTHOPAEDIC SURGERY

General Principles of Prescribing for Surgical Prophylaxis

- Indication for prophylaxis has been based on the Scottish Antimicrobial Prescribing Group (SAPG) Good Practice Recommendations for Surgical Prophylaxis (2022) and guided by regional and local practice.
- Choice of agent:
  - Adhere to recommended agent in table below where possible.
  - Recommendations restrict the use of cephalosporins, clindamycin, quinolones and co-amoxiclav and use narrow spectrum agents where possible.
  - Take recent culture results/antibiotic therapy and additional patient risk factors into account eg. morbid obesity, multiple previous surgeries, prosthetic material, diabetes.
    Discuss with Infection Specialist in a timely manner prior to surgery if multidrug resistance eg. Carbapenemase producing enterobacteriaceae (CPE) isolated.
  - Check allergy status of patient including nature of allergy prior to prescribing.
- Recording of antibiotic as 'STAT' on HEPMA and on Anaesthetic Record Sheet.
- Timing of antibiotic:
  - Optimum timing of IV antibiotics is ≤60 minutes prior to skin incision, usually at induction of anaesthesia.
  - Antimicrobial cover may be sub-optimal if given > 1 hour prior to skin incision or post skin incision.
- Frequency of administration should be single dose only unless:
  - Operation Prolonged (see re-dosing guidance table).
  - >1.5 litre intra-operative blood loss –Re-dose following fluid replacement (see re-dosing guidance table).
  - Specifically stated in following guideline.
    Document in the medical notes the indication for antibiotic administration beyond 1st dose.
- Arrangements for MRSA and MSSA positive patients
  - MRSA positive: Decolonisation therapy should be used prior to elective surgery and antimicrobial prophylaxis should cover for MRSA. See NHSL Policy for management of patients colonised or infected with MRSA.
  - MSSA positive: Decolonisation therapy should be used prior to certain elective orthopaedic procedures where MSSA screening is in operation.

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Recommended Agents in Orthopaedic Surgery

Use antibiotic impregnated cement.
Dosing specified based on CrCL >60ml/min; if renal impairment consult individual drug product literature.

Elective			
Procedure	**1st Choice**	**If True/Severe Penicillin Allergy or MRSA positive**	**Comments**
Arthroscopy	Not routine	Not routine	
Knee arthroscopy with ligament reconstruction (involving screws)	Cefuroxime 1.5g IV or Flucloxacillin 1g IV	Teicoplanin IV 400mg if <65kg or 800mg if ≥65kg	Local recommendation: Give as single dose before tourniquet
Primary arthroplasty, Revision arthroplasty for mechanical reasons, Any surgery involving implant	Cefuroxime 1.5g IV or Flucloxacillin 1g IV	Teicoplanin IV 400mg if <65kg or 800mg if ≥65kg	Single dose advised.
Surgery without implant	Not routine	Not routine	
Revision surgery with suspected infection	Send samples for culture + sensitivity (C+S), then commence treatment: Gentamicin IV – dose according to NHSL treatment guidance + Vancomycin IV – dose according to NHSL treatment guidance		Prescribe on gentamicin and vancomycin charts. Continue gentamicin and vancomycin post-operatively unless otherwise advised. Take levels as per NHSL treatment guidance. Discuss culture results / antibiotic choice with Infection Specialist.
Soft tissue surgery of hand	Not routine	Not routine	

Trauma – prophylaxis and treatment			
Procedure	**1st Choice**	**If TRUE/SEVERE Penicillin Allergy or MRSA positive**	**Comments**
Open fracture: **(1) At presentation:** Antibiotics within 3 hours of injury. Continue antibiotics until first debridement (excision).	(1) Co-amoxiclav 1.2g IV 8 hourly Add gentamicin IV if Gustilo grade III fracture (dose as per NHSL treatment guidance)	(1) If true/severe penicillin allergy: Clindamycin 600mg 6 hourly IV Add gentamicin IV if Gustilo grade III fracture (dose as per NHSL treatment guidance)	If high MRSA risk or unusual environmental exposures discuss with microbiology regarding antibiotic choice.
(2) At the time of first debridement: Continue antibiotics until soft tissue closure, or for a maximum of 72 hours, whichever is sooner.	(2) Co-amoxiclav 1.2g	(2) Clindamycin 600mg IV	If high risk of MRSA Add Teicoplanin IV 800mg if ≥65kg or 400mg if <65kg
(3) At surgery for skeletal stabilisation and definitive tissue closure Single doses only – do not continue post surgery	(3) Co-amoxiclav 1.2g	(3) Clindamycin 600mg IV	

