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HCTM PPUKM
Surgical Prophylaxis Guide 2018

1st Edition

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STATEMENT OF INTENT

These guidelines update the previous guidelines developed in 2012. The content of the guideline is developed based on the best practice and also the latest evidence available. Any deviation from the recommendation in this guideline should be done with justification and evidence based.

This guideline will be reviewed again in 2020.

Forewords

Dr Petrick @Ramesh K Periyasamy

It has been a few years since the last antibiotics guidelines have been updated. There is a serious need to do this as bacteria becomes more resistant with multiple and broader antibiotics usage and duration.

With that in mind, we have decided to update the guidelines based not only with local and international guidelines but also with expertise from a team of specialists. It's been a daunting but fruitful task.

A very special thanks goes to the pharmacy department who had worked tirelessly in bringing everybody together to check on all the recommendations.

Truly we hope that the guidelines will be used as it mirrors the latest recommendations with local available drugs.

With its usage, it is our hope, that antibiotic appropriateness will improve and duration of prophylaxis will be short as recommended.

Broader choice of antibiotic prophylaxis and prolong antibiotic duration has been shown to be ineffective and increases surgical site infection with possible risk of multiple resistant organisms.

With that, I would like to thank everyone in this task force and may this guide will be used in antimicrobial stewardship for all intents and purposes.

PROTOCOL DEVELOPMENT AND OBJECTIVES

The main aim of the guidelines is to guide practitioner on the current evidence and to promote judicious use of prophylactic antibiotic use in the prevention of oral surgical site infections

SPECIFIC OBJECTIVES

1. To identify the surgical procedures that would benefit from surgical antibiotic prophylaxis.

2. To guide the choice and duration of prophylaxis based on the latest evidence available.

Contents

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Principle of Surgical Antibiotic Prophylaxis

Razman Jarmin & Chee Lan Lau

Antimicrobial prophylaxis is part of the important measures to minimize risk surgical site infection (SSI), by reducing the bacterial load at the incision site. The choice of antibiotic should be targeted at the most common but not all possible microorganisms according to surgical procedure(s). The benefit of administration antibiotics should outweigh the probability of adverse drug reaction, super-infection or resistance development.

Surgical Wound classification

According to CDC, surgical wounds are categorised into 4 classes:

Wound class	Description
1. **Clean**	An uninfected operative wound in which no inflammation is encountered and the respiratory, alimentary, genital, or uninfected urinary tracts are not entered. In addition, clean wounds are primarily closed and, if necessary, drained with closed drainage. Operative incisional wounds that follow nonpenetrating (blunt) trauma should be included in this category if they meet the criteria.
2. **Clean-Contaminated**	Operative wounds in which the respiratory, alimentary, genital, or urinary tracts are entered under controlled conditions and without unusual contamination. Specifically, operations involving the biliary tract, appendix, vagina, and oropharynx are included in this category, provided no evidence of infection or major break in technique is encountered.
3. **Contaminated**	Open, fresh, accidental wounds. In addition, operations with major breaks in sterile technique (for example, open cardiac massage) or gross spillage from the gastrointestinal tract, and incisions in which acute, nonpurulent inflammation is encountered, including necrotic tissue without evidence of purulent drainage (for example, dry gangrene), are included in this category.
4. Dirty or Infected	Includes old traumatic wounds with retained devitalized tissue and those that involve existing clinical infection or perforated viscera. This definition suggests that the organisms causing postoperative infection were present in the operative field before the operation.

The prevalence of surgical site infections (SSI) is attributed to multiple factors such as infection control measures, surgical technique, environment, perioperative preparation and etc. Antibiotic prophylaxis is justified in high risk patient with the following conditions:

• Extremes of age	• Diabetes mellitus
• Poor nutritional status	• Immunocompromised
• Obese	• Corticosteroid therapy
• Tobacco use	• recent surgical procedure
• Concurrent remote infections	• Microorganisms colonization

Antimicrobial prophylaxis is indicated for most clean-contaminated and contaminated procedures, and certain clean procedures considering the infection risk and morbidity. Use of antimicrobials in dirty procedures or infection is not a prophylaxis measure but treatment.

Reference:

1. Surgical Site Infection (SSI) Event: Centre for Disease Control. 2018. https://www.cdc.gov/nhsn/PDFs/pscManual/9pscSSIcurrent.pdf. Updated January 2018. Accessed March 3, 2018.
2. Bratzler et al. 2013. Clinical practice guidelines for antimicrobial prophylaxis in surgery. American journal of health-system pharmacy. 2013;70:195-283.

Benefits of prophylaxis

Zamri Zuhdi

The benefits of antibiotic prophylaxis is related to the consequence of severity of SSI[1].

1. Reduce mortality and morbidity: for example in cases involving anastomosis of bowel therefore it reduce or minimalized post-operative anastomotic leak[2].
2. Reduce hospital cost: because of reduce unnecessary expensive antibiotics due to prolonged of surgical site infection[2].
3. Reduce hospital stay for the patient: its mean the patient will discharge on time for example in laparoscopic cholecystectomy, total hospital stay only 3 days[2].
4. Reduce side effect of multiple drug: because of practising using single dose of antibiotic therefore reduce the total amount of antibiotic used[3].

References:

1. Mark J. Enzler et al; Antimicrobial prophylaxis in adult, Mayo Clin. Pre.;2011,86(7); 686-701
2. A National Clinical Guideline; Antibiotic Prophylaxis in Surgery; Scottish Intercollegiate Guidelines Network no. 45; July 2000
3. Ongom and kilijjambu; Org Process Res, 2013,1:3

Side effects of Antibiotics and Antibiotic allergy

Isa Naina Mohamed

Selection of antibiotic prophylaxis must cover expected pathogen at surgical site and should take into account of local resistance patterns. Cross-reactivity between penicillins and cephalosporins is generally quoted at 10%. This reflects data collected prior to 1980, and is confounded by the impurity of the antibiotics in use and tends to overestimate cross sensitivity. Cross-reactivity between penicillins and second generation cephalosporins is low. (Pichichero ME, 2005) Skin test allergy test may be performed to confirm cross-reactivity or when patients are not sure on their allergy history. Allergy history to any drug especially antibiotics must be elicited prior to any commencement of prophylactic or therapeutic antibiotics.

Allergy to antibiotic

Patients with a history of anaphylaxis, laryngeal oedema, bronchospasm, hypotension, local swelling, urticaria or pruritic rash, occurring immediately after a penicillin therapy are at an increased risk of immediate hypersensitivity to beta-lactams and should not receive prophylaxis with a beta-lactam antibiotic. In an event of uncertainty regarding cross-reactivity, and due to the severity of anaphylactic reactions, patients with a history of anaphylaxis to penicillins should not be prescribed Cephalosporins.

Antibiotic associated diarrhoea and clostridium difficile infection

The risk of contracting CDI is raised for patients who:

- have current or recent use of antimicrobial agents (especially broad spectrum antibiotics)
- are elderly
- have a serious underlying illness that compromises their immune system
- have a prolonged stay in a healthcare setting
- have recently had gastrointestinal surgery
- are in hospital when there is an outbreak of CDI
- are using a proton pump inhibitor.

It is not clear how many patients develop CDI following antibiotic prophylaxis with rates of 0.2% to 8% reported depending on the type of surgical procedure involved.(Southern WN et al, 2010) The prevalence of CDI is related to a number of factors including total antibiotic usage and, in particular, to the use of third generation cephalosporins. (Wilcox MH et al. 1996, Wilcox MH et al. 1998, Zadik PM et al. 1998). There is evidence that multiple doses of cephalosporins increase the risk of CDI more than a single dose. In a study of over 1,800 patients undergoing surgery for hip fracture, a change of antibiotic policy from using three doses of prophylactic cefuroxime (1.5 g) to one single dose of cefuroxime (1.5 g) with gentamicin (240mg) resulted in a decrease in CDI from 4.2% to 1.6% (p=0.009). (Starks I et al. 2008)

In patients requiring antibiotic prophylaxis, the risk of *Clostridium difficile* infection should always be considered. The higher risk of *Clostridium difficile* infection associated with some antibiotics (cephalosporins, fluoroquinolones, clindamycin, carbapenems) should also be taken into account when prescribing.

References

1. Pichichero ME. A review of evidence supporting the American Academy of Pediatrics recommendation for prescribing cephalosporin antibiotics for penicillin-allergic patients. Pediatrics. 2005;115(4 Part 1):1048-57.
2. Wilcox MH, Cunniffe JG, Trundle C, Redpath C. Financial burden of hospital-acquired *Clostridium difficile* infection. J Hosp Infect 1996;34(1):23-30.
3. Wilcox MH, Smyth ET. Incidence and impact of *Clostridium difficile* infection in the UK, 1993-1996. J Hosp Infect 1998;39(3):181-7.
4. Zadik PM, Moore AP. Antimicrobial associations of an outbreak of diarrhoea due to *Clostridium difficile*. J Hosp Infect 1998;39(3):189-93.
5. Starks I, Ayub G, Walley G, Orendi J, Roberts P, Maffulli N. Single-dose cefuroxime with gentamicin reduces *Clostridium difficile*-associated disease in hip-fracture patients. J Hosp Infect 2008;70(1):21-6.

