



MUHC Recommendations for Surgical Antibiotic Prophylaxis in Adults



General Principles

- 1. Selection:** Select appropriate agents on the basis of surgical procedure (see table below)
- 2. Pre-operative timing:** the optimal time for infusion to be started is 30-60 min. before incision and should be **completed before the incision**- Ciprofloxacin and vancomycin need longer infusion time (over 1 hour); should be started 60-120 minutes before incision and should also be completed before incision. In order to allow for completion of antibiotic infusion before incision, if possible, a patient requiring ciprofloxacin or vancomycin, should not be scheduled the first one in the morning.
- 3. Redosing:** Repeat dose intra-operatively for cefazolin 3 hours after incision – (after 6 hours for clindamycin) or excessive blood loss (more than 1500 mL)
- 4. Duration:** Prophylaxis should be stopped within 24 hours for most procedures.
- 5. Patients on antibiotics for infections may need additional prophylaxis to cover the surgical site.** If the agents used therapeutically are appropriate, administer an extra-dose within 30-60 minutes before surgical incision.
- 6. Document** start time, dose and end time of antibiotic prophylaxis.
- 7. In the presence of documented resistance to usual recommended agents, antibiotic choice for prophylaxis should change according to cultures and sensitivities, if the organism is a likely pathogen for the surgical site infection.**
- 8. Allergy to penicillin: ONLY TYPE- 1 allergic reactions are contraindicated to cephalosporin and carbapenem (anaphylactic shock, asthma, urticaria, angioedema...).** This should be documented at the pre-admission clinic.
- 9. Tobramycin:** the recommended dose is 5 mg/kg of dosing weight (except for C-section- 2 mg/kg). Maximum recommended dose: 400 mg as following

Weight	Tobramycin Dose
Less than 50 kg	240 mg
50-59 kg	280 mg
60-69 kg	320 mg
70-79 kg	360 mg
Equal or more than 80 kg	400 mg

- 10. Vancomycin:** the recommended dose is **15 mg/kg (actual body weight)** as following

Weight	Vancomycin Dose
Less than or equal to 50 kg	750 mg
51-70 kg	1 g
71-90 kg	1.25 g
91-110 kg	1.5 g
111-130 kg	1.75 g
More than 130 kg	2 g

- 11. Infection at the surgical site:** An infection at the surgical site should be treated according to cultures and sensitivities for the recommended duration of treatment and clinical response