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Trauma – prophylaxis and treatment			
Procedure	**1st Choice**	**If TRUE/SEVERE Penicillin Allergy or MRSA positive**	**Comments**
Open surgery for closed fracture	Cefuroxime 1.5g IV or Flucloxacillin 1g IV	Teicoplanin IV 400mg if <65kg or 800mg if ≥65kg	Single doses only – do not continue post surgery
Hand trauma (contaminated/open/no bite)	Co-amoxiclav 1.2g 8 hourly IV	Clindamycin 600mg 6 hourly If grossly contaminated add in IV gentamicin.	If high MRSA risk discuss with microbiology regarding antibiotic choice. Antibiotics within 3 hours of injury. Continue antibiotics until soft tissue closure, or for a maximum of 72 hours, whichever is sooner.
Human bite / Animal bite	Co-amoxiclav 1.2g 8 hourly IV	Vancomycin IV (dose as per NHSL treatment guidance) + Metronidazole 400mg 8 hourly PO + Ciprofloxacin 500mg 12 hourly PO	Switch to oral antibiotics when appropriate and oral route available. Consult empirical IVOST policy unless positive C+S to guide treatment. Total treatment duration 7 days. Consider risk of BBV transmission. Consider Tetanus prophylaxis.

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IV Antibiotic Administration and Re-Dosing Guidance

Antibiotics should be given as a bolus injection where possible.
All re-dosing guidance based on pre-op Creatinine Clearance (CrCL) >60mL/min; if renal impairment present consult individual drug product literature.

Antibiotic	Dose	Administration	Prolonged surgery Procedure duration (from 1st antibiotic dose)		>1.5L blood loss – Re-dose after fluid replacement
			Over 4 hours	Over 8 hours	
Cefuroxime	1.5g	**IV** Re-constitute 1.5g vial with 15ml of water for injection and give by slow IV injection over 3-5 minutes.	Repeat 1.5g	Repeat 1.5g (again)	Repeat 1.5g
Co-amoxiclav	1.2g	**IV** Re-constitute 1.2g vial with 20ml of water for injection and give by slow IV injection over 3-4 minutes.	Repeat 1.2g	Repeat 1.2g (again)	Repeat 1.2g
Clindamycin	600mg	**IV** Dilute 600mg in 50mL of sodium chloride 0.9% and give by IV infusion over 20-30 minutes. Maximum infusion rate 30mg per minute.	Repeat 600mg	Repeat 600mg	Repeat 600mg
Flucloxacillin	1g	**IV** Re-constitute 1g vial with 20mL of water for injection and give by slow IV injection over 3-4 minutes.	Repeat 1g	Repeat 1g (again)	Repeat 1g
Gentamicin*	See NHSL gentamicin treatment guidance	**IV** Can be given undiluted, or diluted to a convenient volume with sodium chloride 0.9% or glucose 5% to aid slow administration. Give by slow IV injection over at least 3 minutes via large peripheral vein or central line.	**Do not re-dose**	**Do not re-dose**	Give half original dose of gentamicin
Metronidazole	500mg	**IV** Already diluted. Give by IV infusion over at least 20 minutes.	Not required	Repeat 500mg	Repeat 500mg
Teicoplanin	400mg if patient weight <65kg or 800mg ≥65kg	**IV** Re-constitute slowly with 3.14ml ampoule of water for injection provided and roll gently until dissolved. If foamy, stand for 15 minutes until foam subsides then give EACH vial by slow IV injection over 3-5 minutes.	Do not re-dose (long half-life)	Do not re-dose (long half-life)	Give half original dose if >1.5L blood loss within first hour of operation

* Post-operative gentamicin prescribing should take into account intra-operative dose. If subsequent treatment using gentamicin is required post-operatively, measure gentamicin concentration 6-14 hours post theatre dose. Use the gentamicin treatment guidance to decide on course of action before administering a further dose. If sampling window missed, measure gentamicin concentration 20-24 hours post-theatre dose and ensure level <1mg/L before administering a further dose. For gentamicin treatment dosing, refer to NHS Lanarkshire's gentamicin treatment guidance and online calculators. Discuss with pharmacy if further advice is required.

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References

- BAPRAS guideline, STANDARDS FOR THE MANAGEMENT OF OPEN FRACTURES (Sept 2020). Accessed at: https://doi.org/10.1093/med/9780198849360.001.0001
- British National Formulary (BNF). Accessed at: https://bnf.nice.org.uk/drugs/
- Electronic Medicines Compendium (EMC). Accessed at: https://www.medicines.org.uk/emc/
- NHS Injectable Medicines Guide (MEDUSA). Accessed at: https://www.medusaimg.nhs.uk/
- Scottish Antimicrobial Prescribing Group (SAPG) Good Practice Recommendations for Surgical Prophylaxis (October 2022). Access at: https://www.sapg.scot/guidance-qi-tools/good-practice-recommendations/surgical-prophylaxis/