

Antibiotic Prophylaxis for Surgical Procedures

Clinical Practice Guideline

Approved by SSM Health Cardinal Glennon Clinical Practice Guidelines Committee December 2023

Pediatric Antibiotic Prophylaxis for Surgical Procedures

SSM Health Cardinal Glennon Children's Hospital

**The following guideline refers to surgical prophylaxis and does not apply specifically to treatment.

	Operation/Type of Procedure	Recommended Antibiotic	Alternative for Allergies
Cardiothoracic	CT surgery/procedure excluding cardiac catheterization	Cefazolin*	Clindamycin or vancomycin
Gastrointestinal	Esophageal, gastroduodenal	Cefazolin	Clindamycin or Vancomycin PLUS gentamicin
	Biliary tract		
	Open procedure	Cefazolin	Clindamycin or vancomycin PLUS gentamicin
	Laparoscopic procedure		
	--low risk	None	None
	--high risk – (non-functioning gall bladder, obstructive jaundice.) ^^If cholangitis or cholecystitis, treat as infection <u>not</u> prophylaxis	Cefazolin	Clindamycin or vancomycin PLUS gentamicin
	Appendectomy		
	Non-perforated, non-infected	Piperacillin/tazobactam – can consider ceftriaxone plus metronidazole (discuss with surgery attending)	Ciprofloxacin + metronidazole
	Suspected perforation	Piperacillin/tazobactam	Ciprofloxacin + metronidazole
	Small intestine		
	Non-obstructed	Cefazolin	Clindamycin + gentamicin
	Obstructed	Piperacillin/tazobactam – can consider ceftriaxone plus metronidazole (discuss with surgery attending)	
	Colorectal	Cefazolin + metronidazole	Clindamycin + gentamicin
Head and Neck	Hardware placement	Cefazolin	Clindamycin
	Clean-contaminated/cancer surgery	Cefazolin + metronidazole	Clindamycin + gentamicin
	Clean-contaminated involving sinuses or naso/oropharynx	Clindamycin	Ampicillin/sulbactam
Neurosurgery	Elective craniotomy, CSF shunting, or intrathecal pump placement	Cefazolin*	Clindamycin or Vancomycin
Orthopedic		Cefazolin*	Clindamycin or vancomycin
Transplant	Heart	Cefazolin	Clindamycin or vancomycin
	Liver	Piperacillin/tazobactam	Clindamycin or vancomycin PLUS gentamicin
	Pancreas, pancreas-kidney	Cefazolin +/- fluconazole (for high risk i.e. enteric drainage of pancreas)	Clindamycin or vancomycin PLUS gentamicin
Urologic	Routine cystoscopy	None - if urine is sterile	
	Other urologic procedures	Cefazolin +/- gentamicin [@]	Ciprofloxacin
	Urologic procedures involving bowel	Cefoxitin or Cefazolin plus metronidazole	Ciprofloxacin + metronidazole
Transplant	Heart	Cefazolin	Clindamycin or vancomycin
	Liver	Piperacillin/tazobactam	Clindamycin or vancomycin PLUS gentamicin
	Pancreas, pancreas-kidney	Cefazolin +/- fluconazole (for high risk i.e. enteric drainage of pancreas)	Clindamycin or vancomycin PLUS gentamicin

*Consider vancomycin for MRSA coverage in patients colonized with MRSA or with history of MRSA infection

@Add aminoglycoside if inserting prosthetic material

Surgeries that do not require prophylaxis: tonsillectomy, endoscopic sinus procedures, tympanostomy tube placement, Ortho – clean operations without implantation of foreign materials in hand, knee, or foot. Clean head/neck procedures. Routine hernia procedure without use of mesh.

Neonatal Antibiotic Prophylaxis for Surgical Procedures

Check patient medication profile for previous administrations of antibiotics prior to administering pre-op dose

	Operation Type of Procedure	Recommended Antibiotic*
Neonatal	≤ 72h of age	Ampicillin + gentamicin
	>72 h of age	Target to operative site, nosocomial or colonizing organisms
	Esophageal/gastroduodenal/jejunal	Cefazolin
	Gastroschisis abdominal closure	Cefazolin
	Ileal/colorectal	Ampicillin/gentamicin/metronidazole
	NEC	Ampicillin/gentamicin/metronidazole
	Small bowel atresia	Ampicillin/gentamicin/metronidazole

*Consider adding vancomycin in patients colonized with MRSA or with history of MRSA infection

Prevention of Bacterial Endocarditis

Regimens for Antimicrobial Prophylaxis for Dental Procedure

Give single dose 30-60 min before procedure. Pediatric dose should not exceed recommended adult dosage.

