Surgical Antimicrobial Prophylaxis Guidelines (adult)

Appendix 14: Plastic and Reconstructive Surgery (including open fractures)

Preoperative Considerations

Consider individual risk factors for every patient including the need for prophylaxis. Antibiotic choice/dose may need to be modified according to patient factors (e.g. immune suppression, presence of prostheses, allergies, renal function, obesity, malnutrition, diabetes, malignancy, infection at another site, colonisation with multi-drug resistant bacteria and available pathology).

Consider surgical wound classification (**clean, clean-contaminated, contaminated, dirty-infected)** when determining the need for, or choice of, antibiotic prophylaxis. Refer to Surgical Antimicrobial Prophylaxis Prescribing Guideline for further information.

Pre-existing infections (known or suspected) – if present, use appropriate treatment regimen instead of prophylactic regimen for procedure but ensure the treatment regimen has activity against the organism(s) most likely to cause postoperative infection. Adjust the timing of the treatment dose to achieve adequate plasma and tissue concentrations at the time of surgical incision and for the duration of the procedure - seek advice from ID or the AMS team if unsure.

For patients with specific cardiac conditions undergoing a skin or soft tissue procedure through infected skin, skin structures or musculoskeletal tissues, prophylaxis against staphylococcal and streptococcal endocarditis may be required - refer to Antibiotic Prophylaxis for Prevention of Endocarditis in High Risk Patients for further information.

Practice Points

Unless otherwise stated, surgical antibiotic prophylaxis is NOT routinely indicated for clean or clean-contaminated procedures of the skin or subcutaneous tissue (including procedures that breach the oral mucosa).

Topical antibiotics should NOT be applied to the wound during or after surgery

For human or animal bite injuries and clenched fist injuries, surgical antibiotic prophylaxis is required – refer to the Therapeutic Guidelines.

Timing and administration of antibiotics

Surgical antibiotic prophylaxis must be administered before surgical incision to achieve effective plasma and tissue concentrations at the time of incision. Administration of any antibiotic after skin incision reduces effectiveness.

- IV **cefazolin** can be given over 5 minutes and should be administered no more than 60 minutes before skin incision.
- IV **metronidazole** and IV **clindamycin** infusions can be given over 20 minutes. They should be fully administered within 120 minutes of surgical incision. Maximum plasma and tissue concentrations occur at the conclusion of the infusion.
- IV **vancomycin** infusion should be given at a rate of 1g over at least 60 minutes and 1.5g over at least 90 minutes. Vancomycin should be timed to begin 15 to 120 minutes before skin incision. This ensures adequate concentration at the time of incision and allows for any potential infusion-related toxicity to be recognised before induction. The infusion can be completed after skin incision.

Dosing in patients with obesity

- **Cefazolin**: Consider increased dose of cefazolin (3g) for adult patients weighing more than 120kg.
- **Vancomycin**: Consider increased dose of vancomycin (1.5g) for adult patients weighing more than 80kg.

High MRSA risk (defined as history of MRSA colonisation or infection OR frequent stays or a current prolonged stay in hospital with a high prevalence of MRSA OR residence in an area or aged care facility with high prevalence of MRSA OR current residence, or residence in the past 12 months, in a correctional facility):

- Add vancomycin

Repeat dosing

A single preoperative dose is sufficient for most procedures; however repeat intraoperative doses are advisable:

- for prolonged surgery (more than 4 hours from the time of first preoperative dose) when a short-acting agent is used (e.g. cefazolin dose should be repeated after 4 hours and clindamycin after 6 hours), OR
- if major blood loss occurs (e.g. more than 1500 mL in adults), following fluid resuscitation.

When measuring the time to a second intraoperative dose, measure the interval from the time of the first preoperative dose rather than the surgical incision time.