Procedure	Likely Pathogens	Place in Therapy	Antibiotic Prophylaxis	Comments
Cardiac surgery				
CABG	<i>Staph epi</i> , <i>Staph aureus</i> , Enteric Gram-negative bacilli	First choice	Cefazolin 2 g IV X 1 pre-op + tobramycin 5 mg/kg IV (max 400 mg) Cefazolin 2 g IV q 8h x 3 doses post-op	If weight more than 120 kg: cefazolin 3 g Vancomycin in colonized patients with MRSA
		Alternative (B-lactam allergy)	Vancomycin 15 mg/kg IV X 1 pre-op + tobramycin 5 mg/kg IV (Max: 400 mg) Repeat vancomycin 15 mg/kg IV q 12h X 2 doses post-op	
Valves	<i>Staph epi</i> , <i>Staph aureus</i> , Enteric Gram-negative bacilli	First choice	Cefazolin 2 g + tobramycin 5 mg/kg (Max:400 mg) IV X 1 pre-op; Continue cefazolin q 8h X 3 doses	If weight more than 120 kg: cefazolin 3 g Vancomycin in colonized patients with MRSA
		Alternative (B-lactam allergy)	Vancomycin 15 mg/kg IV + tobramycin 5 mg/kg (Max:400 mg) X 1 pre-op Repeat vancomycin 15 mg/kg q 12h x 2 doses post op.	
General surgery				
Appendectomy (not perforated)	Enteric Gram-negative bacilli, Anaerobes	First choice	Cefazolin 2 g IV + metronidazole 500 mg IV X 1 pre-op Cefazolin 2 g + metronidazole 500 mg IV q 8h x 2 doses post-op	If weight more than 120 kg: cefazolin 3 g Prophylaxis should be stopped within 24 hours
		Alternative (B-lactam allergy)	Clindamycin 900 mg IV + tobramycin 5 mg/kg IV (Max:400 mg) X 1 pre-op Clindamycin 900 mg IV q 8h x 2 doses post-op	
Colorectal surgery	Enteric Gram-negative bacilli, Anaerobes	First choice	Day before surgery: Neomycin 1 g and Erythromycin 1 g PO for 3 doses at : 13h00 , 14h00 and 23h00 Cefazolin 2 g IV + metronidazole 500 mg IV X 1 pre-op Cefazolin 2 g IV + metronidazole IV q 8h x 2 doses post-op	If weight more than 120 kg: cefazolin 3g Prophylaxis should be stopped within 24 hours
		Alternative (B-lactam allergy)	Clindamycin 900 mg IV + tobramycin 5 mg/kg IV (Max:400 mg) X 1 pre-op Clindamycin 900 mg IV q 8h x 2 doses post-op	
Penetrating abdominal wound	Enteric Gram-negative bacilli, Anaerobes	First choice	Cefazolin 2 g IV + metronidazole 500 mg IV X 1 pre-op Cefazolin 2 g IV + metronidazole 500 mg IV q 8h x 2 doses post-op	If weight more than 120 kg: cefazolin 3 g
		Alternative (B-lactam allergy)	Clindamycin 900mg IV + tobramycin 5 mg/kg IV (Max:400 mg) X 1 pre-op Clindamycin 900 mg IV q 8h x 2 doses post-op	
Gastric surgery	Enteric Gram-negative bacilli, Gram-positive cocci	First choice	Cefazolin 2 g IV X 1 pre-op	If weight more than 120 kg: cefazolin 3 g
		Alternative (B-lactam allergy)	Clindamycin 900 mg IV + tobramycin 5 mg/kg IV (Max:400 mg) X1 pre-op	
Hernia repair	Gram-positive cocci	First choice	Cefazolin 2 g IV X 1 pre-op	If weight more than 120 kg: cefazolin 3 g
		Alternative (B-lactam allergy)	Vancomycin 15 mg/kg IV X 1 pre-op	
Hepatic resection	<i>Enterococcus</i> , <i>Strep species</i> , Gram-negative bacilli, Anaerobes	First choice	Ceftriaxone 2 g + Ampicillin 2 g X 1 pre-op	
		Alternative (B-lactam allergy)	Vancomycin 15 mg/kg IV + tobramycin 5 mg/kg IV (Max: 400 mg)	
Cholecystectomy *	Enteric Gram-negative bacilli, Gram-positive cocci	First choice	Cefazolin 2 g IV X 1 pre-op	If weight more than 120 kg: cefazolin 3 g
		Alternative (B-lactam allergy)	Clindamycin 900 mg IV + tobramycin 5 mg/kg dose IV (max 400 mg) x 1 dose pre-op	
				If documented MRSA: ADD Vancomycin 15 mg/kg IV

* for high risk patients: diabetic, Age >70 years, acute cholecystitis, non-functioning gall bladder, obstructive jaundice or common bile duct stones.