ANTIBIOTIC PROPHYLAXIS ACCORDING TO DISCIPLINES

1. NEUROSURGICAL PROCEDURES

NEUROSURGICAL PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION [FROM INCISION]	REFERENCES	REMARKS
Clean (Craniotomy, burrhole for clean pathology) **Clean + Implant** (CSF diversion procedures e.g. Shunt, EVD, Omaya, DBS, Titanium/acrylic , craniplasty, artificial dura used) **Clean contaminated** (Transphenoidal, Acosutic neuroma, involving air sinuses)	IV Cefazolin 2g or IV Cefuroxime 1.5gm	If beta lactam allergy IV Clindamycin 900mg If colonize with MRSA IV Vancomycin 1g or 15mg/kg in 200mL over 2 hrs.	IntraOP : Cefazolin or cefuroxime q4hrly Post Op: q8hrly up to 24 hours	National Antibiotic Guideline 2014 2nd Ed Liu W et al 2014. Clin Neurol Neurosurg. Jan;116:13-9	
Contaminated (Skull fracture, previous surgery, lacerated scalp)	IV Cefuroxime 1.5gm q8h +/- IV Metronidazole 500mg q8h add IV gentamicin 2mg/kg if soiling present	If beta lactam allergy Clindamycin 900mg IV If colonize with MRSA IV Vancomycin 1g or 15mg/kg in 200mL over 2 hrs.	For 72 hours	Ratilal et al 2015. Cochrane Database of Systematic Reviews Rosen et al. 2016. . Am J Rhinol Allergy (30) e10 – e16	To review antibiotic if no improvement after 3 days
Transnasal surgery	IV Cefazolin 1-2 g OR IV Cefuroxime 1.5g + IV Metronidazole 500mg	If beta lactam allergy IV Clindamycin 900mg If colonize with MRSA IV Vancomycin 1g or 15mg/kg in 200mL over 2 hrs.	IntraOP : Cefazolin or cefuroxime q4hrly Post Op: q8hrly up to 24 hours		
Implantation of intrathecal pump	IV Cefazolin 2g OR IV Cefuroxime 1.5g	If beta lactam allergy IV Clindamycin 900mg If colonize with MRSA IV Vancomycin 1g or 15mg/kg in 200mL over 2 hrs.	To consult specialist		To be reviewed by specialist after 3 days

2. OPHTHALMOLOGY PROCEDURES

OPHTHALMOLOGY PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
All types of ocular surgeries	Topical ciprofloxacin, chloramphenicol or levofloxacin	Any of the listed drugs	At completion of surgery	2017 Clinical practice guideline on management of postoperative infectious endophthalmitis	
Cataract surgery - uncomplicated	Intracameral cefuroxime 1 mg/0.1 ml	Subconjunctival gentamicin	At completion of surgery		
Cataract surgery – complicated (with posterior capsular rent)	Subconjunctiva Gentamicin and oral ciprofloxacin 500 mg bd	None	At completion of surgery		
Anterior chamber washout	Subconjunctiva Gentamicin	None	At completion of surgery		
Pterygium excision with bare sclera	Subconjunctiva Gentamicin	None	At completion of surgery		
Trabeculectomy	Subconjunctiva Gentamicin	None	At completion of surgery	Wallin, Ö et al. (2014).. Acta ophthalmologica, 92(5), 426-431.	
Implantation of glaucoma drainage device	Subconjunctiva Gentamicin	None	At completion of surgery		
Goniotomy	Subconjunctiva Gentamicin	None	At completion of surgery		
Penetrating keratoplasty/ other corneal transplants	Subconjunctiva Gentamicin	None	At completion of surgery	Ang, M et al. (2012.. Ophthalmology, 119(11), 2239-2244.	
Lamellar keratoplasty	Subconjunctiva Gentamicin		At completion of surgery	Melles, Get al. (2000). Ophthalmology, 107(10), 1850-1856.	
Osteoordontokeratoplasty (ookp)	IV Co-AmoxiClav1.2 g then PO Co-AmoxiClav625 mg bd	IV Ciprofloxacin 400 mg then PO Ciprofloxacin 500mg bd	IV 1 dose at induction then at completion of surgery		

OPHTHALMOLOGY PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Ptosis repair	Ointment *Maxitrol*® (neomycin and polymyxin B sulfates and dexamethasone)	None	At completion of surgery		
Surgical correction of squint	Ointment *Maxitrol*® (neomycin and polymyxin B sulfates and dexamethasone)	None	At completion of surgery	Mojon, D. S. (2009). Ophthalmologica, 223(2), 111-115.	
Intravitreal injection	Topical ciprofloxacin	None	After injection	De Caro, et al (2008).Retina, 28(6), 877-883.	
Removal of Silicone Oil	Subconjunctiva Gentamicin	None	At completion of surgery	Dada, V. Ket al (2001).. Journal of Cataract & Refractive Surgery, 27(8), 1243-1247.	
Scleral buckling	Subconjunctiva Gentamicin Oral Ciprofloxacin 500 mg bd	Oral Cefuroxime, Oral Cloxacillin	At completion of surgery	Chhablani et. Al. (2013). Journal of ophthalmic inflammation and infection, 3(1), 67.	
Vitrectomy	Subconjunctiva Gentamicin	None	At completion of surgery	Yang, S. S., & Jiang, T. (2013). International Journal of ophthalmology, 6(2), 198..	
Eyelid reconstruction	Ointment M*axitrol*® (neomycin and polymyxin B sulfates and dexamethasone)	None	At completion of surgery	Karcioglu, Z. A. (Ed.). (2014). Springer.	
Exenteration	Ointment *Maxitrol*® (neomycin and polymyxin B sulfates and dexamethasone)	None	At completion of surgery	Karcioglu, Z. A. (Ed.). (2014Springer.	
Enucleation	Ointment *Maxitrol*® (neomycin and polymyxin B sulfates and dexamethasone)	None	At completion of surgery	Iordanidou, V., & De Potter, P. (2004). American journal of ophthalmology, 138(3), 425-429.	
Orbital decompression	Ointment *Maxitrol*® (neomycin and polymyxin B sulfates and dexamethasone)	None	At completion of surgery	Woo, K. I., & Kim, Y. D. (2004). Japanese journal of ophthalmology, 48(4), 397-403.	
Orbital floor repair	Ointment *Maxitrol*® (neomycin and polymyxin B sulfates and dexamethasone)	None	At completion of surgery	Wladis, E. J. (2013). Orbit, 32(1), 30-32.	
Reconstruction of socket	Ointment *Maxitrol*® (neomycin and polymyxin B sulfates and dexamethasone)	None	At completion of surgery	Karcioglu, Z. A. (Ed.). (2014). Springer.	

2 A.POTENTIAL CONTAMINATED SURGERIES (THERAPEUTIC PURPOSES)

OPHTHALMOLOGY

[β] = contaminated procedure

[¥] = potential contamination depending on the reason for evisceration e.g uncontrolled endophthalmitis or panophthalmitis

OPHTHALMOLOGY PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
[B] Reposition of iris	Subconjunctiva Gentamicin	None	At completion of surgery	Chang, et al. (2012). Clinical & experimental ophthalmology, 40(7), 669-674.	
[B] Toilet and suturing of lids (T&S)	Ointment *Maxitrol*® (neomycin and polymyxin B sulfates and dexamethasone)	None	At completion of surgery	Mindel J, Starr MB, Lally JM.. Surv Ophthalmol. 1995 May 1;39(6):485–501.	
[B] Toilet and suturing of cornea / scleral laceration wound	Intravenous Ciprofloxacin 400 mg bd/ Topical Chloramphenicol	None	On admission		
[¥]Evisceration	Ointment *Maxitrol*® (neomycin and polymyxin B sulfates and dexamethasone)	None	At completion of surgery		
[B] Dacrocystorhinostomy/ canaliculo-dacryocstorhinostomy (cdcr)	Ointment *Maxitrol*® (neomycin and polymyxin B sulfates and dexamethasone)	None	At completion of surgery	Dulku, S., Akinmade, A., & Durrani, O. M. (2012)Orbit, 31(1), 44-47.	

