

Antimicrobial Prophylaxis for Surgical and Non-surgical Procedures

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Antimicrobial Prophylaxis for Surgical and Non-Surgical Procedures

Introduction

The goal of antibiotic prophylaxis in surgical patients is to reduce the incidence of surgical site infection and to use antibiotics in a manner that is supported by evidence of effectiveness.

It is important to emphasise that surgical antibiotic prophylaxis is an adjunct to, not a substitute for good surgical technique. Antibiotic prophylaxis should be regarded as ONE component of an effective policy for the control of healthcare associated infection.

This policy also covers a variety of medical procedures, for which the same general principles apply.

Even single doses of antibiotics can result in *C. difficile* infection so prophylaxis should only be given when benefit has been demonstrated

Antibiotic prophylaxis should not be used routinely for clean, non-prosthetic uncomplicated surgery. It should be given to patients before clean-contaminated and contaminated surgery and before clean surgery which involves the placement of a prosthesis or implant.

Administration of prophylactic antibiotics

- Intravenous prophylactic antibiotic should be given within 30 minutes before the skin is incised or the procedure undertaken
- A single standard therapeutic dose of antibiotic is usually sufficient for prophylaxis under most circumstances
- In the event of major intra-operative blood loss in adults (>1,500 ml) an additional dose of prophylactic antibiotic should be considered after fluid replacement
- An additional intra-operative dose of antibiotic is recommended for operations longer than four hours (with the exception of gentamicin)
- Doses listed are for adults with normal renal function

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ABDOMINAL SURGERY		
Procedure	Antibiotics	Comments
Small/Large bowel resection	Gentamicin 2mg/kg IV (max 160mg) + metronidazole 500mg IV	
Cholecystectomy (open)	Gentamicin 2mg/kg IV (max 160mg)	
Cholecystectomy (laparoscopic)	Not routinely recommended <i>Consider for high-risk patients:-</i> Gentamicin 2mg/kg IV (max 160mg)	High risk <ul style="list-style-type: none"> • Bile spillage • Acute cholecystitis/pancreatitis • Insertion of prosthetic device • Conversion to open laparotomy • Intraoperative cholangiogram
Gastro-oesophageal surgery	Gentamicin 2mg/kg IV (max 160mg)	
Gastric bypass/sleeve gastrectomy	Gentamicin 2mg/kg IV (max 160mg) + metronidazole 500mg IV	
Appendicectomy	Gentamicin 2mg/kg IV (max 160mg) + metronidazole 500mg IV	

Hernia Repair (inguinal/femoral/incisional/ with or without mesh)	Not routinely recommended	For complicated hernia repair with mucosal breach refer to small/large bowel recommendations
Clean general surgical procedures	Not recommended	Includes varicose vein repair and thyroidectomy
Splenectomy	Not recommended	For long term prophylaxis and vaccine refer to Trust guidance

UROLOGY SURGERY

Urine samples required prior to any surgical procedure; prophylaxis may need adapting based on this

Procedure	Antibiotics	Comments
<ul style="list-style-type: none"> • Transurethral resection of prostate and bladder tumours • Transurethral prostate biopsy • Shock wave lithotripsy • Ureterostomy/ureteroscopy • Percutaneous removal of renal stones • Nephrectomy 	Gentamicin 2mg/kg IV (max 160mg)	
Transrectal prostatic biopsy	Gentamicin 2mg/kg IV (max 160mg) + metronidazole 400mg PO	Take oral antibiotic 60 minutes before procedure.
Radical cystectomy	Cefuroxime 1.5g tds IV + metronidazole 500mg IV	Continue for 24 hours post op If severe penicillin allergy, Gentamicin 2mg/kg IV (max 160mg) + Clindamycin 600mg IV
Fascial sling	Gentamicin 2mg/kg IV (max 160mg) + metronidazole 500mg IV	Followed by oral cefalexin 500 mg tds +metronidazole 400 mg tds for 3 days
Urethroplasty	Gentamicin 2mg/kg IV (max 160mg) + metronidazole 500mg IV	Followed by oral cefalexin 500 mg tds + metronidazole 400mg tds for 5 days
Laparoscopic Surgery	Gentamicin 2mg/kg IV (max 160mg) +	

	metronidazole 500mg IV	
<ul style="list-style-type: none"> Inguino-scrotal surgery (circumcision, dorsal slit, hydrocele repair, inguinal orchidectomy) Cystoscopy 	Not required	If evidence of UTI at time of nephrectomy or cystoscopy antibiotics may be required
Prosthesis insertion	Co-amoxiclav 1.2g IV	Penicillin-allergy (rash) - Cefuroxime 1.5g IV+ metronidazole 500mg IV Penicillin anaphylaxis – Co-trimoxazole** 960mg IV + metronidazole 500mg IV
Percutaneous Nephrostomy insertion	Gentamicin 2mg/kg IV (max 160mg)	If gentamicin contra-indicated, then Cefuroxime 750mg IV single dose

