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Trust Guideline for the Management of: Antibiotic Prophylaxis in adults undergoing procedures in Interventional Radiology

A Clinical Guideline

For use in:	Interventional Radiology
By:	Prescribers working in Interventional Radiology
For:	Adult patients
Division responsible for document:	Clinical Support
Key words:	Interventional Radiology, Antibiotic Prophylaxis
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Date of approval:	Antimicrobial Sub-Committee 30/11/2021 CGAP Chair 02/02/2022
Ratified by or reported as approved to:	Clinical Safety and Effectiveness Sub-Board
To be reviewed before:	02 February 2025
To be reviewed by:	Dr Ourania Kakisi, Caroline Hallam, Dr Mark Lewis
Trust Docs ID No:	9459
Version No:	6
Compliance links:	No
If Yes - does the strategy/policy deviate from the recommendations of NICE? If so why?	N/A

This guideline has been approved by the Trust's Clinical Guidelines Assessment Panel as an aid to the diagnosis and management of relevant patients and clinical circumstances. Not every patient or situation fits neatly into a standard guideline scenario and the guideline must be interpreted and applied in practice in the light of prevailing clinical circumstances, the diagnostic and treatment options available and the professional judgement, knowledge and expertise of relevant clinicians. It is advised that the rationale for any departure from relevant guidance should be documented in the patient's case notes.

The Trust's guidelines are made publicly available as part of the collective endeavour to continuously improve the quality of healthcare through sharing medical experience and knowledge. The Trust accepts no responsibility for any misunderstanding or misapplication of this document.

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Version and Document Control:

Version Number	Date of Update	Change Description	Author
4	02/06/2020	Reviewed and updated	Caroline Hallam
5	04/11/2021	Updated with TV biopsies and drainage	Jenni Martin
5.1	29/11/2021	Updated with teicoplanin and gentamicin dose	Caroline Hallam
6	02/02/2022	Addition of gall bladder drainage	Dr Ourania Kakisi and Caroline Hallam

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ENDOSCOPIC ULTRASOUND FNA	1. First Choice	2. Recommendation if first choice contraindicated	3. Recommendation if MRSA positive – status known or if status unknown at high risk
ANTIBIOTICS NOT USUALLY REQUIRED However, if cyst aspirated or common bile duct sampled	Gentamicin 160mg IV (If eGFR <30ml/min use 2mg/kg, max 160mg)	Discuss with Microbiology	Gentamicin 160mg IV (If eGFR <30ml/min use 2mg/kg, max 160mg) + Teicoplanin 400mg IV (6mg/kg if ≥70kg, max 800mg)

NEPHROSTOMY AND/OR INSERTION OF JJ STENT	1. First Choice	2. Recommendation if first choice contraindicated	3. Recommendation if MRSA positive – status known or if status unknown at high risk
Check sensitivity of previous urinary isolates			
If no evidence of resistance to gentamicin	Gentamicin 160mg IV (If eGFR <30ml/min use 2mg/kg, max 160mg)	Gentamicin 160mg IV (If eGFR <30ml/min use 2mg/kg, max 160mg)	Gentamicin 160mg IV (If eGFR <30ml/min use 2mg/kg, max 160mg) + Teicoplanin 400mg IV (6mg/kg if ≥70kg, max 800mg)
If resistant organism isolated	Discuss with Microbiology	Discuss with Microbiology	Discuss with Microbiology
If known organism is an extended spectrum beta-lactamse producer	Meropenem 1g IV	Discuss with Microbiology	Meropenem 1g IV + Teicoplanin 400mg IV (6mg/kg if ≥70kg, max 800mg)
SIMPLE NEPHROSTOMY EXCHANGES **Not routinely recommended unless patient is showing signs of sepsis or if clinically indicated** 30 mins prior to procedure	**MSU negative:** Gentamicin 160mg IV (If eGFR <30ml/min use 2mg/kg, max 160mg) **MSU positive**: directed by culture results	**MSU negative:** Gentamicin 160mg IV (If eGFR <30ml/min use 2mg/kg, max 160mg) **MSU positive:** directed by culture results	**MSU negative:** Teicoplanin 400mg IV (6mg/kg if ≥70kg, max 800mg) + Gentamicin 160mg IV (If eGFR <30ml/min use 2mg/kg, max 160mg) **MSU positive:** directed by culture results