3 ENT PROCEDURES

ENT

ENT PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Septoplasty	Antibiotic not recommended	Antibiotic not recommended	NA	Ottoline et al. 2013. Antibiotic Prophylaxis in Otolaryngologic Surgery. Int. Arch. Otorhinolaryngol. 17(1):85-91.	
Septorhinoplasty	IV Cefazolin 2g + IV Metronidazole 500mg Or IV Ampicillin/Sulbactam 3g Or IV Co-AmoxiClav 1.2g	IV Cefuroxime 750mg -1.5g + IV Metronidazole 500mg Or IV Clindamycin 900mg	Intraop: 1 dose q4hrly [NA for metronidazole & Clindamycin]	Ottoline ACX et al. 2013 *Int. Arch. Otorhinolaryngol.* 17(1); 85-91 National Antibiotic Guideline. 2014. 2nd Ed. Scottish Intercollegiate Guidelines Network. Antibiotic prophylaxis in surgery. 2014. 2nd Ed www.sign.ac.uk/pdf/sign104.pdf	
Nasal bone reduction	Antibiotic not recommended	Antibiotic not recommended	NA	South Australian expert Advisory Group on Antibiotic Resistance (SAAGAR) March 2012	
Turbinoplasty / turbinectomy	Antibiotic not recommended	Antibiotic not recommended	NA	Scottish Intercollegiate Guidelines Network. 2014. 2nd Ed	
Endoscopic surgery (including functional endoscopic sinus surgery, middle meatalantrostomy, sphenoidotomy, ethmoidectomy, endoscopic frontal surgeries,)	Antibiotic not recommended	Antibiotic not recommended	NA	National Antibiotic Guideline. 2014. 2nd Ed. Scottish Intercollegiate Guidelines Network. 2014. 2nd Ed	**For tumour surgery prophylaxis antibiotic is needed

ENT PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Endoscopic CSF leak repair	IV Cefazolin 2g or IV Cefuroxime 1.5g + IV Metronidazole 500mg	IV Clindamycin 900mg	8 hourly for further 3 doses	National Antibiotic Guideline. 2014. 2nd Ed.	*refer neurosurgical guideline
Endoscopic dacrocystorhinostomy (with stenting)	IV Co-AmoxiClav 1.2g Or IV Ampicillin/Sulbactam 3g Or IV Cefazolin 2g + IV Metronidazole 500mg	IV Cefuroxime 750mg -1.5g + IV Metronidazole 500mg OR IV Clindamycin 900mg	Intraop: Repeat doseq4hrly [NA for metronidazole & Clindamycin]	National Antibiotic Guideline. 2014. 2nd Ed Ottoline ACX et al. 2013.. *Int. Arch. Otorhinolaryngol.* 17(1); 85-91	** if stenting done need antibiotic prophylaxis, If no stenting done, antibiotic prophylaxis is not recommended
Endoscopic sphenopalatine artery ligation	Antibiotic not recommended	Antibiotic not recommended	NA	Ottoline ACX et al. 2013. *Int. Arch. Otorhinolaryngol.* 17(1); 85-91	
Endoscopic nasopharyngectomy	IV Co-AmoxiClav 1.2g Or IV Ampicillin/Sulbactam 3g Or IV Cefazolin 2g + IV Metronidazole 500mg	IV Cefuroxime 750mg -1.5g + IV Metronidazole 500mg OR IV Clindamycin 900mg	Intraop: Repeat dose q4hrly [NA for metronidazole & Clindamycin]	National Antibiotic Guideline. 2014. 2nd Ed.	
Endoscopic medial maxillectomy	IV Co-AmoxiClav 1.2g Or IV Ampicillin/Sulbactam 3g Or IV Cefazolin 2g + IV Metronidazole 500mg	IV Cefuroxime 750mg -1.5 + IV Metronidazole 500mg OR IV Clindamycin 900mg	Intraop: Repeat dose q4hrly [NA for metronidazole & Clindamycin]	National Antibiotic Guideline. 2014. 2nd Ed.	

ENT PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Transphenoidal hypophysectomy	IV Cefazolin 2g or IV Cefuroxime 1.5g + IV Metronidazole 500mg	IV Clindamycin 900mg	Repeat dose 8 hourly for further 3 doses	Little AS, White WL. 2011.. *Pituitary.*14(2); 99-104 Orlando R et al. 2007..Surgical neurology. 68(0); 145-148 National Antibiotic Guideline. 2014. 2nd Ed.	Refer neurosurgical guideline
Tympanoplasty	Antibiotic not recommended	Antibiotic not recommended	NA	Ottoline ACX et al. 2013. *Int. Arch. Otorhinolaryngol.* 17(1); 85-91	
Mastoidectomy (including atticotomy, atticoantrostomy, Cortical mastoidectomy, Modified radical mastoidectomy, radical mastoidectomy. Combined approached tympanoplasty, Facial nerve decompression)	IV Co-AmoxiClav 1.2g Or IV Ampicillin/Sulbactam 3g Or IV Cefazolin 2g + IV Metronidazole 500mg	IV Cefuroxime 750mg -1.5g + IV Metronidazole 500mg Or IV Clindamycin 900mg	Intraop: Repeat dose q4hrly [NA for metronidazole & Clindamycin]	Ottoline ACX et al. 2013. *Int. Arch. Otorhinolaryngol.* 17(1); 85-91	
Translabyrinthine approach	IV Cefazolin 2g or IV Cefuroxime 1.5g	IV Clindamycin 900mg	Repeat 8 hourly for further 3 doses	National Antibiotic Guideline. 2014. 2nd Ed.	

ENT PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Ossicular reconstruction***	Antibiotic not recommended	Antibiotic not recommended	NA	Ottoline ACX et al. 2013.. *Int. Arch. Otorhinolaryngol.* 17(1); 85-91	
*** if with prosthesis	IV Co-AmoxiClav 1.2g Or IV Ampicillin/Sulbactam 3g Or IV Cefazolin 2g + IV Metronidazole 500mg	IV Clindamycin 900mg Or IV Cefuroxime 750mg -1.5g + IV Metronidazole 500mg	Intraop: repeat dose q4hrly [NA for metronidazole & Clindamycin]	National Antibiotic Guideline. 2014. 2nd Ed.	
Transtympanic tube (grommet or T-tube)	Single dose of topical antibiotic : Sofradex ear drop after grommet inserted . Sofradex = framycetin sulfate and gramicidin	Ofloxacin Otic Solution		Scottish Intercollegiate Guidelines Network. 2014. 2nd Ed	
Temporal bone resection	IV Co-AmoxiClav 1.2g Or IV Ampicillin/Sulbactam 3g Or IV Cefazolin 2g + IV Metronidazole 500mg	IV Clindamycin 900mg Or IV Cefuroxime 750mg -1.5g + IV Metronidazole 500mg	Intraop: Repeat dose q4hrly [NA for metronidazole & Clindamycin]	National Antibiotic Guideline. 2014. 2nd Ed Ottoline ACX et al. 2013. *nt. Arch. Otorhinolaryngol.* 17(1); 85-91	

ENT PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Stapedotomy	IV Co-AmoxiClav 1.2g Or IV Ampicillin/Sulbactam 3g Or IV Cefazolin 2g + IV Metronidazole 500mg	IV Clindamycin 900mg Or IV Cefuroxime 750mg -1.5g + IV Metronidazole 500mg	Intraop: Repeat dose q4hrly [NA for metronidazole & Clindamycin]	Obeso S et al. 2009.. ActaOtorinolaringol Esp. 61(1) : 54-68 Ottoline ACX et al. 2013. *Int. Arch. Otorhinolaryngol.* 17(1); 85-91	
Cochlear implant	*To consult specialist*			Anne S et al. 2016.. Annals of Otology, Rhinology & Laryngology. 1-7	
Bone anchored hearing aid	IV Co-AmoxiClav 1.2g Or IV Ampicillin/Sulbactam 3g Or IV Cefazolin 2g + IV Metronidazole 500mg	IV Clindamycin 900mg Or IV Cefuroxime 750mg -1.5g + IV Metronidazole 500mg	Intraop: Repeat dose q4hrly [NA for metronidazole & Clindamycin]	National Antibiotic Guideline. 2014. 2nd Ed	
Canalplasty	Antibiotic not recommended	Antibiotic not recommended			
Meatoplasty	Antibiotic not recommended	Antibiotic not recommended			

ENT PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Head and Neck (Clean procedure/ benign)	Antibiotic not recommended	Antibiotic not recommended	NA	National Antibiotic Guideline. 2014. 2nd Ed. Scottish Intercollegiate Guidelines Network. 2014. 2nd Ed	Antibiotic is NOT recommended unless implant is used.
Head and Neck 1. Clean/ clean contaminated for cancer surgery including procedure requiring incision through oral or pharyngeal mucosa ± neck dissection ± microvascular flap/ pedicle myocutaneous flap 2. Laryngectomy (Partial/ Total ± neck dissection) 3. Maxillectomy (Total/ Partial/ Subtotal) 4. Tracheal resection and anastomosis/ Cricotracheal reconstruction	IV Co-AmoxiClav 1.2gm OR IV Ampicillin + Sulbactam 3g OR IV Cefazolin 2gm + IV Metronidazole 500mg (Cefazolin 3gm for patient >120kg)	IV Clindamycin 900mg	1 dose prior to skin incision Intraop: repeat dose q4hrly [NA for metronidazole & Clindamycin] Post Op: variable period according to the details of the individual case.	Strauss M et al. 1997. *J Laryngol Otol.*; 111:631–4. Skitarelić N et al. 2007. *J Craniomaxillofac Surg*.; 35:15–20. Johnson JTet al. 1997.. *Head Neck.* ; 19:367–71. Man LX et al. 2011 *European Archives of Oto-Rhino-Laryngology* 273.9: 2805-2811. Scotton W et al. 2012. *European Archives of Oto-Rhino-Laryngology*. ;269:2415-22. Skitarelić N et al. 2007.. *J Craniomaxillofac Surg*.; 35:15–20. Scottish Intercollegiate Guidelines Network. 2014. 2nd Ed Bratzler et al. 2013. Clinical practice guidelines for antimicrobial prophylaxis in surgery. Am J Health-Syst Pharm.2013;70:195-283. Ottoline ACX et al. 2013 *Int. Arch. Otorhinolaryngol.* 17(1); 85-91	

