

GUIDELINE FOR ANTIMICROBIAL USE IN THE ORTHOPAEDIC AND TRAUMA DEPARTMENT

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Date: February 2016

Approved by: The Drugs & Therapeutics Committee
Date: February 2016
Implementation
Date: February 2016

For Review: **February 2018**

*This document is part of antibiotic formulary guidance
Formulary guidance holds the same status as Trust policy*

GUIDANCE ON MANAGEMENT

AMENDMENT FORM

Version	Date	Brief Summary of Changes	Author
4	November 2015	Complete review of prophylaxis table and therapeutic section in table format	Dr Ken Agwuh Mr Roger Helm, & Mr T Kumar
3	April 2014	Complete update of guidelines	Dr Ken Agwuh Mr Roger Helm, & Mr T Kumar
2	March 2012	Antibiotic prophylaxis added for fractured neck of femur	Dr Ken Agwuh, Mr Z Abiddin, & Mr T Kumar
1	May 2011	New policy	Dr Ken Agwuh & Mr Z Abiddin

BACKGROUND:

The aim of this guideline is to provide basic information on prophylactic and therapeutic antimicrobial use in orthopaedic and trauma patients.

Prophylactic use of antimicrobials aims at inhibition of growth of contaminating bacteria, mainly skin flora organisms, and their adherence to prosthetic devices or implants, thereby reducing the risk of infection, also to reduce the incidence of surgical site infection.

Therapeutic antimicrobial treatment on the other hand, is used to clear infection by an organism.

The goals of prophylactic or therapeutic administration of antibiotics to surgical patients should also include antibiotic use in a manner that is supported by evidence of effectiveness, minimise the effect of antibiotics on the patient's normal bacterial flora, minimise adverse effects and cause minimal change to the patient's host defences.

ORTHOPAEDIC SURGICAL PROPHYLAXIS:

Surgical procedure	Routine antibiotic	Penicillin allergy	Special instruction
Primary Arthroplasty	Flucloxacillin i/v 2gm + Gentamicin* single dose at induction, then Flucloxacillin i/v 1gm 6 hourly x 2 doses	Teicoplanin i/v 600mg single dose + Gentamicin* single dose	Gentamicin i/v as soon as line established, or at least 10 minutes before application of tourniquet if to be used
Revision Arthroplasty	Flucloxacillin i/v 2gm + Gentamicin* single dose at induction, then Flucloxacillin i/v 1gm 6 hourly x 2 doses	Teicoplanin i/v 600mg single dose + Gentamicin* single dose	As above
Open spinal surgery +/- instrumentation	As above	As above	As above
Other orthopaedic implant surgery (any route)	Flucloxacillin i/v 2gm dose only + Gentamicin* single dose at induction	Teicoplanin i/v 600mg plus Gentamicin* single dose	As above
Open surgery for closed fracture	Flucloxacillin i/v 2gm dose only + Gentamicin* single dose at induction	Teicoplanin i/v 600mg plus Gentamicin* single dose	As above
Open or compound fractures**	Co-amoxiclav i/v 1.2gm 8 hourly	Cefuroxime i/v 1.5gm 8 hourly + oral Metronidazole 400mg 8 hourly	** See below
All Hip Fractures	Teicoplanin i/v 600mg + Gentamicin* single dose at induction. Consider Copal G+C cement.		Gentamicin i/v as soon as line established, or at least 10 minutes before application of tourniquet if to be used

NOTES:

****Principal recommendations for open or compound fractures:**

- Antibiotics should be administered as soon as possible after the injury, and certainly within three hours.
- The antibiotic should be continued until first debridement (excision) and continued until soft tissue closure or for a maximum of 72 hours, whichever is sooner.

* Gentamicin 2mg/kg should be administered on induction of anaesthesia at the time of skeletal stabilisation and definitive soft tissue closure. **The Gentamicin should not be continued post-operatively.**

All patients with recent positive MRSA screen results should receive iv Teicoplanin 600mg + iv Gentamicin 2mg/kg dosing as antibiotic prophylaxis regime or discuss with microbiologist.

Special Note on revision Arthroplasty:

In patients with suspected Periprosthetic Joint Infection (PJI), antibiotic prophylaxis should be withheld until after cultures from the joint have been obtained.

At surgeons discretion if operative findings suggestive of infection or initial Gram stain positive. Antibiotic can be continued until initial/direct culture results on deep samples reported as negative.

Antibiotic-loaded cement is recommended in addition to intravenous antibiotic (SIGN guidelines, April 2014).