RETROGRADE URETERIC STENT CHANGES 30 mins prior to procedure	Gentamicin 160mg IV (If eGFR <30ml/min use 2mg/kg, max 160mg)	Gentamicin 160mg IV (If eGFR <30ml/min use 2mg/kg, max 160mg)	Gentamicin 160mg IV (If eGFR <30ml/min use 2mg/kg, max 160mg)
RENAL CRYOABLATION	**No entry into urinary tract**- no cover required **No entry into urinary tract but difficult percutaneous** Co-amoxiclav IV 1.2g **Entry into urinary tract** Co-amoxiclav IV 1.2g + Gentamicin 160mg IV (If eGFR <30ml/min use 2mg/kg, max 160mg)	**No entry into urinary tract-** no cover required **No entry into urinary tract but difficult percutaneous** Teicoplanin IV 400mg (6mg/kg if ≥70kg, max 800mg)+ Gentamicin 160mg IV (If eGFR <30ml/min use 2mg/kg, max 160mg) **Entry into urinary tract** Teicoplanin IV 400mg (6mg/kg if ≥70kg, max 800mg)+ Gentamicin 160mg IV (If eGFR <30ml/min use 2mg/kg, max 160mg)	**No entry into urinary tract**- no cover required **No entry into urinary tract but difficult percutaneous** Teicoplanin IV 400mg (6mg/kg if ≥70kg, max 800mg)+ Gentamicin 160mg IV (If eGFR <30ml/min use 2mg/kg, max 160mg) **Entry into urinary tract** Teicoplanin IV 400mg (6mg/kg if ≥70kg, max 800mg)+ Gentamicin 160mg IV (If eGFR <30ml/min use 2mg/kg, max 160mg)

UTERINE EMBOLISATION	**1. First Choice**	**2. Recommendation if first choice contraindicated**	**3. Recommendation if MRSA positive – status known or if status unknown at high risk**
Uterine embolisation	Cefuroxime 750mg IV + Metronidazole 500mg IV	Gentamicin 160mg IV (If eGFR <30ml/min use 2mg/kg, max 160mg) + Clindamycin 300mg PO	Gentamicin 160mg IV (If eGFR <30ml/min use 2mg/kg, max 160mg) + Metronidazole 500mg IV + Teicoplanin 400mg IV (6mg/kg if ≥70kg, max 800mg)

THROMBOLYSIS	**1. First Choice**	**2. Recommendation if first choice contraindicated**	**3. Recommendation if MRSA positive – status known or if status unknown at high risk**
When sheath inserted	Teicoplanin IV (T=0)	Discuss with Microbiology	Teicoplanin (T=0)

When sheath inserted in situ + and manipulation taking place continue teicoplanin until sheath removed (12-72 hours). Once sheath removed stop teicoplanin. Patient therefore may receive 1-5 doses.	T=12 hours Teicoplanin IV T=24 hours Teicoplanin IV T=48 hours Teicoplanin IV T=72 hours Teicoplanin IV 400mg (6mg/kg if ≥70kg, max 800mg)	Discuss with Microbiology	T=12 hours Teicoplanin 400mg IV T=24 hours Teicoplanin 400mg IV T=48 hours Teicoplanin 400mg IV T=72 hours Teicoplanin 400mg IV 400mg IV (6mg/kg if ≥70kg, max 800mg)

ENDOVASCULAR ANEURYSM REPAIR (EVARs)	1. First Choice	2. Recommendation if first choice contraindicated	3. Recommendation if MRSA positive – status known or if status unknown at high risk
EVAR	Teicoplanin 400mg IV (6mg/kg if ≥70kg, max 800mg) + Metronidazole 500mg IV	Discuss with Microbiology	Teicoplanin 400mg IV (6mg/kg if ≥70kg, max 800mg) + Metronidazole 500mg IV

VASCULAR PROCEDURES IN PATIENTS WITH PROSTHETIC GRAFTS	1. First Choice	2. Recommendation if first choice contraindicated	3. Recommendation if MRSA positive – status known or if status unknown at high risk
Vascular procedures in patients with prosthetic grafts, (e.g. angioplasty, embolisation)	Teicoplanin 400mg IV (6mg/kg if ≥70kg, max 800mg)	Discuss with Microbiology	Teicoplanin 400mg IV (6mg/kg if ≥70kg, max 800mg)

RADIOFREQUENCY ABLATION	1. First Choice	2. Recommendation if first choice contraindicated	3. Recommendation if MRSA positive – status known or if status unknown at high risk
Lung	Gentamicin 160mg IV (If eGFR <30ml/min use 2mg/kg, max 160mg) + Flucloxacillin 1g IV	Gentamicin 160mg IV (If eGFR <30ml/min use 2mg/kg, max 160mg) + Teicoplanin 400mg IV (6mg/kg if ≥70kg, max 800mg)	Gentamicin 160mg IV (If eGFR <30ml/min use 2mg/kg, max 160mg) + Teicoplanin 400mg IV (6mg/kg if ≥70kg, max 800mg)