ENT PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Head and Neck (Clean cancer surgery involving neck dissection **only**)	IV Co-AmoxiClav 1.2gm OR IV Ampicillin + sulbactam 3g OR IV Cefazolin 2gm + IV Metronidazole 500mg (Cefazolin 3gm for patient >120kg)	Clindamycin 900mg	1 dose prior to skin incision	Man et al. 2011 Antibiotic Prophylaxis in Uncontaminated Neck Dissection. Laryngoscope, 121:1473–1477 Bratzler et al. 2013. Am J Health-Syst Pharm. 2013;70:195-283.	Only 3 doses
Thyroplasty (medialization thyroplasty with implant) [clean surgery with implant]	IV Co-AmoxiClav 1.2gm OR IV Cefazolin 2gm	Clindamycin 900mg	1 dose prior to skin incision	Abraham et al. 2001. "Complications of type I Thyroplasty and Arytenoid Adduction." *The Laryngoscope* ; 111:1322-9.	The antibiotic can be continued postoperatively for a variable period according to the details of the individual case.
Excision of benign neck mass (except branchial fistula excision/ sistrunk)	Antibiotic not recommended	Antibiotic not recommended	NA	Scottish Intercollegiate Guidelines Network. 2014. 2nd Ed	Consider antibiotic in benign neck mass with risk of wound contamination.
Parotidectomy/ Submandibulectomy	Antibiotic not recommended	Antibiotic not recommended	NA	Johnson et al. 1987. Infection following uncontaminated head and neck surgery. *Archives of Otolaryngology–Head & Neck Surgery*.;113:368-9.	Consider antibiotic in long surgery time or cancer of the salivary gland.

ENT PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Thyroidectomy/ Parathyroidectomy	Antibiotic not recommended	Antibiotic not recommended	NA	Avenia N, Sanguinetti A, Cirocchi R, et al. Antibiotic prophylaxis in thyroid surgery: a preliminary multi- centric Italian experience. *Ann Surg Innov Res.* 2009; 3:10.	
Adenoidectomy/ Tonsillectomy	Antibiotic not recommended	Antibiotic not recommended	NA	Bratzler et al. 2013. Am J Health-Syst Pharm. 2013;70:195-283. Sánchez-Carrión Set al. 2006.. Utility of prophylactic antibiotics in pediatric adenoidectomy. International Journal of Pediatric Otorhinolaryngology. 70:1275-81.	
Endolaryngeal microsurgery/ Laser surgery	Antibiotic not recommended	Antibiotic not recommended	NA	Ottoline et al. 2013.. Int. Arch. Otorhinolaryngol. 17(1):85-91	

4. MAXILLOFACIAL PROCEDURES

MAXILLOFACIAL PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Extraction - One Tooth (Oral Surgery Under Local Anaesthesia)	Antibiotic not recommended	Antibiotic not recommended	NA	Antibiotic Prophylaxis in Oral Surgery for Prevention of Surgical Site infection. MOH 2015. 2nd Ed. .	
Excision Of Mucous Extravasation Cyst	Antibiotic not recommended	Antibiotic not recommended	NA		
Management Of Infected Socket	PO 500mg Amoxycillin	PO 500mg Cefuroxime	30-45 min before incision		
Surgical Extraction - Impacted , Roots , Embedded (Oral Surgery Under Local Anaesthesia)	IV Co-AmoxiClav 1.2g *Antibiotic not required in good dental hygiene and healthy patient	IV Cefuroxime 1.5g	1 dose		
Biopsy - Soft Tissue or Hard Tissue	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g	Intra Op: Repeat dose q 3 hours (Co-AmoxiClav) or q 4 hours (Cefuroxime)		
Excision - Soft Tissue or Hard Tissue					
Toilet And Suturing - Minor or Major Wounds					
Trauma - - Dressing Of Soft Tissue Injury - Closed Reduction And Fixation Of Fractures (Maxillofacial) - Closed Reduction And Fixation Of Fractures (Dentoalveolar) - Removal Of Fixation					
Enucleation / Marsupialisation Of Cyst					
Removal Of Foreign Body					
Management Of Infected Socket					
Haemostasis					
Incision And Drainage					
Autogenous Bone Grafting					
Prosthetic Surgery - Mini Dental Implant (Ex Cost)					

- Conventional Dental Implant (Ex. Implant Cost) - Sinus Lift - Sulcus Deepeding - Alveoloplasty					
MAXILLOFACIAL PROCEDURES	**PREFERRED FIRST LINE**	**ALTERNATIVE IF ALLERGY**	**DURATION**	**REFERENCES**	**REMARKS**
Endodontic Surgery - Apicectomy - Orthodontic Implant - Exposure And Gold Chain Bonding (Ex Cost Of Chain)					
Nasoorbital - Close - Closed Reduction & Fixation - Open - Orif	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g No antibiotic if closed reduction via nasal	Intra Op: Repeat dose q 3 hrly (Co-AmoxiClav) or q 4 hrly (Cefuroxime)		Except for close reduction • For combined surgeries to refer other teams • To review antibiotic duration for Complicated cases and surgeries >2hrs
Nasoethmoid - Closed Reduction & Fixation - Open - Orif					
Maxilla - Le Fort 111 - Orif - Circumzygomatic Suspension					
Removal - Removal Of Osteosynthesis Plate - Removal Silastic - Removal Of Osteosynthesis Wire -- Other - Removal Of Pack					
Imf- Intermaxillary Screws Imf					
Imf- Intermaxillary Arch Bars Imf					
Simple Treatments - Anaesthetic Injection	Antibiotic not required	Antibiotic not required	NA	Antibiotic Prophylaxis in Oral Surgery for Prevention of Surgical Site infection. MOH 2015. 2nd Ed.	
Arthroscopy : Upper /Lower Space Diagnostic					
Arthrocentesis - Arthroscopy Upper or Lower Space Arthrocentesis					

MAXILLOFACIAL PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Meniscus - Menisectomy - Meniscus Alloplastic Replacement - Meniscus Repair - Meniscus Re-Attachment					
Condyle Removal - High Condylar Shave; Cindylectomy; Condylotomy; Gap Arthroplasty; Condyle Osteotomy					
Prothesis - Prosthesis Glenoid Fossa; Prosthesis Condyle Head; Prosthesis Total					
Root Canal Treatment - Anterior & Premolar (Conservative Dentistry)	Antibiotic not required	Antibiotic not required	NA	Antibiotic Prophylaxis in Oral Surgery for Prevention of Surgical Site infection. MOH 2015. 2nd Ed.	
Coronoid - Coronoidectomy	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g	Intra Op: Repeat dose q3 hrly(Co-AmoxiClav) or q4hrly (Cefuroxime)		
Dislocation - Manipulation / Reduction - Dislocation Capsular Plication - Extra - Articular Sclerosant Injection - Eminectomy - Zygomatic Arch Down Fracture - Eminence Augmentation - Dislocation Myotomy					
Soft Tissue - Ora - Facial- Primary Closure; Flap Repair; Scar Revision	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g	Intra Op: Repeat dose q3 hrly(Co-AmoxiClav) or q4hrly (Cefuroxime)		Except for close reduction. *To consult specialist on duration of antibiotic
Mandible – Closed or Open Reduction Of Mandibular Fracture					
Zygoma - Closed Reduction - Other Technoque - Gillies Approach - Open Reduction & Internal Fixation					

MAXILLOFACIAL PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Orbital Floor - Repair - Orbital Floor Repair Alloplast /Autogenous / Titanium Mesh	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g	Intra Op: Repeat dose q3 hrly(Co-AmoxiClav) or q4hrly (Cefuroxime)	Antibiotic Prophylaxis in Oral Surgery for Prevention of Surgical Site infection. MOH 2015. 2nd Ed.	Except for close reduction.
Maxilla - Le Fort 1 - Orif / Close Reduction					
Craniofacial - Open - Orbital Ridge Fracture Repair - Craniotomy Complicating Fracture Repair - Anterior Craniotomy Repair					
Excision Of Tumour And Reconstrution					
Neoplasia	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g	Intra Op: Repeat dose q3 hrly(Co-AmoxiClav) or q4hrly (Cefuroxime)		*To consult specialist on duration of antibiotic
Cuteneuos - Excosion & Primary Closure - Excosion &Split Skin Graft - Excosion & Wolfe Graft - Excosion & Flap Cosure - Crysurgery - Excisional Biopsy					
Tumour Debulking					
Intraoral Soft Tissue - Eua + Biopsy					
Intraoral Resection - Excision Of Tumour (Unspec) / Palate / - Biopsy Tongue / Floor Of Mouth/ Partial or Total Glossectomy / Destruction Of Lesion Fom Laser Excision					
Bone Mandible - Mandibulotomy / Mandibular Rim Resection / Segmental Mandibulectomy/ Hemimandibulectomy / Subtotal or Total Mandibulectomy / Bone Biopsy Mandible					
Bone Maxillary - Hemimaxillectomy / Partial Maxillectomy or Fenestration / Total Maxillectomy/ Orbital Exenteration / Bone Biopsy					