VASCULAR SURGERY		
Procedure	Antibiotics	Comments
Reconstructive vascular surgery	*Co-amoxiclav 1.2g IV + Gentamicin* 2mg/kg IV (max 160mg)	A further 2 doses post-op of co-amoxiclav may be given at the discretion of the vascular surgeon Penicillin allergy: teicoplanin 600mg IV (instead of co-amoxiclav)
Lower limb amputation	*Co-amoxiclav 1.2g IV tds for 24 hrs	If any suspicion of gas gangrene then post op treatment up to 5 days is recommended. Penicillin-allergy (rash): Cefuroxime 1.5g IV + metronidazole 500mg IV Penicillin anaphylaxis – Co-trimoxazole** 960mg IV + metronidazole 500mg IV

BREAST SURGERY		
Procedure	Antibiotics	Comments
Excision biopsy	Not recommended	
Total duct excision	*Flucloxacillin 1g IV	Penicillin allergy: Teicoplanin 600mg IV
Breast cancer surgery without implant	*Flucloxacillin 1g IV	
Breast cancer surgery with implant	*Flucloxacillin 1g IV + gentamicin 2mg/kg IV (max 160mg)	Penicillin allergy: Teicoplanin 600mg IV + Gentamicin 2mg/kg IV (max 160mg)

OBSTETRICS AND GYNAECOLOGICAL SURGERY

Procedure	Antibiotics	Comments
<ul style="list-style-type: none"> • Hysterectomy (vaginal, abdominal, laparoscopic) • Vaginal pelvic floor repairs • Urogynaecological operations • Other major gynaecological surgery • Laparotomy 	Co-amoxiclav 1.2g IV	Penicillin-allergy: gentamicin 2mg/kg IV (max 160mg) + clindamycin 600mg
<ul style="list-style-type: none"> • Diagnostic or other operative laparoscopy/laparoscopic sterilisation • Hysteroscopy • Insertion of Intrauterine Contraceptive Device (IUCD) • Endometrial Ablation or Biopsy 	Antibiotic prophylaxis NOT routinely recommended	
<ul style="list-style-type: none"> • Hysterosalpingogram • Laparoscopy and Dye Test 	Not required if screened and Chlamydia negative	If unscreened or if distal tube blockage detected on HSG - azithromycin 1g PO stat. pre-op
<ul style="list-style-type: none"> • Surgical termination of pregnancy • Evacuation of Incomplete Miscarriage 	Metronidazole 1g PR or 800mg PO AND azithromycin 1g PO	If allergic or intolerant to either of these, please discuss with microbiologist

Caesarean section	Cefuroxime 1.5g IV + metronidazole 500mg IV 15-20 minutes before skin incision.	Penicillin anaphylaxis: Clindamycin 600mg IV + gentamicin 2mg/kg IV (max 160mg)
Assisted vaginal delivery	Cefuroxime 1.5g IV + metronidazole 500mg IV stat dose prior to commencement of procedure	Penicillin anaphylaxis – Clindamycin 600mg IV stat
<ul style="list-style-type: none"> • 3rd/4th perineal tear repairs • Manual removal of placenta 	Co-amoxiclav 1.2g IV	Penicillin allergy (rash) – cefuroxime 1.5g IV + metronidazole 500mg IV Penicillin anaphylaxis – Co-trimoxazole** 960mg IV + metronidazole 500mg IV Up to 5 days post-op oral antibiotics may be considered

BILIARY PROCEDURES/ERCP

British Society of Gastroenterology recommends that the following groups of patients receive routine antibiotic prophylaxis: patients with biliary disorders, such as PSC or cholangiocarcinoma, patients with liver transplant, pancreatic pseudocyst, severe neutropenia and/or advanced haematological malignancy. Incomplete drainage is also a risk factor for infection post procedure.