Liver	Gentamicin 160mg IV (If eGFR <30ml/min use 2mg/kg, max 160mg) + Metronidazole 500mg IV	Discuss with Microbiology	Gentamicin 160mg IV (If eGFR <30ml/min use 2mg/kg, max 160mg) + Metronidazole 500mg IV + Teicoplanin 400mg IV (6mg/kg if ≥70kg, max 800mg)

TRANSARTERIAL CHEMOEMBOLISATION (TACE)	1. First Choice	2. Recommendation if first choice contraindicated	3. Recommendation if MRSA positive – status known or if status unknown at high risk
Liver	Gentamicin 160mg IV (If eGFR <30ml/min use 2mg/kg, max 160mg) + Metronidazole 500mg IV	Discuss with Microbiology	Gentamicin 160mg IV (If eGFR <30ml/min use 2mg/kg, max 160mg) + Metronidazole 500mg IV + Teicoplanin 400mg IV (6mg/kg if ≥70kg, max 800mg)

TIPPS STENT INSERTION	1. First Choice	2. Recommendation if first choice contraindicated	3. Recommendation if MRSA positive – status known or if status unknown at high risk
	Gentamicin 160mg IV (If eGFR <30ml/min use 2mg/kg, max 160mg) + Metronidazole 500mg IV	Discuss with Microbiology	Gentamicin 160mg IV (If eGFR <30ml/min use 2mg/kg, max 160mg) + Metronidazole 500mg IV + Teicoplanin 400mg IV (6mg/kg if ≥70kg, max 800mg)

PERCUTANEOUS TRANSHEPATIC CHOLANGIOGRAM (PTC)/BILIARY STENT	1. First Choice	2. Recommendation if first choice contraindicated	3. Recommendation if MRSA positive – status known or if status unknown at high risk
1. PATIENT ALREADY ON ANTIBIOTICS **If patient is already on appropriate antibiotics e.g. for ongoing cholangitis then no additional antibiotics are usually required.** **If required, however**	**Time treatment dose for before procedure** (if patient is on treatment dose of gentamicin do not give additional STAT dose of gentamicin) Gentamicin 160mg IV (If eGFR <30ml/min use 2mg/kg, max 160mg)	Discuss with Microbiology	**Time treatment dose for before procedure** (if patient is already on treatment dose of gentamicin do not give additional STAT dose of gentamicin) Gentamicin 160mg IV (If eGFR <30ml/min use 2mg/kg, max 160mg) + Teicoplanin 400mg IV (6mg/kg if ≥70kg, max 800mg)
2. NO CURRENT ANTIBIOTIC THERAPY	Gentamicin 160mg IV (If eGFR <30ml/min use 2mg/kg, max 160mg) + Metronidazole 500mg IV	Discuss with Microbiology	Gentamicin 160mg IV (If eGFR <30ml/min use 2mg/kg, max 160mg) + Metronidazole 500mg IV + Teicoplanin 400mg IV (6mg/kg if ≥70kg, max 800mg)
3. REPEAT PROCEDURES **As for 1. and 2. above. Antibiotic therapy may need tailoring to the individual patient depending on antibiotic history and sensitivity of recent isolates.**			
Gallbladder Drainage	**1. First Choice**	**2. Recommendation if first choice contraindicated**	**3. Recommendation if MRSA positive – status known or if status unknown at high risk**
1. PATIENT ALREADY ON ANTIBIOTICS **If patient is already on appropriate antibiotics e.g for acute cholecystitis**	**Time treatment dose for before procedure**(if patient is on treatment dose of gentamicin do not give additional STAT dose of gentamicin) Gentamicin 160mg IV (If eGFR <30ml/min use 2mg/kg, max 160mg)	Discuss with Microbiology	**Time treatment dose for before procedure** (if patient is on treatment dose of gentamicin do not give additional STAT dose of gentamicin) Gentamicin 160mg IV (If eGFR <30ml/min use 2mg/kg, max 160mg) + Teicoplanin 400mg IV (6mg/kg if ≥70kg, max 800mg)
2. NO CURRENT ANTIBIOTIC THERAPY	Gentamicin 160mg IV (If eGFR <30ml/min use 2mg/kg, max 160mg) + Metronidazole 500mg IV	Discuss with Microbiology	Gentamicin 160mg IV (If eGFR <30ml/min use 2mg/kg, max 160mg) + Metronidazole 500mg IV + Teicoplanin 400mg IV (6mg/kg if ≥70kg, max 800mg)

