

**Surgical Antibiotic Prophylaxis (SAP)**  
**Cardiac Intensive Care Unit (CICU)**

**Background**

Surgical antibiotic prophylaxis (SAP) is recommended to decrease the incidence of major infections post cardiac surgery. Major infections (surgical site infection (SSIs), sepsis, pneumonia) which occur in 5% of the total cardio-surgical population, are associated with increased mortality rates, prolonged hospitalisation and increased health-care cost. The majority of pathogens isolated from patients with SSIs post cardiac surgery are Gram-positive bacteria <sup>1,7</sup>.

Beta-lactam antibiotics exhibit time dependent bacterial kill. Maintaining beta-lactam levels above the minimum inhibitory concentration (MIC) for a percentage of the dosing interval (50% for penicillins) will ensure near maximal bactericidal effect <sup>2</sup>. Improved outcomes have been demonstrated in critically ill patients when beta-lactams are administered as a continuous infusion, rather than the conventional bolus or 30 minute infusion, producing a drug concentration in excess of the MIC for a longer period of time <sup>1,3,4,5,6</sup>. The recommended optimal length of SAP with beta-lactam antibiotics undergoing cardiac surgery is 24h (should not exceed 48h) <sup>1</sup>.

To ensure an effective antibiotic concentration throughout surgery, flucloxacillin or cefuroxime should be given as an initial bolus, 30 minutes before skin incision, followed immediately by a continuous infusion until the end of surgery. An adequate loading dose of teicoplanin and gentamicin should be determined according to patient weight.

**Risk of postoperative acute kidney injury**

For patients with pre-existing renal impairment (eGFR<60mL/min), or who have additional risk factors for developing AKI, consider using cefuroxime instead of flucloxacillin + gentamicin.

**Body Weight**

Use actual body weight for weight-based dosing. If elevated BMI (≥30), use adjusted body weight (ABW) to calculate gentamicin dose <sup>8</sup>.

**Choose one of the three regimens according to MRSA status, renal function and penicillin allergy**

<b>Flucloxacillin (bolus &amp; infusion) + Gentamicin (bolus) - no history of penicillin allergy. <u>MAX 12G/24HOURS</u></b>				
<b>Normal renal function (eGFR&gt;60mL/min). MRSA negative</b>				
		<b>Dose</b>	<b>Reconstitution and dilution</b> <sup>12</sup>	<b>Infusion Rate</b>
Flucloxacillin	Loading Dose	2000mg as slow IV bolus over at least 8 minutes	Reconstitute each 1g vial with 10mL of sodium chloride 0.9%	
	Intra-op continuous infusion	500mg/hour for duration of surgery	Reconstitute each 1g vial (total 3g) with 20mL sodium chloride 0.9% Final volume= 60mL (50mg/mL)	10mL per hour
	Post-op continuous infusion (2x12hour infusions)	6g/24hours - 3g in 60mL	Reconstitute each 1g vial (total 3g) with 20mL sodium chloride 0.9% Final volume= 60mL (50mg/mL)	5mL per hour (over 12hours)
Gentamicin		Single dose 5mg/kg (max dose 480mg)	Can be given undiluted, or diluted to a convenient volume with sodium chloride 0.9% to aid slow administration	

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<sup>†</sup> Medusa recommends reconstitution with water for injection however sodium chloride 0.9% used in clinical practice and appropriate

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<b>Cefuroxime (bolus &amp; infusion)<sup>11</sup> - possible or probable penicillin allergy (not severe)<sup>9</sup></b>				
<b>Moderate or severe renal impairment or additional risk factors for developing AKI. MRSA negative</b>				
		<b>Dose</b>	<b>Reconstitution and dilution<sup>12</sup></b>	<b>Infusion Rate</b>
Cefuroxime	Loading Dose	1500mg	Reconstitute each 1.5g vial with 15mL sodium chloride 0.9% <sup>†</sup> . Should be given by IV infusion only. Dilute to 50mL sodium chloride and give over 30 minutes	
	Intra-op continuous infusion	200mg/hour	Reconstitute each 1.5g vial (total 3g) with 30mL sodium chloride 0.9% <sup>†</sup> Final volume= 60mL (50mg/mL)	4mL per hour
	Post-op continuous infusion	3g/24hours	Reconstitute each 1.5g vial (total 3g) with 30mL sodium chloride 0.9% Final volume= 60mL (50mg/mL)	2.5mL per hour (over 24hours)

<b>Teicoplanin (bolus) + Gentamicin (bolus)- severe penicillin allergy (anaphylaxis, Stevens-Johnson syndrome)</b>				
<b>Normal renal function (eGFR&gt;60mL/min). MRSA positive (or risk of MRSA)</b>				
		<b>Dose</b>	<b>Reconstitution and dilution<sup>12</sup></b>	<b>Infusion Rate</b>
Teicoplanin		Single dose 12mg/kg (1200mg max)	Reconstitute each vial with 1 ampoule of water for injection (provided in teicoplanin box) and give slowly over 3-5 minutes	
	Post-op	Give a 2nd dose (800mg) 12h after initial dose; 3rd +/- 4th dose (800mg) at 12h intervals to cover 24hrs after the end of surgery	Reconstitute each vial with 1 ampoule of water for injection (provided in teicoplanin box) and give slowly over 3-5 minutes	
Gentamicin		Single dose 5mg/kg (max dose 480mg)	Can be given undiluted, or diluted to a convenient volume with sodium chloride 0.9% to aid slow administration	

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