MAXILLOFACIAL PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Parotid - Superficial Parotidectomy / Parotid Biopsy (Open) / Total Conservative Parotidectomy/ Total Radical Parotidectomy / Nerve Reconstruction In Parotidectomy					
Submandibular - Submandibular Gland Excision					
Duct - Repositioning Of Parotid Duct / Submandibular Duct					
Sublingual - Excision Of Sublingual Gland					
Minor Gland - Excision Of Minor Salivary Tumour					
Giant Cell - Excision Of Giant Cell Lesion					
Fibro - Osseous - Excision Of Fibro - Osseous Lesion					
Ameloblastoma - Excision					
E. Orthognathic Surgery (Per Jaw)	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g	Intra Op: Repeat dose q3 hrly(Co-AmoxiClav) or q4hrly (Cefuroxime)	Antibiotic Prophylaxis in Oral Surgery for Prevention of Surgical Site infection. MOH 2015. 2nd Ed.	
Third Molars - Simple Extraction / Elevation Of 18, 28 / Surgical Removal Of 38 , 48 / Transplantation / Multiple Surgical Removal	Antibiotic not recommended	Antibiotic not recommended	NA		
Other Teeth - Simple Extraction / - Surgical Removal Of Retain Root/ Transplantation / Exposure/ Full Clearance					
Apicectomy - Apicectomy / Apicectomy + Retrograde Root Filling / Apicectomy + Cyst / Granuloma Enucleation / Root Canal Therapy					

MAXILLOFACIAL PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Cyst - Enucleation Cyst / Marsupialisation Of Cyst					
Fixed Appliance	Antibiotic not recommended	Antibiotic not recommended			
Removable Appliance (Orthodontics)					
Salivary (Minor) - Excision Of Mucocele / Biopsy	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g	Intra Op: Repeat dose q3 hrly(Co-AmoxiClav) or q4hrly (Cefuroxime)	Antibiotic Prophylaxis in Oral Surgery for Prevention of Surgical Site infection. MOH 2015. 2nd Ed.	
Antrum - Caldwell Luc / Antrostomy / Removal Of Tooth					
Washout / Irrigation And Drainage					
Periodontal - Gingivectomy / Repositioned Flap/ Gingivoplasty / Muscosal Graft/ Bone Regeneration Techniques					
Soft Tissue - Frenectomy					
Sequestrectomy - Bone Sequestrectomy					
Implantology - Implan Intraoral or Extraoral Osseous Integrated . 1st Stage or 2nd stage					
Scaling And Polishing (Periodontics)	Antibiotic not recommended	Antibiotic not recommended	NA	Antibiotic Prophylaxis in Oral Surgery for Prevention of Surgical Site infection. MOH 2015. 2nd Ed.	
Root Debridement (Periodontics)					
Periodontal Surgery (Oral Surgery Under Local Anaesthesia)	Antibiotic not recommended	Antibiotic not recommended	NA		
Abscess Drainage - Incision & Drainage I/O or E/O / Exploration Of Tissue Spaces & Drainage /	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g	1 dose		
Comprehensive - Dental Care	Antibiotic not recommended	Antibiotic not recommended	NA		
Zygoma - Other - Open Reduction Zygoma (Other Technique)	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g	Intra Op: Repeat dose q3 hrly(Co-AmoxiClav) or q4hrly (Cefuroxime))		
Prosthesis - Prosthesis Glenoid Fossa / Prosthesis Condyle Head					

MAXILLOFACIAL PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Other Teeth - Surgical Removal Canine	Antibiotic not recommended	Antibiotic not recommended	NA		
Antrum - Oroantral Fisula Repair Palatal Flap	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g	Intra Op: Repeat dose q3 hrly(Co-AmoxiClav) or q4hrly (Cefuroxime)	Antibiotic Prophylaxis in Oral Surgery for Prevention of Surgical Site infection. MOH 2015. 2nd Ed.	
Antrum - Oroantral Fisula Repair Buccal Flap					
Extraction - 5-10 Tooth	Antibiotic not recommended	Antibiotic not recommended	NA		
Extraction - 11-20 Tooth					
Extraction - > 20 Tooth					
Remove Arch Bar	Antibiotic not recommended	Antibiotic not recommended	NA		
Distraction Osteogenesis	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g	Intra Op: Repeat dose q3 hrly(Co-AmoxiClav) or q4hrly (Cefuroxime)		As per orthognathic

5. BREAST & ENDOCRINE PROCEDURES

BREAST & ENDOCRINE PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Excision Of Branchial Fistula	Antibiotic not recommended	NA	NA	Guideline for Surgical Prophylaxis within Breast Surgery for Adult Patients. Nottingham University Hospitals antibiotic guidelines committee. https://www.nuh.nhs.uk/handlers/downloads.ashx?id=61003. Accessed 22 June 2017 Bağhaki et al. 2014. Guideline for Antimicrobial Prophylaxis in Breast Surgery. J Breast Health; 10: 79-82	
Excision Of Breast Lump	Antibiotic not recommended	NA	NA		
Excision Of Breast Tumour,Microdochectomy	IV Cefuroxime 1.5G	IV Erythromycin 500mg over 1hr	1 dose pre op		Spillage of intraductal fluid
Excision Of Thyroglossal Cyst	Antibiotic not recommended	NA	NA		
Excision Of Retroperitonel Tumours	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5G	Intra Op: repeat dose q4hrly		
Lymph Node Biopsy	Antibiotic not recommended	NA	NA		
Mastectomy	Antibiotic not recommended	NA	NA		Unless the patient had neoadjuvant chemotherapy
Thyroidectomy-Lobectomy	Antibiotic not recommended	NA	NA		
Thyroidectomy-Total & Subtotal	Antibiotic not recommended	NA	NA		
Regional Lymph Nodes Excision	Antibiotic not recommended	NA	NA		
Reconstruction Of Breast Using Latissimus Dorsi	IV Cefuroxime 1.5G	IV Erythromycin 500mg over 1hr	Intra Op: repeat dose q4hrly		Long surgery; 4-6 Hours
Excision Of Lesion Of Submandibular Gland	Antibiotic not recommended	NA	NA		
Reduction Mammoplasty And Subcutaneous Mammectomy	Antibiotic not recommended	NA	Intra Op: repeat dose q4hrly		Long surgery; 3-4 Hours
Mastopexy	Antibiotic not recommended	NA	NA		
Plastic & Reconstructive : Reconstruction Of Breast Using Local Flap	Antibiotic not recommended	NA	NA		Long surgery; 6-8 Hours
Plastic & Reconstructive : Reconstruction Of Breast Using Tram Flap	IV Cefuroxime 1.5G	IV Erythromycin 500mg over 1hr	Intra Op: repeat dose q4hrly		Long surgery; 6-8 Hours

BREAST & ENDOCRINE PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Plastic & Reconstructive : Removal Of Prosthesis From Breast	Antibiotic not recommended	NA	NA		
Insertion Of Prosthesis Following Mastectomy	IV Co-AmoxiClav 1.2g	IV Erythromycin 500mg over 1hr	Intra Op: repeat dose q4hrly		
Liposuction (Suction Assisted Lipectomy) - Breast	Antibiotic not recommended	NA	NA		
Mammoplasty - Augmentation (Without Cost Of Prothesis)- Surgeri Plastic	Antibiotic not recommended	NA	NA		
Mammoplasty - Reduction (Surgeri Plastic)	Antibiotic not recommended	NA	NA		
Diagnostic Procedures On Skin And Subcutaneous Tissue	Antibiotic not recommended	NA	NA		
Excision Or Destruction Of Lesion Or Tissue Of Skin And Subcutaneous (Up To 3)	Antibiotic not recommended	NA	NA		
Excision Of Biopsy Lymph Node	Antibiotic not recommended	NA	NA		
Open Hemithyroidectomy	Antibiotic not recommended	NA	NA		
Thyroidectomy : Open Total/Subtotal or Endoscopic	Antibiotic not recommended	NA	NA		
Neck Dissection / Re-Do Neck Dissection	Antibiotic not recommended	NA	NA		
Parathyroidectomy or Re-Do Parathyroidectomy or Total Parathyroidectomy	Antibiotic not recommended	NA	NA		
Sistrunk Procedure	Antibiotic not recommended	NA	NA		Unless infected cases or fistula
Branchial Cyst or Fistula Excision	Antibiotic not recommended	NA	NA		Unless infected or fistula
Open Adrenalectomy	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5G or IV Erythromycin 500mg over 1hr	1 dose pre op		

BREAST & ENDOCRINE PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Laparoscopic Adrenalectomy	Antibiotic not recommended	IV Cefuroxime 1.5G or IV Erythromycin 500mg over 1hr	1 dose pre op		Consider antibiotic in patient with Cushing syndrome because of high cortisol
Head And Neck : Insertion Of Chemoport	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5G or IV Erythromycin 500mg over 1hr	1 dose pre op		
Open Pancreatic Nodule Enucleation	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5G or IV Erythromycin 500mg over 1hr	1 dose pre op		
- Laparascopic Approach	Antibiotic not recommended	NA	NA		
Reconstruction: Free Flaps	Antibiotic not recommended	NA	NA		
Axillary Dissection/Clearance (Ad/Ac)	Antibiotic not recommended	NA	NA		Unless the patient had neoadjuvant chemotherapy
Breast Augmentation – Bilateral or Unilateral	IV Cefuroxime 1.5G	IV Cefuroxime 1.5G or IV Erythromycin 500mg over 1hr	1 dose pre op		
Breast Lift (Mastopexy) – Bilateral or Unilateral	Antibiotic not recommended	NA	NA		
Breast Reduction- Bilateral or Unilateral	Antibiotic not recommended	NA	NA		Long surgery; 3-4 Hours
CAPSULECTOMY Or CAPSULOTOMY	Antibiotic not recommended	NA	NA		IV Cefuroxime x 1 dose If implant present in situ
Change Of Implant	IV Cefuroxime 1.5G	IV Erythromycin 500mg over 1hr	1 dose pre op		To consult specialist for duration