PEG/RIG INSERTION	1. First Choice	2. Recommendation if first choice contraindicated	3. Recommendation if MRSA positive – status known or if status unknown at high risk
	Co-amoxiclav 1.2g IV	Gentamicin(dose as below) <50kg – 80mg 50-80kg – 120mg >80kg – 160mg	**Add** Teicoplanin 400mg STAT IV (6mg/kg if ≥70kg, max 800mg)

Transvaginal ultrasound guided drainage	1. First Choice	2. Recommendation if first choice contraindicated	3. Recommendation if MRSA positive – status known or if status unknown at high risk
1. PATIENT ALREADY ON ANTIBIOTICS **If patient is already on appropriate antibiotics e.g. for ongoing pelvic sepsis (GI/post-op aetiology) then no additional antibiotics are usually required.** **If at the point of procedure it is determined the pelvic sepsis is likely tubo-ovarian in origin then consider**	Metronidazole 1 g PR STAT and Azothromycin 1 g PO STAT post-procedure	Discuss with Microbiology	Add Teicoplanin 400mg IV (6mg/kg if ≥70kg, max 800mg)
2. NO CURRENT ANTIBIOTIC THERAPY **(typically aspirations of sterile pelvic cysts)**	IV Co-amoxiclav 1.2 g (30 – 60 minutes before procedure)	IV Clindamycin 600 mg IV (diluted in 100 ml of 0.9% saline and infused over 20 minutes) + Gentamicin 5 mg/kg (dose according to Trust Gentamicin Calculator)	Add IV Teicoplanin 400mg IV (6mg/kg if ≥70kg, max 800mg)

Transvaginal ultrasound guided biopsy	1. First Choice	2. Recommendation if first choice contraindicated	3. Recommendation if MRSA positive – status known or if status unknown at high risk
Pelvic mass biopsy	IV Co-amoxiclav 1.2 g (30 – 60 minutes before procedure)	IV Clindamycin 600 mg IV (diluted in 100 ml of 0.9% saline and infused over 20 minutes) and Gentamicin 5 mg/kg (dose according to Trust Gentamicin Calculator)	Add IV Teicoplanin 400mg IV (6mg/kg if ≥70kg, max 800mg)

General principles of antibiotic prophylaxis

The antibiotics selected for prophylaxis must cover the common pathogens.

Benefits and risk of antibiotic prophylaxis

The final decision regarding the benefits and risks of prophylaxis for an individual patient will depend on: -

- The patient's risk of infection.
- The potential severity of the consequences of procedure infection
- The effectiveness of prophylaxis in that procedure
- The consequences of prophylaxis for that patient (e.g. increased risk of colitis, anaphylaxis)

The ultimate decision rests with the radiologist's assessment of risk and benefit. Giving prophylaxis to patients who are having procedures for which this guideline does not recommend prophylaxis can be justified if the radiologist believes the patient to be at particularly high risk.

Dose and route of administration

For most procedures single dose prophylaxis is appropriate. Single dose prophylaxis reduces the risk of adverse events, such as toxicity, Clostridium difficile or the development of resistance.

For some procedures there is evidence that longer prophylaxis is of benefit, and where this is so this is indicated.

Continuing antibiotics post intervention to treat infection is not prolonging prophylaxis, it is treating infection.

The dose of antibiotic given for prophylaxis is, in most circumstances, the same as would be used therapeutically.

Prophylactic antibiotics for interventional radiology procedures should be administered intravenously, unless otherwise stated.

Timing of administration

Prophylaxis should be started preoperatively (in most circumstances), should be given 30 minutes to 1 hour before the procedure.

Additional doses

During the procedure

- For procedures where there is major intra-operative blood loss (>1500mL) consider an additional dose of prophylactic antibiotic after fluid replacement.

- For procedures longer than 6 hours consider an additional dose.

Choice of antibiotics

- There are some critical influences on choice of antibiotics:
- Is the patient allergic to penicillins or cephalosporins?
- Are they allergic to any other antibiotic recommended?
- Are they MRSA positive?
- Do they have a history of Clostridium difficile infection?
- Are they from a ward which is on special measures for Clostridium difficile?
- Are they undergoing repeated procedures?
- Are they already on antibiotics?