Situation	Agent	Children	Adults
Oral	Amoxicillin	50 mg/kg	2 g
Unable to take oral medication	Ampicillin	50 mg/kg, IM or IV	2 g, IM or IV
Allergic to penicillin or oral ampicillin	Cephalexin ^{a,b} or Clindamycin or Azithromycin or clarithromycin	50 mg/kg 20 mg/kg 15 mg/kg	2 g 600 mg 500 mg
Allergic to penicillins or ampicillin and unable to take oral medication	Cefazolin or Ceftriaxone ^b or Clindamycin	50 mg/kg, IM or IV or 20 mg/kg, IM or IV	1 g, IM or IV 600, IM or IV

^aOr other first or second generation oral cephalosporin in equivalent pediatric or adult dosage.

^bCephalosporins should not be used in a person with a history of anaphylaxis, angioedema, or urticaria with penicillins or ampicillin.

Table adapted from AAP Redbook, reference 2 below

Dosing Schedule for Pre-Operative Antibiotics

Administer within 60 minutes prior to surgical incision. For vancomycin or fluoroquinolones, administer within 120 minutes of incision. Re-dose antibiotics after specified time period in table below for patients with **normal renal function**. Consider re-dosing if excessive or prolonged bleeding occurs.

Antimicrobial Agent	Pediatric to adult IV Dose	Infusion time	Re-dosing Schedule ^{a,b}	Neonatal Dose	Re-dosing Schedule ^a
Ampicillin	50 mg/kg (max 2000mg)	15 min	2hr x 2 re-doses	50 mg/kg	12hr or 8h if >3kg and >7d
Ampicillin/sulbactam	50 mg ampicillin/kg (max 2000mg)	15 min	2hr x 2 re-doses	50 mg ampicillin/kg	12hr or 8h if >3kg and >7d
Cefazolin	30 mg/kg (max 2g; 3g for pts \geq 120kg)	3-5 min	4 hr x 2 re-doses	25 mg/kg	12hr or 8h if >3kg and >7d
Cefoxitin	40 mg/kg (max 2g)	3-5 min	2 hr x 2 re-doses	40 mg/kg	
Ciprofloxacin	10 mg/kg (max 400 mg)	60 min	NA	10 mg/kg	12h
Clindamycin	10 mg/kg (max 900 mg)	30 min	6 hr	7.5 mg/kg	12hr or 8h if >3kg and >7d
Fluconazole	6 mg/kg (max 400 mg)	120min ^c	NA	6 mg/kg	NA
Gentamicin	2.5 mg/kg Adults: 5 mg/kg --use dosing weight if obese ^d	30 min	NA	\leq 29wks GA: 5 mg/kg >30 wks GA: 4 mg/kg	NA
Metronidazole	15 mg/kg (max 500 mg)	30 min	NA	<1.2 kg: 7.5 mg/kg \geq 1.2 kg: 15 mg/kg	NA
Piperacillin/tazobactam (based on piperacillin component)	2-9 months: 80 mg/kg >9 mo and \leq 40 kg: 100 mg/kg (max 3g) >40 kg: 3 g	30 min	2 hr x 2 re-doses	PNA<7d:100mg/kg PNA 8-28d:80mg/kg	12hr or 8h if >3kg and >7d
Vancomycin	15 mg/kg (max 1500 mg)	60 min	NA	10 mg/kg	12 hr

^a From Initial Pre-Op dose. For patients with Normal Renal Function

^b After 3rd dose, change to standard therapeutic dosing intervals

^c May infuse over 60 min if dose is \leq 200mg

^d Dosing weight= IBW + 0.4 (actual BW – IBW); IBW male = 50kg +2.3 (Height” - 60”); IBW female = 45.5kg + 2.3(Height” - 60”)

References:

1. American Academy of Pediatrics. [Antimicrobial Prophylaxis in Pediatric Surgical Patients.] In: Kimberlin DW, Brady MT, Jackson MA, Long SS, eds. *RedBook: 2018 Report of the Committee on Infectious Diseases*. 30th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2018:[1030--1043]
2. American Academy of Pediatrics. [Prevention of Bacterial Endocarditis.] In: Kimberlin DW, Brady MT, Jackson MA, Long SS, eds. *RedBook: 2018 Report of the Committee on Infectious Diseases*. 30th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2018:[1044--1045]
3. Gilbert, David N et al. *The Sanford Guide To Antimicrobial Therapy 2016*. 46th ed. Sperryville: Antimicrobial Therapy, Inc., 2016. Print.
4. Bratzler DW, Patchen Dellinger E, Olsen KM, et al. Clinical practice guidelines for antimicrobial prophylaxis in surgery. *Am J Health-Syst Pharm*. 2013; 70:195-283.

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