Gentamicin dose calculation (iv) 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)

ADULT THERAPEUTIC ANTIMICROBIAL USE:

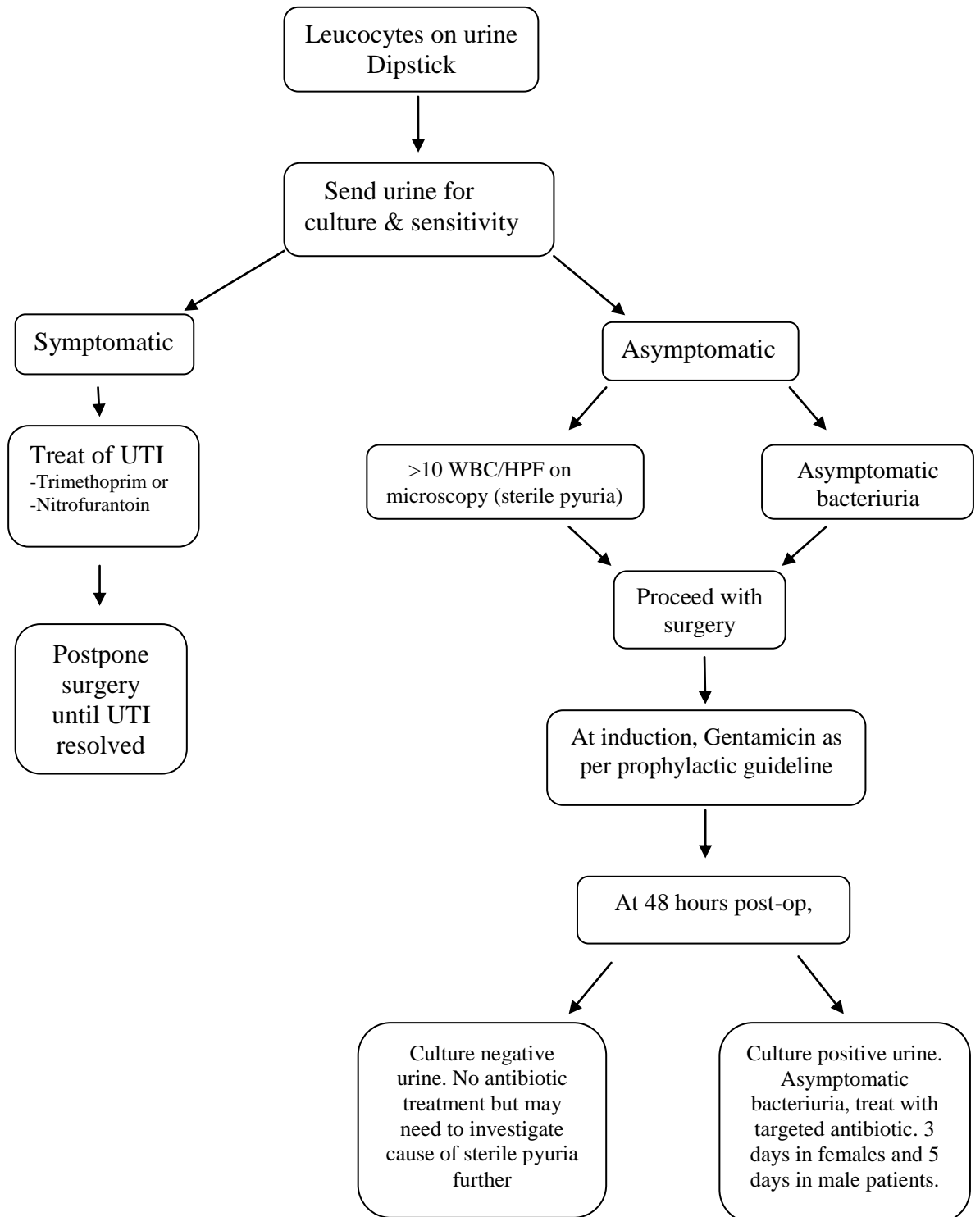
INFECTION	ORGANISM	ANTIMICROBIALS	COMMENTS
<u>Bursitis</u> Non-high risk patients	<i>Staphylococcus aureus</i>	Flucloxacillin i/v 1-2g qds or Clindamycin i/v 600mg - 1.2g qds (if penicillin allergy) Can switch to oral Flucloxacillin 500mg -1g qds or clindamycin 300mg-450mg qds if patient improved to treat for 2-3/52 or use other appropriate antibiotic based on cultures results/sensitivities.	80% caused by <i>S. aureus</i> and other Gram positive organisms. Aspirates should be sent for cultures (preferably before first dose of antibiotic) as Gram stain positive in about 2/3 rd of cases. Complete drainage is essential,
	High risk patients	Known MRSA	Teicoplanin i/v 400mg 12 hourly for 3 doses, then 400mg od Or discuss with microbiologist
<u>Septic arthritis</u> Native joints in non-high risk patients	Staphylococcus aureus and Beta haemolytic Streptococci	Flucloxacillin i/v 2g qds or Cefuroxime i/v 750mg-1.5g tds (if penicillin allergy) Can switch to oral Flucloxacillin 500mg -1g qds or clindamycin 300mg-450mg qds if patient improved to treat for 4/52 or use other appropriate antibiotic based on cultures results/sensitivities.	Most commonly caused by Staphylococci and Streptococci organisms. Send blood cultures and joint aspirate for urgent Gram stain/culture & sensitivities before initiation of antibiotic.
	Native joints in high risk patients	Known MRSA	Teicoplanin i/v 400mg 12 hourly for 3 doses, then 400mg od Or discuss with microbiologist.
	Native joint due to penetrating injury	Usually polymicrobial	Seek microbiologist advice
<u>Osteomyelitis</u> Acute	<i>Staphylococcus aureus</i> Others (anaerobes)	Flucloxacillin i/v 2g qds or Clindamycin i/v 600mg - 1.2g qds (if penicillin allergy). Addition of a second agent may be advised by microbiologist, and depending on cultures and sensitivities. Can switch to oral	Can also be contiguous soft tissue infection (usually poly-microbial) or haematogenous infection (usually mono-bacterial) Blood cultures and other relevant orthopaedic tissue/pus samples should be taken before initiation of antibiotic.