More information on each of these follows:

Penicillin allergy

Patients with a history of anaphylaxis, laryngeal oedema, bronchospasm, hypotension, local swelling, urticaria or pruritic rash, occurring immediately after a dose of penicillin are at potential increased risk of immediate hypersensitivity to beta-lactams and should not receive prophylaxis with a beta-lactam antibiotic, e.g. cefuroxime. Patients with a history of penicillin allergy should be reviewed to exclude a non- immunological adverse reaction, e.g. diarrhoea, vomiting, non-specific maculopapular rash or an experience wrongly attributed to the antibiotic, e.g. ampicillin and Epstein-Barr virus infection.

MRSA positive

If a patient is found to be MRSA positive on pre-op screening, then if non-urgent their procedure should be postponed until they have had a clearance regimen.

Intranasal mupirocin should be used prophylactically for adult patients undergoing surgery with a high risk of major morbidity who are identified with S.aureus or MRSA. In the presence of known mupirocin resistance then use naseptin nasal ointment.

Where prophylaxis against MRSA is required, **either** because of the procedure **or** the patient is MRSA positive, then teicoplanin 400mg should be given. This may already be routine, but if not please give in addition to regular prophylaxis. Teicoplanin should be given at induction. Vancomycin 1g should be given over 90 minutes and completed no more than one hour before induction.

Patients with a previous history of Clostridium difficile (C.difficile)

For patients with a previous history of previous C.difficile, cephalosporins and quinolones should be avoided, as should co-amoxiclav if possible. Many prophylaxis regimens do not include these antibiotics. BUT in these patients who have a previous history please use a regimen that includes the appropriate selection from gentamicin, teicoplanin and metronidazole.

There will however be particular patients and procedures in whom the risk of C.difficile is outweighed by the benefit of using particular antibiotics, but this should be an explicit decision made by consultant in charge of the patient. Microbiology can also help in these difficult cases.

Patients on a Ward on Supportive Measures for Clostridium difficile

If the ward is on Supportive Measures due to a Period of Increased Incidence (PII) of C.difficile then patients from the ward who are to be given antibiotic prophylaxis should have the same regimens as patients who have a previous history of C. difficile.

Repeat procedures

If the patient requires repeated doses of surgical prophylaxis e.g. the procedure has to be repeated, re-exploration etc then consider the antibiotic to be used. If the patient is at high risk of C. difficile, then avoid regimens using cephalosporins and quinolones, and also co- amoxiclav if possible.

Prophylaxis in patients already on antibiotics

Depending on the duration of antibiotics, eg if recently started, and the procedure it may be possible to cover the procedure with an appropriately timed dose of the antibiotics the patient is on. If not, and additional prophylaxis is required, then this will need careful thinking through. BUT as a general rule it will be inappropriate to give cephalosporins, quinolones or co-amoxiclav.

Endocarditis

For prevention of endocarditis in patients with heart-valve lesion, septal defect, patent ductus, prosthetic valve or history of endocarditis please refer to current BNF or endocarditis guidelines on the intranet for up to date guidance on prophylaxis.

Documentation

Antibiotic prophylaxis should be clearly documented in the medical notes and on the drug chart. All aspects of antibiotic prophylaxis, for example, where prophylaxis is not given when recommended should be clearly documented in the medical notes.

Using the policy

Please contact Dr Ourania Kakisi, Consultant Microbiologist, if there are any queries regarding the policy or policy changes. Out of hours, the on-call Microbiologist may be contacted via switchboard Tel: 01603 286286.

Objective of Guideline

To provide information on the principles of antibiotic prophylaxis in interventional radiology and provide guidance on what antibiotic prophylaxis regimens are recommended for different procedures.

Rationale for the recommendations

This guideline is based on the SIGN guidelines, Antibiotic prophylaxis in Surgery. The policy was written to provide an overview of information in the important area of antibiotic prophylaxis as no Trust summary was available. The guideline reflects current practice within the hospital. Recommendations are based on evidence based practice and are tailored to antimicrobial resistance patterns within the Trust.

Broad recommendations

See quick reference guide above

Clinical Audit Standards derived from guideline

- Correct antibiotic used for procedure
- Antibiotic given at correct time pre procedure
- Antibiotic given by correct route
- Correct number of doses used - doses given post procedure only if recommended in the guideline.

Summary of development and consultation process undertaken before registration and dissemination

This guideline has been produced in close collaboration with the interventional radiologists.

The final version has been endorsed by the Antimicrobial Subcommittee.

Distribution list / dissemination method

Trust Intranet

References / source documents

1. SIGN Guideline 104. Antibiotic Prophylaxis in Surgery (July 2008)
2. BNF 63 March 2012
3. Scottish Medicines Consortium :Antibiotic Prophylaxis in Surgery, 2009
4. Mandell Douglas and Bennett. Principles and Practice of Infectious Diseases, seventh edition; Churchill Livngstone 2010