Procedure	Likely Pathogens	Place in Therapy	Antibiotic Prophylaxis	Comments
Gynaecologic surgery				
C-section	<i>Staph aureus</i> , Gr. B Strep. Enteric gram negative	First choice	Cefazolin 2 g IV X 1 pre-op	If weight more than 120 kg: cefazolin 3 g
		Alternative (B-lactam allergy)	Clindamycin 900 mg IV + tobramycin 2 mg/kg IV X 1 pre-op	
Hysterectomy / surgical abortion	Enteric Gram-negative bacilli, Gr. B Strep, <i>Enterococcus</i>	First choice	Cefazolin 2 g IV X 1 pre-op	If weight more than 120 kg: cefazolin 3 g
		Alternative (B-lactam allergy)	Clindamycin 900 mg IV + tobramycin 5 mg/kg IV (Max:400 mg) X 1 pre-op	
Urologic				
Open or laparoscopic genitourinary procedure	Gram-negative bacilli, <i>Enterococcus</i> .	First choice	Cefazolin 2 g IV X 1 pre-op	If weight more than 120 kg: cefazolin 3 g
		Alternative (B-lactam allergy)	Clindamycin 900mg IV + tobramycin 5 mg/kg IV (Max:400 mg) X 1 pre-op	
Cystoscopy (high-risk), (TURP) transrectal biopsy or transurethral prostatectomy	Gram-negative bacilli	First choice	Tobramycin 5 mg/kg IV (Max:400 mg) X 1 pre-op	Be aware for resistance if patient has received antibiotics recently
		Alternative	Ciprofloxacin 400 mg IV X 1 pre-op	
Nephrectomy		First choice	Cefazolin 2 g IV X 1 pre-op	If weight more than 120 kg: cefazolin 3 g
		Alternative (B-lactam allergy)	Vancomycin 15 mg/kg IV X1pre-op	
Head and neck surgery				
Incision through oral or pharyngeal mucosa	<i>Staph aureus</i> , Gram-negative bacilli, Anaerobes (not <i>B.fragilis</i>)	First choice	Cefazolin 2 g IV X 1 pre-op	If weight more than 120 kg: cefazolin 3 g
		Alternative (B-lactam allergy)	Clindamycin 900 mg IV X 1 pre-op	
Neurosurgery				
Craniotomy Shunt	<i>Staph aureus</i> , <i>Staph epi</i>	First choice	Cefazolin 2 g IV X 1 pre-op	If weight more than 120 kg: cefazolin 3 g
		Alternative (B-lactam allergy)	Vancomycin 15 mg/kg IV X 1 pre-op	
Spine	<i>Staph aureus</i> , <i>Staph epi</i>	First choice	Cefazolin 2 g IV X 1 pre-op For multi level spinal fusion of the lumbar region with implants.: Add Tobramycin 5 mg/kg IV (Max:400 mg) X 1 pre-op	If weight more than 120 kg: cefazolin 3 g
		Alternative (B-lactam allergy)	Vancomycin 15 mg/kg IV X 1 pre-op	
Orthopaedic surgery				
Closed fracture, THP, TKR	<i>Staph epi</i> , <i>Staph aureus</i>	First choice	Cefazolin 2 g IV X 1 pre-op Cefazolin 2 g IV q 8h x 2 doses post-op	If weight more than 120 kg: cefazolin 3 g Prophylaxis should be stopped within 24 hours
		Alternative (B-lactam allergy)	Vancomycin 15 mg/kg IV X 1 pre-op Repeat vancomycin 15 mg/kg IV X 1 dose post-op 12 hours after the first dose	
Open fracture	<i>Staph</i> , <i>Strep</i> , Gram-negative bacilli, Anaerobes	First choice	Cefazolin 2 g IV + tobramycin 5 mg/kg IV (max:400 mg) X 1 pre-op; Continue cefazolin 2 g IV q8h X 2 doses post op.	If weight more than 120 kg: cefazolin 3 g Gustillo grade 2 fracture continue with Cefadroxil 1 g PO BID X 3-5 days. Gustillo grade 3 fracture, continue IV Antibiotics for 5-7 days
		Alternative (B-lactam allergy)	Clindamycin 900 mg IV + Tobramycin 5 mg/kg IV (Max:400 mg) X1 pre-op Clindamycin 900 mg IV q 8h x 2 doses post-op	