BREAST & ENDOCRINE PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Completion Ad/Ac	Antibiotic not recommended	NA	NA		• To consult specialist if patient is immuno-compromised
Excision Of A Breast Lump (S) / Cutaneous Lesions(S)/ Lymph Node (S)/ Accessory Breast / Bilateral Accessory Breasts	Antibiotic not recommended	NA	NA		
Haematoma Evacuation	IV Cefuroxime 1.5G	IV Erythromycin 500mg over 1hr	1 dose pre op		To consult specialist on duration
Hookwire Localization & Wide Excision	IV Cefuroxime 1.5G	IV Erythromycin 500mg over 1hr	1 dose pre op		
Implant Reconstruction	IV Cefuroxime 1.5G	IV Erythromycin 500mg over 1hr	1 dose pre op		To consult specialist on duration
Insertion Of Chemoport	IV Cefuroxime 1.5G	IV Erythromycin 500mg over 1hr	1 dose pre op		
Ld or Tram Breast Reconstruction	IV Cefuroxime 1.5G	IV Erythromycin 500mg over 1hr	1 dose pre op		
Local Flap Breast Reconstruction, or Local Flap Wound Closure	Antibiotic not recommended	NA	NA		
Macrodochectomy (Total Duct Excision)	IV Cefuroxime 1.5G	IV Erythromycin 500mg over 1hr	1 dose pre op		Intraductal fluid spillage
Mastectomy (Simple/Toilet) / Skin Sparing / Subcutaneous	Antibiotic not recommended	NA	NA		Unless the patient had neoadjuvant chemotherapy
Mastectomy/Ssm/Scm, Ld & Implant Breast Reconstruction	IV Cefuroxime 1.5G	IV Erythromycin 500mg over 1hr	1 dose pre op		
Mastectomy/Ssm/Scm, Ad & Implant Breast Reconstruction	IV Cefuroxime 1.5G	IV Erythromycin 500mg over 1hr	1 dose pre op		
Mastectomy/Ssm/Scm, Ad & Ld / Tram Breast Reconstruction	IV Cefuroxime 1.5G	IV Erythromycin 500mg over 1hr	1 dose pre op		
Microdochectomy	IV Cefuroxime 1.5G	IV Erythromycin 500mg over 1hr	1 dose pre op		Intraductal fluid spillage

BREAST & ENDOCRINE PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Nipple Areolar Reconstruction / Tattooing/ Eversion or Nipple Reconstruction - Bilateral or Unilateral	Antibiotic not recommended	NA	NA		
Punch Biopsy	Antibiotic not recommended	NA	NA		
Reexcision Of A Margin (S)	IV Cefuroxime 1.5G	IV Erythromycin 500mg over 1hr	1 dose pre op		cavity seroma
Removal Of Chemoport or Implant or Suture(s) (Ros)	Antibiotic not recommended	NA	NA		
Repositioning Of Implant	IV Cefuroxime 1.5G or IV Co-AmoxiClav 1.2g	IV Erythromycin 500mg over 1hr	1 dose pre op		
Scar Revision	Antibiotic not recommended	NA	NA		
Sentinel Lymph Node Biopsy (Slnb)	Antibiotic not recommended	NA	NA		
Skin Graft ; Full or Partial Thickness	Antibiotic not recommended	NA	NA		
Skin Sparing Mastectomy (Ssm)	Antibiotic not recommended	NA	NA		Unless the patient had neoadjuvant chemotherapy
Skin/Wound Debridement	Antibiotic not recommended	NA	NA		
Subcutaneous Mastectomy (Scm)	Antibiotic not recommended	NA	NA		Unless the patient had neoadjuvant chemotherapy
Therapeutic Mammoplasty or Therapeutic Mammoplasty + Snb	Antibiotic not recommended	NA	NA		Unless the patient had neoadjuvant chemotherapy
Wedge Biopsy	Antibiotic not recommended	NA	NA		
Wide Local Excisions(Wle)	Antibiotic not recommended	NA	NA		
Wle & Ad/Ac or Wle & Slnb	Antibiotic not recommended	NA	NA		Unless the patient had neoadjuvant chemotherapy
Wle & Ad/Ac & Implant Breast Reconstruction or Wle & Ad/Ac & Ld Breast Reconstruction	IV Cefuroxime 1.5g	IV Erythromycin 500mg over 1hr	1 dose pre op		

6. CARDIOTHORACIC PROCEDURES

CARDIOTHORACIC PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Coronary artery bypass, Ventricular assist devices.	IV Cefazolin 2g, repeat after 4 hours if procedure is >4 hours, followed by 2g 8hourly post-operatively PLUS IV Gentamicin 2mg/kg or IV Cefuroxime 1.5g q4H intraoperatively followed by q8hrly post operatively or IV Cloxacillin + IV gentamicin	Vancomycin 1g or 15mg/kg IV in 200mL over 2 hr **For patients colonized with MRSA** Vancomycin 1g or 15mg/kg IV in 200mL over 2 hrs. PLUS Cefazolin 2g	48 hours	National Heart Institute Antibiotic Guideline 2014 National Antibiotic Guideline. 2014. 2nd Ed. Ann Thorax Surg 2006;81:397–404 Ann Thorac Surg 2007;83:1569–76 UMMC Antibiotic Guideline 2014 Sousa-Uva M et al. 2017 European Journal of Cardio-Thoracic Surgery: 1–29	In any circumstances alternative should only be used with justification and verified with specialist and consultant.
Implantation of cardiac device (pacemaker, ICD, CRTD) (by cardiologist)	IV Cefazolin 2g		1 dose pre op	Baddour et al 2010. Update on cardiovascular implantable electronic device infections and their management: a scientific statement from the American Heart Association. Circulation. 121(3):458.	
Non cardiac procedures(including lobectomy, pneumonectomy, lung resection, and thoracotomy), Video-assisted thoracoscopic surgery	IV Cefazolin 2g, repeat after 4 hours if procedure is >4 hours, followed by 2g 8hourly post-operatively		48hours	National Heart Institute Antibiotic Guideline 2014	

7. VASCULAR PROCEDURES

VASCULAR

VASCULAR PROCEDURES	PREFERRED FIRST LINE*	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
HSV ligation, Stripping and multiple stab avulsion. (Superficial venous surgery.)	Antibiotic not recommended	Antibiotic not recommended	1 dose pre op	National Antibiotic Guideline. 2014. 2nd Ed. Use iv antibiotic if presence of venous ulcer	IV Co-AmoxiClav 1.2g if there is active ulcer
Carotid endareterectomy	IV Co-AmoxiClav 1.2g	IV Cefazolin 2g MRSA Colonized IV Vancomycin 1g or 15mg/kg in 200mL over 2 hr	1 dose pre op	Bratzler DW. 2013*Am J Health Syst Pharm.* Feb 1;70(3):195-283 Nottingham NHS (2014) https://www.nuh.nhs.uk/handlers/downloads.ashx?id=61005	
Emergency embolectomy	IV Co-AmoxiClav 1.2g	IV Cefazolin 2g	1 dose pre op	https://www.sahealth.sa.gov.au/wps/wcm/connect/257f0b004f91779c91cadbc4163822ed/Vascular_Oct2014.	
Femoral popliteal bypass/ any distal bypass	IV Co-AmoxiClav 1.2g	IV Cefazolin 2g			
AVF	Oral Cephalexin 500mg	IV Cefazolin 2g	1 dose pre op	https://www.sahealth.sa.gov.au/wps/wcm/connect/257f0b004f91779c91cadbc4163822ed/Vascular_Oct2014. Surgical Antibiotic Prophylaxis Guideline – Vascular Surgery (Government of South Australia) http://www.albertahealthservices.ca/assets/Infofor/hp/if-hp-antimicrobial-stewardship-surgical-prophylaxis.pdf	

VASCULAR PROCEDURES	PREFERRED FIRST LINE*	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Abdominal aortic aneurysm (AAA) excision and onlay graft	IV Co-AmoxiClav 1.2g	IV Cefazolin 2g	1 dose pre op IntraOp: repeat dose q4hrly		
Aorto-bifemoral/ aorto-iiliac	IV Co-AmoxiClav 1.2g		1 dose pre op		
Aorto –open op of renal/visceral branch	IV Co-AmoxiClav 1.2g		1 dose pre op		
Arteriovenous malformation(AVM)	IV Co-AmoxiClav 1.2g		1 dose pre op		
Bypass with wound	IV Co-AmoxiClav 1.2g*	IV Cefazolin 2g MRSA Colonized IV Vancomycin 1g or 15mg/kg in 200mL over 2 hrs.		If a non infected wound* culture is known. Use the most appropriate broad spectrum antibiotic to cover for the organism. If MRSA is isolated or suspected. Consider vancomycin.	Serve Vancomycin for patient with known/suspected MRSA colonizer.
Deep Venous Surgery	IV Co-AmoxiClav 1.2g		1 dose pre op		
Vascular graft implants a. AVF graft b. Aortic graft / TEVAR / EVAR	IV Co-AmoxiClav 1.2g	MRSA infection prophylaxis IV Vancomycin 1g or 15mg/kg in 200mL over 2 hrs.	1 dose pre op	National Antibiotic Guideline. 2014. 2nd Ed.	