Chronic		Flucloxacillin 500mg -1g qds or clindamycin 300mg-450mg qds if patient improved to treat for 4-6/52 or use other appropriate antibiotic based on cultures results/sensitivities.	For High risk patients Gram Negative organisms may be associated with osteomyelitis. Please seek microbiologist advice.
	As above	Please discuss with microbiologist. Duration of treatment longer than in acute osteomyelitis.	Surgical debridement is the mainstay of management
In diabetic patients	Refer to Trust guideline for skin and soft tissue infection		
<u>Cellulitis</u>	Refer to Trust guideline for skin and soft tissue infection		
<u>Animal Bites</u>	Refer to Trust guideline for skin and soft tissue infection		
<u>Post-operative chest infection</u>	Refer to Trust guidelines for treatment of lower respiratory tract infection		
<u>Post-operative wound infection</u>	<i>Staphylococcus aureus</i> Others (anaerobes)	Flucloxacillin i/v 1-2g qds or Clarithromycin i/v 500mg bd (if penicillin allergy) for 5-7 days review	Send swab from wound site for cultures
<u>Removal of urinary catheter post joint replacement</u>	Organisms likely to colonise urinary catheter	No antibiotic indicated.	There is no benefit of giving antibiotic for removal of urinary catheter post revision as no evidence of benefit (IDSA 2010)

PAEDIATRIC ANTIBIOTIC PRESCRIBING:

NOTE: Information on paediatric bone/joint infections can be found in the paediatric antibiotic policy.

1. Management of sterile pyuria / asymptomatic bacteriuria in patients undergoing lower limb arthroplasty: The Doncaster Bacteriuria Chart (Based on audit by Wong A, Hari-Kumar PN, with in put from Agwuh,KN).



**** Will be preferable to use Trimethoprim or Nitrofurantoin as first line.**

Reference:

American Academy of Orthopaedic Surgeons (AAOS), 2010. Diagnosis of Periprosthetic Joint Infections of the hip and knee. Guideline and evidence report:
<http://www.aaos.org/research/guidelines/PJGuideline.pdf>

Berbari EF, Steckelberg JM, Osmon DR, Osteomyelitis. In Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Churchill Livingstone Elsevier, 7th Ed, 2010, pp 1457-1467.

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Brown EM, Pople IK, de Louvois J, Hedges A, Bayston R, Eisenstein SM, et al.: Spine update: prevention of postoperative infection in patients undergoing spinal surgery. Spine. 2004 Apr 15;29(8):938-45.

Hauser CJ, Adams CA Jr, Eachempati SR, Council of the Surgical Infection Society. Surg Infect (Larchmt). 2006 Aug; 7(4):379-405

IDSA: Urinary catheter guidelines (CID) 2010;50(1 March) 625-63.

NICE: Surgical site infection: Prevention and treatment of surgical site infection. NICE Guidelines [CG74], published October 2008.

Ohl, CA: Infectious Arthritis of Native Joints. In Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Churchill Livingstone Elsevier, 7th Ed, 2010, pp 1443-1456.

Parvizi J and Gehrke T: Proceedings of the International Consensus Meeting on Periprosthetic Joint Infection:
https://www.efort.org/wpcontent/uploads/2013/10/Philadelphia_Consensus.pdf

SIGN: Antibiotic Prophylaxis in surgery, Scottish Intercollegiate Guideline Network Publication Number 104, Edinburgh, April 2014.