ANTIBIOTIC PROPHYLAXIS IN VASCULAR SURGERY

The aim of surgical prophylaxis is to reduce rates of surgical site and healthcare-associated infections and so reduce surgical morbidity and mortality. There is however growing evidence that aspects of prescribing practice may themselves be associated with health-care associated infections, notably *Clostridium difficile* infection. The Scottish Antimicrobial Prescribing Group (SAPG), along with the Scottish Government, is monitoring surgical prophylaxis in order to reduce the rates of *C.difficile*. Clinical specialties should aim to achieve the target prescribing indicator of a policy compliant antibiotic given to elective patients requiring surgical prophylaxis in ≥95% of sampled cases. Specific clinical areas may be targeted to submit audit data nationally as part of the national work around CDI. SIGN guideline 104 published in July 2008, and updated in April 2014, has outlined which surgical procedures require prophylactic antibiotics based on a review of the available evidence. Principles of prophylaxis have also been outlined, including timing and duration of antibiotic administration. In conjunction with the surgical specialties within NHS Tayside the Antimicrobial Management Group has undertaken to review local prophylaxis policy and to formulate a uniform policy.

Principles of Antibiotic Prophylaxis Policy

1. **Indication for prophylaxis** should comply with SIGN 104 guideline i.e. when 'highly recommended', 'recommended' or 'considered' within guideline.
2. **Timing of antibiotic(s)**:
    - Optimum timing is intravenous dose given or infusion completed ≤ 60 minutes prior to skin incision
    - Sub-optimal if >1 hour prior to skin incision or post-skin incision
    - The exception is co-trimoxazole (Septrin) which is a one hour infusion. The window for this is within 2 hours of knife to skin (or the application of a tourniquet where used)
3. **Recording of antibiotic** prescription in 'once only' section of medicine chart to avoid multiple dosing
4. **Frequency of administration** should be single dose only unless:
    - > 1.5 litres intra-operative blood loss - re-dose following fluid replacement (see administration guidance table)
    - operation prolonged (see administration guidance table)
    - specifically stated in following guidelines
5. **Documentation in medical notes** of reason for antibiotic administration beyond single dose or state intention for antibiotic treatment course
6. **Choice of agent** should:
    - Avoid cephalosporins and quinolones wherever possible
    - Use narrow spectrum agents when possible to minimise impact on resistance and CDI
    - Take into account local resistance patterns
    - Provision of alternatives for beta-lactam allergy
7. **De-colonisation therapy/MRSA patients**
    - If a patient is identified as MRSA positive from screening swabs within 3 weeks of anticipated date of elective surgery then a decolonisation program should be started as per MRSA protocol. The decolonisation regimen should also be restarted the day they come into hospital for 5 days to reduce the microbial load peri-operatively. For surgical prophylaxis for primary operations vancomycin infusion should be used. If they have MRSA infection prior to elective surgery the approach is the same as for any other infection.
8. **Complex individual prophylaxis** issues should be discussed with Microbiology or Infectious Diseases pre-operatively and recorded in medical notes.
9. **Compliance with local policy** is required and monitored by NHS Tayside. Any deviation from policy must be recorded in the appropriate medical records.

IV Antibiotic Administration Guidance:

Antibiotic	Dose	Administration	Prolonged surgery (time from administration of initial dose)	>1.5L blood loss redose after fluid replacement
Flucloxacillin	1g	Bolus over 3-5 minutes	1g to be repeated every 4 hours	1g
Gentamicin*	4mg/kg Use ideal body weight (IBW) if >20% overweight IBW = (males: 50kg, females: 45.5kg) +0.9kg for every cm >150cm	Bolus over at least 5 mins or infusion	Repeat original dose ONLY if surgery longer than 8 hours and eGFR >60ml/min	Give half original dose
Vancomycin	1g	Infusion over 100 - 120 minutes in 250ml sodium chloride 0.9%	Redose 1g if surgery > 12 hours	500mg
Aztreonam	2g	IV bolus over 3-5 minutes	eGFR >30ml/min 2g after 4 hours eGFR <30ml/min 1g after 4 hours	As for prolonged surgery

* For complex patients discuss with pharmacy or ID or microbiology in advance to ensure re-dosing is safe and appropriate.

Type of Surgery	Procedure	SIGN 104 Recommendation	Antibiotic(s)	Comments (if patient is MRSA positive refer to guidance in section 7 above)
Vascular	Arterial Reconstructions (inc. aortic reconstructions, carotid surgery without presence of sepsis and prosthetic fistula)	'Recommended'	Flucloxacillin IV + Gentamicin IV	*If Pen allergy* - Vancomycin IV + Gentamicin IV *Decreased renal function* (on dialysis or eGFR <30ml/min) - Flucloxacillin IV + Aztreonam IV *Pen allergy and decreased renal function* - Vancomycin IV + Aztreonam IV *MRSA positive* - Vancomycin IV + Gentamicin IV *MRSA positive and decreased renal function* – Vancomycin IV + Aztreonam IV *[NB. Complex endovascular procedures – may consider Flucloxacillin IV + Aztreonam IV]*
	Autologous fistula	'Clinician decision based on individual case basis'		
	Amputation	'Recommended'	Flucloxacillin IV + Gentamicin IV	See notes above for alternative options
	Open Varicose Vein Surgery (ulceration)	'Recommended'	Flucloxacillin IV + Gentamicin IV	See notes above for alternative options
	Soft tissue surgery of the hand	'Clinician decision based on individual case basis'		
	Vascular Line Insertion/TIPSS	'Not recommended'		

References:

- SAPG Good Practice Recommendations for Surgical and Procedural Antibiotic Prophylaxis in Adults in NHS Scotland. https://www.sapg.scot/media/4109/good-practice-recommendations-for-surgical-and-procedural-antibiotic-prophylaxis-in-adults-in-nhs-scotland.pdf [Accessed May 2019]
- SAPG Recommendations for Re-dosing Antibiotics for Surgical Prophylaxis. https://www.sapg.scot/media/4105/good-practice-recommendations-for-re-dosing-antibiotics-for-surgical-prophylaxis.pdf [Accessed May 2019]

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