* if there is a recent positive culture prior to surgery in a non-infected wound, to revise antibiotic prophylaxis according to culture result.

8. UPPER GI & BARIATRIC PROCEDURES

UPPER GI & BARIATRIC PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Fundoplication (Nissen) Laparoscopic	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g	At induction of anaesthesia	National Antibiotic Guideline. 2014. 2nd Ed.	If allergic to beta lactamase, to use clindamycin (for all procedures)
Gastroduodenoscopy	Not required	Not required	Not required		
Gastroscopy	Not required	Not required	Not required		
Gastrostomy/Jejunostomy	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g	At induction of anaesthesia		
Hellers Operation Laparoscopic	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g	At induction of anaesthesia		
Herniorrhaphy	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g	At induction of anaesthesia		
Repair Of Umbilical Hernia	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g	At induction of anaesthesia		
Small Bowel Resection, Ileocolectomy,Ileocolostomy, Jejuno-Jejunostomy	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g + IV metronidazole 500mg	At induction of anaesthesia		
Abdomen Gastrointestinal : Diagnostic Laparoscopy	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g	At induction of anaesthesia		
Gastrectomy-Partial & Total	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g	At time of induction		
Oesophagectomy	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g	At induction of anaesthesia		
OESOPHAGOGASTRECTOMY With Colon Interposition	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g + IV metronidazole 500mg	At induction of anaesthesia		
Oesophagogastrectomy And Interposition Of Viscus	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g + IV metronidazole 500mg	At induction of anaesthesia		
Open Excision Of Lesion Of Oesophagus Bypass Of Oesophagus	IV Co-AmoxiClav 1.2g IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g + IV metronidazole 500mg *	At induction of anaesthesia At induction of anaesthesia		

UPPER GI & BARIATRIC PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Revision Of Oesophageal Anastomosis	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g	At induction of anaesthesia	National Antibiotic Guideline. 2014. 2nd Ed.	If allergic to beta lactamase, to use clindamycin (for all procedures)
Thoracoscopic Repair Of Oesophagus	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g	At induction of anaesthesia		
Thoracoscopic Oesophagectomy And Interposition Of Viscus	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g + IV metronidazole 500mg *	At induction of anaesthesia		
Laparoscopic Sleeve Gastrectomy	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g	At induction of anaesthesia		
Laparoscopic Gastric Bypass	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g	At induction of anaesthesia		
Primary Repair Of Hernia	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g	At induction of anaesthesia	National Antibiotic Guideline. 2014. 2nd Ed.	
Laparoscopic Repair Of Inguinal Hernia (Unilateral or Bilateral)	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g	At induction of anaesthesia		
Repair Of Recurrent Inguinal Hernia	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g	At induction of anaesthesia		
Primary Repair Of Incisional Hernia	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g	At induction of anaesthesia		
Repair Of Recurrent Incisional Hernia	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g	At induction of anaesthesia		
Repair Of Other Hernia Of Abdominal Wall	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g	At induction of anaesthesia		

9. COLORECTAL PROCEDURES

COLORECTAL PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Abdomino perineal resection	IV Co-AmoxiClav 1.2g Or IV Cefazolin 2g + IV Metronidazole 500mg	IV Metronidazole 500mg	1 dose Pre Op Intra Op: 1 dose q 4 hrs [NA for metronidazole & Gentamicin]	Bratzler DW. 2013..*Am J Health Syst Pharm.* Feb 1;70(3):195-283 South Australian expert Advisory Group on Antibiotic Resistance (SAAGAR). 2014. Nelson RL et al. 2014. Cochrane Database Syst Rev. (5):CD001181. Antibiotic prophylaxis guideline for colorectal, hepatobiliary and vascular surgery for adult patients https://www.nuh.nhs.uk/handlers/downloads.ashx?id=61005 *Nottingham Antibiotic Guidelines Committee 2014*	
Abdomen gastrointestinal : Ileostomy/colostomy	Antibiotic Not Recommended	Antibiotic not recommended	NA		
Anoplasty	IV Co-AmoxiClav 1.2g Or IV Cefazolin 2g + IV Metronidazole 500mg	IV Gentamicin 2mg/kg + IV Metronidazole 500mg	1 dose Pre Op Intra Op: 1 dose q 4 hry [NA for metronidazole & Gentamicin]		
Ano-rectal [pull through] operation	IV Co-AmoxiClav 1.2g Or IV Cefazolin 2g + IV Metronidazole 500mg	IV Gentamicin 2mg/kg + IV Metronidazole 500mg	1 dose Pre Op Intra Op: 1 dose q 4 hrs [NA for metronidazole & Gentamicin]		
Anterior resection with or without colostomy	IV Co-AmoxiClav 1.2g Or IV Cefazolin 2g + IV Metronidazole 500mg	IV Gentamicin 2mg/kg + IV Metronidazole 500mg	1 dose Pre Op Intra Op: 1 dose q 4 hrs [NA for metronidazole & Gentamicin]		

COLORECTAL PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Closure of colostomy (ileostomy)	IV Co-AmoxiClav 1.2g Or IV Cefazolin 2g + IV Metronidazole 500mg	IV Gentamicin 2mg/kg + IV Metronidazole 500mg	1 dose Pre Op Intra Op: 1 dose q 4 hrs [NA for metronidazole & Gentamicin]	See above	
Colonoscopy with or without polypectomy	Antibiotic Not Recommended	NA	NA		
Excision of fissure-in-ano	IV Metronidazole 500mg	-	1 dose Pre Op		
Fistulectomy	IV Metronidazole 500mg	-	1 dose Pre Op		
Haemorrhoidectomy	IV Metronidazole 500mg	-	1 dose Pre Op		
Revision of colostomy	IV Co-AmoxiClav 1.2g Or IV Cefazolin 2g + IV Metronidazole 500mg	IV Gentamicin 2mg/kg + IV Metronidazole 500mg	1 dose Pre Op Intra Op: 1 dose q 4 hrs [NA for metronidazole & Gentamicin]]		
Revision of gastrointestinal anastomosis	IV Co-AmoxiClav 1.2g Or IV Cefazolin 2g + IV Metronidazole 500mg	IV Gentamicin 2mg/kg + IV Metronidazole 500mg	1 dose Pre Op Intra Op: 1 dose q 4 hrs [NA for metronidazole & Gentamicin]		
Sigmoidectomy	IV Co-AmoxiClav 1.2g Or IV Cefazolin 2g + IV Metronidazole 500mg	IV Gentamicin 2mg/kg + IV Metronidazole 500mg	1 dose Pre Op Intra Op: 1 dose q 4 hrs [NA for metronidazole & Gentamicin]		

COLORECTAL PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Small bowel resection, ileocolectomy,ileocolostomy, jejuno-jejunostomy	IV Co-AmoxiClav 1.2g Or IV Cefazolin 2g + IV Metronidazole 500mg	IV Gentamicin 2mg/kg + IV Metronidazole 500mg	1 dose Pre Op Intra Op: 1 dose q 4 hrs [NA for metronidazole & Gentamicin]		
Total colectomy, hemicolectomy	IV Co-AmoxiClav 1.2g Or IV Cefazolin 2g + IV Metronidazole 500mg	IV Gentamicin 2mg/kg + IV Metronidazole 500mg	1 dose Pre Op Intra Op: 1 dose q 4 hrs [NA for metronidazole & Gentamicin]	See above	
Stapled haemorrhoidopexy	IV Metronidazole 500mg	-	1 dose Pre Op		
Starr procedure	IV Metronidazole 500mg	-	1 dose Pre Op		
Laparoscopic colectomy	IV Metronidazole 500mg	-	1 dose Pre Op		
Laparoscopic anterior resection	IV Co-AmoxiClav 1.2g Or IV Cefazolin 2g + IV Metronidazole 500mg	IV Gentamicin 2mg/kg + IV Metronidazole 500mg	1 dose Pre Op Intra Op: 1 dose q 4 hrs [NA for metronidazole & Gentamicin]		
Laparoscopic APR	IV Cefazolin 2g + IV Metronidazole 500mg	IV Gentamicin 2mg/kg + IV Metronidazole 500mg	1 dose Pre Op Intra Op: 1 dose q 4 hrs [NA for metronidazole]		
Laparoscopic total colectomy	IV Co-AmoxiClav 1.2g Or IV Cefazolin 2g + IV Metronidazole 500mg	IV Gentamicin 2mg/kg + IV Metronidazole 500mg	1 dose Pre Op Intra Op: 1 dose q 4 hrs [NA for metronidazole & Gentamicin]		
Transanal resection of rectal	IV Metronidazole 500mg	-	1 dose Pre Op		
Sigmoidoscopy	Antibiotic Not Recommended	NA	NA		