Procedure	Antibiotics	Comments
ERCP Where there is no evidence of infection/cholangitis and where complete biliary decompression is anticipated.	Antibiotic prophylaxis NOT routinely indicated	This includes common bile duct stones, and straightforward stent change
Suspected cholangitis or sepsis	See treatment guideline	Additional antibiotic prophylaxis not required
ERCP in high-risk patients; EUS-guided biliary drainage	Gentamicin 1.5mg/kg IV (max 160mg) If gentamicin is contraindicated, use ***Ciprofloxacin 750mg PO 60-90 mins pre-procedure	No further doses if complete drainage achieved. If incomplete drainage, then treat with co-amoxiclav 625mg PO TDS or cotrimoxazole 960mg PO BD until complete drainage Avoid Gentamicin if eGFR <20ml/min
PTC	Gentamicin 1.5mg/kg IV (max 160mg) If gentamicin is contraindicated, use Cefuroxime 1.5g IV stat	Avoid gentamicin if eGFR <20ml/min No further doses if complete drainage achieved. If incomplete drainage, then treat with co-amoxiclav 625mg PO TDS or cotrimoxazole 960mg PO BD until complete drainage
Febrile post ERCP / EUS-BD / PTC	Co-amoxiclav 1.2g IV TDS	Penicillin -allergy (rash) - Cefuroxime 1.5g IV TDS Penicillin-anaphylaxis Gentamicin (follow Trust high dose guideline) Review at 24-48hrs post-procedure – stop if no evidence infection

MISCELLANEOUS PROCEDURES		
Cardiac Pacemaker Insertion	Teicoplanin 600mg IV + Gentamicin 2mg/kg IV (max 160mg)	
PEG Insertion	Co-amoxiclav 1.2g IV	Penicillin-allergy (rash) - cefuroxime 1.5g IV Penicillin anaphylaxis – **co-trimoxazole 960mg IV
Thoracoscopy	None required	
Urinary catheter insertion or removal	None required routinely	Consider for patients with history of symptomatic UTI after catheter change or who experience trauma during catheterisation: gentamicin 2mg/kg IV (max 160mg)
Nasal pack insertion (epistaxis)	PO Flucloxacillin* 500mg qds may be given until pack removal (max 3-5 days)	There is no clear evidence for this practice. Not indicated in routine anterior nasal packing May be considered if prolonged packing >48h or posterior nasal packing Penicillin allergy: PO Clindamycin 450mg qds (max 3 – 5 days)
Upper GI bleed (varices)	IV Co-amoxiclav 1.2g tds 7 days (or PO 625mg tds if appropriate)	Penicillin allergy: Co-trimoxazole 960mg bd IV/PO 7 days
Orthopaedic Surgery	<i>Refer to “Guideline for antimicrobial use in the Orthopaedic and Trauma Department”</i>	

Appendix 1

MRSA colonised patients*	In patients known or suspected to be colonised with MRSA - Teicoplanin 600mg stat should be added or, in the case of asterisked items in chart above, substituted (discuss with Microbiologist if in doubt)
Cotrimoxazole**	Administer as an infusion over 60 minutes. Dilute each 480mg/5ml vial in 125ml sodium chloride 0.9%
Ciprofloxacin***	Fluoroquinolone warning: <ul style="list-style-type: none"> • The European Medicines Agency's Pharmacovigilance Risk Assessment Committee has recommended restricting the use of fluoroquinolone antibiotics following a review of side effects mainly involving muscles, tendons, bones, nervous system and in those at high risk of aortic aneurysm. • Patients should be warned about these side effects, which are rare but can be disabling and potentially long-lasting. A Patient Information Leaflet is available here .
Gentamicin	Administer as slow IV injection over 3-5 minutes

Gentamicin IV Dose calculation for prophylaxis

Weight	Dose
<49kg	80mg
50 – 69kg	120mg
70 – 89kg	160mg
>90kg	200mg

Dose should approximate to 2mg/kg. If weight unknown, use 120mg as a single dose.

References

Scottish Intercollegiate Guidelines Network (SIGN): **Antibiotic Prophylaxis in Surgery**. July 2008, Updated April 2014

NICE guideline NG125: **Surgical site infections: prevention and treatment**. April 2019. Updated August 2020

NICE clinical guideline CG141: **Acute upper GI bleeding in over 16s**. June 2012. Updated August 2016

NICE clinical guideline: **Urinary tract infection (catheter-associated): antimicrobial prescribing**. 23rd November 2018. Updated Sept 2019

Royal College of Obstetricians & Gynaecologists guideline: **Assisted Vaginal Birth (Green-top guideline No. 26)**. Published April 2020. Updated June 2023

Royal College of Obstetricians & Gynaecologists guideline: **Management of Third- and Fourth-Degree Perineal Tears (Green Top Guideline No 29)** June 2015

British Society of Gastroenterology: **Antibiotic prophylaxis in gastrointestinal endoscopy**. Jan 2012. Updated April 2022.