Procedure	Likely Pathogens	Place in Therapy	Antibiotic Prophylaxis	Comments
Spine surgery	<i>Staph epi</i> , <i>Staph aureus</i>	First choice	Cefazolin 2g IV X 1 pre-op Cefazolin 2g IV q 8h x 2 doses post-op	If weight more than 120 kg: cefazolin 3 g Prophylaxis should be stopped within 24 hrs
		Alternative (B-lactam allergy)	Vancomycin 15 mg/kg X 1 pre-op Repeat vancomycin 15 mg/kg X 1 dose post-op 12 hours after the first dose	
Thoracic Surgery				
Lobectomy Pneumonectomy, Lung resection	<i>Staphylococcus aureus</i>	First choice	Cefazolin 2 g IV X 1 pre-op	If weight more than 120 kg: cefazolin 3 g If MRSA positive : Vancomycin 15 mg/kg IV
		Alternative (B-lactam allergy)	Clindamycin 900 mg IV X 1 pre-op	
Esophagectomy, Esophageal procedure	<i>Staphylococcus aureus</i>	First choice	Cefazolin 2 g IV X 1 pre-op Cefazolin 2 g IV q 8h x 2 doses post-op	If weight more than 120 kg: cefazolin 3 g Prophylaxis should be stopped within 24 hours If MRSA positive add Vancomycin 15 mg/kg
		Alternative (B-lactam allergy)	Clindamycin 900 mg IV + tobramycin 5 mg/kg IV (max 400 mg) X 1 pre-op Clindamycin 900 mg IV q 8h x 2 doses post-op	
Transplant Surgery				
Kidney	Enteric Gram negative bacilli, <i>Enterococcus</i> , <i>Staph. species</i>	First choice	Ceftriaxone 2 g IV + Vancomycin 15 mg/kg IV X1 pre-op	Treat according to sensitivities if Belzer positive with a pathogenic bacteria (S. aureus, E.coli or other coliforms). Do not treat if culture positive with S. epi, Staph Coagulase negative or Corynebacterium.
		Alternative (B-lactam allergy)	Ciprofloxacin 400 mg IV + Vancomycin 15 mg/kg IV pre-op	
Liver transplant	<i>Enterococcus</i> , <i>Strep species</i> , Gram-negative bacilli, Anaerobes	First choice	Ceftriaxone 2 g IV + Vancomycin 15 mg/kg IV X 1 pre-op	Treat according to sensitivities if Belzer positive with a pathogenic bacteria (S. aureus, E.coli or other coliforms). Do not treat if culture positive with S. epi, Staph Coagulase negative or Corynebacterium. If VRE + : Daptomycin 4 mg/kg IV
		Alternative (B-lactam allergy)	Vancomycin 15 mg/kg IV + tobramycin 5 mg/kg IV (max 400 mg) X 1 dose pre-op	
Kidney + Pancreas transplant	<i>S.aureus</i> , <i>Candida spp.</i> , <i>Enterococcus</i> ,, <i>Strep species</i> Gram-negative bacilli, Anaerobes	First choice	Meropenem 1 g IV + Fluconazole 400 mg IV pre-op Meropenem 1 g IV q 6h X 4 doses post-op Fluconazole 400 mg IV q 24h X 1 dose post-op	Treat according to sensitivities if Belzer positive with a pathogenic bacteria (S. aureus, E.coli or other coliforms). Do not treat if culture positive with S. epi, Staph Coagulase negative or Corynebacterium.
		Alternative (B-lactam allergy)	Ciprofloxacin 400 mg IV + Metronidazole 500 mg IV + Vancomycin 15 mg/kg IV + Fluconazole 400 mg IV X 1 pre- op Continue for 24 hours post-op	

Vascular Surgery				
Peripheral vascular surgery and vascular surgery with implant insertions , for clean incision		First choice	Cefazolin 2 g IV X 1 pre-op Cefazolin 2 g IV q 8h x 2 doses post-op Repeat cefazolin dose if prolonged surgery (after 3 hours) For inguinal and below incision ADD : Tobramycin 5 mg/kg IV (Max:400 mg) X 1 pre-op	If weight more than 120 kg: cefazolin 3 g Vancomycin in colonized patients with MRSA Contaminated or Infected wounds should receive antibiotic treatment post op adjusted with culture results (ex: transmetatarsal amputation of necrotic toe , drainage of infected wound or graft)
		Alternative (B-lactam allergy)	Vancomycin 15 mg/kg X 1 pre-op Repeat vancomycin 15 mg/kg X 1 dose post-op 12 hours after the first dose	Patients undergoing brachiocephalic procedures (e.g., carotid endarterectomy, brachial artery repair) without implantation of prosthetic graft material do not appear to benefit from routine antimicrobial prophylaxis

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References:

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