Surgical Antimicrobial Prophylaxis Guidelines (adult)

Appendix 16: Urological Surgery

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.

Screening for preoperative bacteriuria

- For uncomplicated cystoscopic diagnostic procedures do not screen for bacteriuria as the risk of postoperative infection is low. If the results of urinalysis suggest urinary tract infection, urine culture should be performed
- For other elective urological procedures that enter the urinary tract, perform preoperative urine culture. In catheterised patients, collect samples using a new catheter to avoid contamination of the sample by organisms colonizing the old catheter.
- If perioperative screening is not possible before an immediate operation, empirical treatment may be required.

Treating preoperative bacteriuria

If bacteriuria is confirmed by screening, treat with a short course of antibiotics even if the patient is asymptomatic.
If confirmed bacteriuria before an elective procedure OR if an immediate operation is required and there is clinical evidence of a urinary tract infection but culture results are unavailable, give gentamicin 3mg/kg IV as a single preoperative dose. Higher doses may be required if systemic symptoms (e.g. pyelonephritis) are present.
NOTE: Preoperative treatment of bacteriuria does not negate the need for surgical antibiotic prophylaxis unless the antibiotic used is the same as the recommended prophylaxis AND adequate plasma and tissue concentrations are likely to be achieved throughout the procedure. For patients treated for bacteriuria preoperatively, modify the choice of surgical antibiotic prophylaxis based on the results of culture and susceptibility testing.

Endocarditis prophylaxis

Prophylaxis against enterococcal endocarditis is indicated for patients with specific cardiac conditions who are undergoing urological surgery which surgical antibiotic prophylaxis is required. If the surgical antibiotic prophylaxis regimen does not include an antibiotic active against enterococci (e.g. amoxicillin, vancomycin) refer to Antibiotic Prophylaxis for Prevention of Endocarditis in High Risk Patients for appropriate add-on recommendations.

Prophylaxis against enterococcal endocarditis may also be required for patients with specific cardiac conditions who are undergoing urological surgery for which surgical antibiotic prophylaxis is not required, if the patient has an established genitourinary infection – refer to Antibiotic Prophylaxis for Prevention of Endocarditis in High Risk Patients for further information.

Practice Points

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 **gentamicin** can be given over 3 to 5 minutes and should be administered within 120 minutes before surgical incision.
- IV **metronidazole** infusion can be given over 20 minutes and 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.
- **Gentamicin**: For adult patients with a body mass index 30 kg/m^2 or more, use adjusted body weight (up to a maximum of 100kg) to calculate the gentamicin dose.
- **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), 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		
Procedure	**Recommended Prophylaxis**	**High Risk Penicillin / Cephalosporin Allergy***
C**lean procedures** **Diagnostic cystoscopy without manipulation of urinary tract** **Extracorporeal shock-wave lithotripsy** **Urodynamic studies** **Open or laparoscopic urological procedures** when urinary tract not entered (e.g. vasectomy, scrotal surgery, varicocele ligation) **and** prosthetic material is not implanted	Prophylaxis NOT recommended	
Open or laparoscopic urological procedures in which entry into the bowel lumen is not expected and when: > urinary tract entered > prosthetic material (e.g. penile prosthesis, artificial urinary sphincters, mesh) is implanted	**cefazolin 2g** IV PLUS **gentamicin 2mg/kg** IV <u>If inadvertent rectal injury then ADD immediately:</u> **metronidazole 500mg** IV infusion <u>High risk of MRSA infection :</u> **ADD vancomycin 1g** IV infusion (**1.5g** for patients more than 80kg **actual body weight**)	**vancomycin 1g** IV infusion (**1.5g** for patients more than 80kg **actual body weight**) PLUS **gentamicin 2mg/kg** IV <u>If inadvertent rectal injury then ADD immediately:</u> **metronidazole 500mg** IV infusion
Open or laparoscopic urological procedures in which entry into the bowel lumen is expected (e.g. ileal conduit, rectocele repair)	**cefazolin 2g** IV PLUS **metronidazole 500mg** IV infusion <u>High risk of MRSA infection:</u> **ADD vancomycin 1g** IV infusion (**1.5g** for patients more than 80kg **actual body weight**)	**gentamicin 2mg/kg** IV PLUS **metronidazole 500mg** IV infusion <u>High risk of MRSA infection:</u> **ADD vancomycin 1g** IV infusion (1.5g for patients more than 80kg **actual body weight**)
Endoscopic intrarenal and ureteric stone procedures (e.g. percutaneous nephrolithotomy, pyeloscopy for ureteric or kidney stones) **Ureteroscopy/ instrumentation of upper tract** (incl. retrograde pyelogram) **Other endoscopic procedures** only if there are risk factors for postoperative infection (e.g. urinary tract obstruction or abnormalities, urinary stones, indwelling or externalised catheters)	**gentamicin 2mg/kg** IV <u>If gentamicin is contraindicated use:</u> **cefazolin 2g** IV <u>Known urinary MRSA colonisation:</u> **ADD vancomycin 1g** IV infusion (**1.5g** for patients more than 80kg **actual body weight**)	**gentamicin 2mg/kg** IV <u>Known urinary MRSA colonisation:</u> **ADD vancomycin 1g** IV infusion (**1.5g** for patients more than 80kg **actual body weight**)
Open prostatectomy / robotic prostatectomy	**cefazolin 2g** IV PLUS **gentamicin 2mg/kg** IV <u>If risk of entry into bowel lumen then ADD:</u> **metronidazole 500mg** IV infusion <u>High risk of MRSA infection:</u> **ADD vancomycin 1g** IV infusion (**1.5g** for patients more than 80kg **actual body weight**)	**vancomycin 1g** IV infusion (**1.5g** for patients more than 80kg **actual body weight**) PLUS **gentamicin 2mg/kg** IV <u>If risk of entry into bowel lumen then ADD:</u> **metronidazole 500mg** IV infusion
Transurethral resection of prostate (TURP) (consider culture and susceptibility results if available)	**gentamicin 2mg**/kg IV <u>If gentamicin is contraindicated use:</u> **cefazolin 2g** IV <u>Known urinary MRSA colonisation:</u> **ADD vancomycin 1g** IV infusion (**1.5g** for patients more than 80kg **actual body weight**)	**gentamicin 2mg/kg** IV <u>Known urinary MRSA colonisation:</u> **ADD vancomycin 1g** IV infusion (**1.5g** for patients more than 80kg **actual body weight**)

Recommended Prophylaxis

Procedure	Recommended Prophylaxis	High Risk Penicillin \ Cephalosporin Allergy*
Transperineal prostatic biopsy (consider culture and susceptibility results if available)	**cefazolin 2g** IV High risk of MRSA infection: **ADD vancomycin 1g** IV infusion (**1.5g** for patients more than 80kg **actual body weight**)	**gentamicin 2mg/kg** IV PLUS **vancomycin 1g** IV infusion (**1.5g** for patients more than 80kg **actual body weight**)
Transrectal prostatic biopsy (consider culture and susceptibility results if available)	**ciprofloxacin 500mg** PO as a single dose, 2 hours before procedure *If there is a history of overseas travel (India, South East Asia, Southern Europe) in the last 6 months or use of quinolone therapy within the preceding 3 months, prebiopsy screening for ciprofloxacin-resistant Enterobacteriaceae (with faecal samples or rectal swabs) can be considered. Contact ID/Clinical Microbiology for advice.*	

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

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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