Recommended Prophylaxis

Surgery	Recommended Prophylaxis	High Risk Penicillin / Cephalosporin Allergy*
Clean bone or soft tissue injury **Open fractures of the distal phalanx (provided prompt irrigation/debridement of the fracture within 8 hours of injury)** **Non-infected lesions & minor excisions** **Blepharoplasty / Ptosis repair** **Rhytidectomy** **Other clean or clean-contaminated skin and soft tissue procedures, including those that breach the oral mucosa**	Prophylaxis NOT recommended	

Recommended Prophylaxis

Surgery	Recommended Prophylaxis	High Risk Penicillin / Cephalosporin Allergy*
Groin/axilla dissection **Abdominoplasty** **Insertion of implants, mesh, prostheses, screws, plates etc.** **Traumatic wounds (non-severe injuries)** **Open fractures (non-severe injuries +)** ****Broader antibiotic cover may be required for wounds that have been immersed in water – refer to the Therapeutic Guidelines**	**cefazolin 2g** IV High risk of MRSA infection: **ADD vancomycin 1g** IV infusion (**1.5g** for patients more than 80kg **actual body weight**)	**clindamycin 600mg** IV OR For known MRSA colonisation/infection give INSTEAD: **vancomycin 1g** IV infusion (**1.5g** for patients more than 80kg **actual body weight**)
Open fractures (severe injury ^) **Traumatic wounds (severe injuries#)** ****Broader antibiotic cover may be required for wounds that have been immersed in water – refer to the Therapeutic Guidelines**	**cefazolin 2g** IV then 8-hourly for a further 2 doses PLUS for heavily contaminated severe injuries (e.g. agricultural injuries): **ADD metronidazole 500mg** IV then 12-hourly for a further 1 dose High risk of MRSA infection: **ADD vancomycin 1g** IV infusion (**1.5g** for patients more than 80kg **actual body weight**)	**clindamycin 600mg** IV then 8-hourly for a further 2 doses OR For known MRSA colonisation/infection give INSTEAD: **vancomycin 1g** IV infusion (**1.5g** for patients more than 80kg **actual body weight**) then 12-hourly for a further 1 dose PLUS for heavily contaminated severe injuries (e.g. agricultural injuries): **ADD metronidazole 500mg** IV then 12-hourly for a further 1 dose
	Antibiotic prophylaxis for severe injuries should not continue for more than 24 hours after definitive wound closure. The total duration of prophylaxis should not be more than 72 hours, even if soft tissue coverage is not achievable.	

* High risk penicillin/cephalosporin allergy: History suggestive of high risk (e.g. anaphylaxis, angioedema, bronchospasm, urticaria, DRESS/SJS/TEN)

\+ Open fractures - non-severe injuries: open fractures resulting from indirect injury or direct, low-energy injury (Gustilo-Anderson type I or II) – see Table 1

^ Open fractures - severe injuries: open fractures resulting from high-energy injury or exhibiting high-energy fracture patterns (Gustilo-Anderson type III) – see Table 1

\# Traumatic wounds - severe injuries: muscular, skeletal and soft tissue trauma, crush injuries, penetrating injuries, stab wounds

Table 1: Gustilo-Anderson Classification of Open Fractures (Garner, 2020)

Type 1	Open fracture with a wound less than 1cm long, low energy, without gross contamination
Type 2	Open fracture with a wound 1-10cm long, low energy, without gross contamination or extensive soft-tissue damage, flaps, or avulsions
Type 3	A: Open fracture with a wound > 10cm with adequate soft-tissue coverage, or any open fracture due to high energy trauma or with gross contamination, regardless of the size of the wound B: Open fracture with extensive soft-tissue injury or loss, with periosteal stripping and bone exposure that requires soft-tissue coverage in the form of muscle rotation or transfer C: Open fracture associated with arterial injury requiring repair

Postoperative Care

Except where included above, postoperative antibiotics are NOT indicated unless infection is confirmed or suspected, regardless of the presence of surgical drains. If infection is suspected, consider modification of antibiotic regimen according to clinical condition and microbiology results.

Definitions / Acronyms

AMS	Antimicrobial Stewardship	**DRESS**	Drug rash with eosinophilia and systemic symptoms
ID	Infectious Diseases	**IV**	Intravenous
MRSA	Methicillin-resistant *Staphylococcus aureus*	**SJS / TEN**	Stevens-Johnson syndrome / Toxic epidermal necrolysis

References

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