10. HEPATOBILIARY PROCEDURES

HEPATOBILIARY PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Open cholecystectomy+/- biliary exploration **or** laparoscopic cholecystectomy (high risk)+/- biliary exploration	No antibiotic [If high risk, IV Co-AmoxiClav 1.2g]	No antibiotic	~~NA~~	Antimicrobial prophylaxis for surgery. Treat guidel Med Lett 2012;10:73 Bratzler DW. 2013. *Am J Health Syst Pharm.* Feb 1;70(3):195-283	High risk- factors that indicate high risk include age>70 years, pregnancy,acute cholecystitis,nonfunctioning gallbladder, obstructive jaundice, common bile duct stone, immunosuppression.
Laparoscopic cholecystectomy	Antibiotic Not Recommended	NA	NA		
Whipples procedure/ pylorus preserving pancreaticoduodenectomy(PPPD) / distal pancreatectomy/ drainage procedure	IV Co-AmoxiClav 1.2g Or IV Cefazolin 2g + IV Metronidazole 500mg	IV Gentamicin 2mg/kg + IV Metronidazole 500mg	1 dose Pre Op Intra Op: 1 dose q 4 hrs [NA for metronidazole]	Antimicrobial prophylaxis for surgery. Treat guidel Med Lett 2012;10:73	
Hepatectomy(major/minor)	IV Co-AmoxiClav 1.2g Or IV Cefazolin 2g + IV Metronidazole 500mg	IV Gentamicin 2mg/kg + IV Metronidazole 500mg	1 dose Pre Op Intra Op: 1 dose q 4 hrs [NA for metronidazole]	Antimicrobial prophylaxis for surgery. Treat guidel Med Lett 2012;10:73	

HEPATOBILIARY PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Splenectomy	IV Co-AmoxiClav 1.2g Or IV Cefazolin 2g + IV Metronidazole 500mg	IV Gentamicin 2mg/kg + IV Metronidazole 500mg	1 dose Pre Op Intra Op: 1 dose q 4 hrs [NA for metronidazole]	Antimicrobial prophylaxis for surgery. Treat guidel Med Lett 2012;10:73	
ERCP	IV Co-AmoxiClav 1.2g Or IV Cefazolin 2g + IV Metronidazole 500mg	IV Gentamicin 2mg/kg + IV Metronidazole 500mg	1 dose Pre Op Intra Op: 1 dose q 4 hrs [NA for metronidazole]		

11. UROLOGY PROCEDURES

UROLOGY surgery

UROLOGY PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Minor cystoscopic procedures	Antibiotics not recommended	NA	NA	EAU's Guidelines on Urological Infections. 2015.	
Urodynamic study	Antibiotics not recommended	NA	NA	EAU's Guidelines on Urological Infections. 2015.	
Transrectal biopsy of prostate	Oral Ciprofloxacin 500mg	Oral Co-AmoxiClav 625mg	1 dose pre op	EAU's Guidelines on Urological Infections. 2015.	Control of bacteriuria prior to surgery.
Transurethral Resection of Bladder Tumor [**TURBT**]	IV Co-AmoxiClav 1.2 g	IV ciprofloxacin 400mg	1 dose pre op	EAU's Guidelines on Urological Infections. 2015.	Control of bacteriuria prior to surgery.
Transurethral Resection of the Prostate [**TURP**]	IV Co-AmoxiClav 1.2 g + IV Gentamicin 80mg	IV ciprofloxacin 400mg + IV Gentamicin* 2mg/kg *(if renal impaired,omit /adjust gentamicin dose)	1 dose pre op	EAU's Guidelines on Urological Infections. 2015. UMMC 2014 MyNAG 2014 NHS Nottingham 2017	Control of bacteriuria prior to surgery.
Ureteroscopy [**URS**] / Retrograde intrarenal surgery [**RIRS**]/ Percutaneous NephroLithotomy [**PCNL**]	IV Co-AmoxiClav 1.2 g + IV Gentamicin	IV ciprofloxacin 400mg + IV Gentamicin* 2mg/kg *(if renal impaired,omit /adjust gentamicin dose)	1 dose pre op	EAU's Guidelines on Urological Infections. 2015. NHS Nottingham 2017	Control of bacteriuria prior to surgery.
Extracorporeal Shock Wave Lithotripsy [**ESWL**]	Antibiotics not recommended	NA	NA	EAU's Guidelines on Urological Infections. 2015.	

UROLOGY PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Open or laparoscopic surgery such as nephrectomy, cystectomy and prostatectomy	IV Co-AmoxiClav 1.2 g	IV ciprofloxacin 400mg or IV Gentamicin* 2mg/kg *(if renal impaired,omit /adjust gentamicin dose)	1 dose pre op	EAU's Guidelines on Urological Infections. 2015. NHS Nottingham 2017	
Scrotal surgery such as hydrocoele and vasectomy	Antibiotics not recommended	NA	NA	EAU's Guidelines on Urological Infections. 2015.	
Tenckhoff insertion for Peritoneal Dialysis	IV Cefazolin 1g	If colonized with MRSA IV Vancomycin 1g or 15mg/kg in 200mL over 2 hr	Immediately before tenckhoff insertion.	International Society for Peritoneal Dialysis (ISPD) 2000, 2016; ASHP Therapeutic Guidelines (2013-2017); NEPHROLOGY 2004; 9, S72–S75 The CARI Guidelines	No pre-soaking of catheter in Vancomycin
Permanent catheter insertion for Hemodialysis	IV Cefazolin 1g	If colonized with MRSA IV Vancomycin 1g or 15mg/kg in 200mL over 2 hr	1 dose pre op	Guidelines for Adult Antibiotic Prophylaxis during IR Procedures Nov 2010; Uptodate 2017	

Obstetrics Procedures

Addendum:

- In penicillin/ cephalosporin allergy, use IV erythromycin 500mg
- If the procedure prolonged >3 hours or blood loss >1.5L, second dose of antibiotic should be administered 4 hours after the initial dose.
- In obese women >35kg/m^2 the antibiotic dose should be doubled

OBSTETRICS PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Caesarean section	IV Cefuroxime 1.5g	IV Ampicilin /Sulbactam 1.5gm	1 dose prior to skin incision; For emergency cases antibiotic can be given in labour room (or before cord clamping)	National Antibiotic Guideline. 2014. 2nd Ed. UMMC Antibiotic Guideline 2014 RCOG . 2011 National Institute for Health and Clinical Excellence. CG132 Caesarean Section. Available at: http://guidance.nice.org.uk/CG132 : to avoid Co-AmoxiClav Costantine MM, Rahman M, Ghulmiyah L, Byers BD, Longo M, Wen T, et al.Timing of perioperative antibiotics for caesarean delivery: a metaanalysis. Am J Obstet Gynecol 2008;199(3):301.e1–6 Buppasiri et al. Antibiotic Guideline 2015-2016. Johns Hopkins Medicine	To add metronidazole if recurrent caesarean.

OBSTETRICS PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Caesarean hysterectomy	IV Cefuroxime 1.5g + IV metronidazole 500 mg	IV Ampicilin/ Sulbactam 1.5gm	1 dose pre Op IntraOp: 1 dose q 4 hours or if blood loss > 1.5L	National Antibiotic Guideline. 2014. 2nd Ed. WHO 2015. Recommendations for prevention and treatment of maternal peripartum infections. http://www.who.int/reproductivehealth/publications/maternal_perinatal_health/peripartum-infections-brief/en/(Accessed on 1 July 2017) ACOG 2009 Practice Bulletin, Clinical Management Guideline for Obstetricians and Gynaecologists. Number 104. Ayeleke RO 2017 Antibiotic prophylaxis for elective hysterectomy Cochrane Database Syst Rev. Jun18;6:CD004637..pub2	Mostly PPH, hence second dose should be administered 4 hours later
Cervical cerclage	Not indicated	NA	NA		Mostly bacterial vaginosis has been excluded, otherwise need Metronidazole

OBSTETRICS PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Manual removal of placenta	IV Co-Amoxiclav 1.2 gm	IV Cefuroxime 1.5 gm + IV Metronidazole 500mg Or IV Ampicilin/ Sulbactam 1.5g	1 dose pre Op	WHO 2015. Recommendations for prevention and treatment of maternal peripartum infections. http://www.who.int/reproductivehealth/publications/maternal_perinatal_health/peripartum-infections-brief/en/(Accessed on 3rd July 2017) Chong et al. 2014. Prophylactic antibiotics for manual removal of retained placenta in vaginal birth. **Cochrane** Database of Systematic Reviews, Issue 10. Art. No.: CD004904. Chibueze et al. 2015. Prophylactic antibiotics for manual removal of retained placenta during vaginal birth: a **systematic review** of observational studies and meta-analysis. BMC Pregnancy and Childbirth (15):313:	
Intrauterine temponade	IV Cefuroxime 750mg tds + IV Metronidazole 500mg tds	IV Co-AmoxiClav 1.2 gm Or IV Ampicilin/ Sulbactam 1.5g		National Technical Committee Confidential Enquiries Into Maternal Deaths 2016. Quick Reference Guide Postpartum Haemorrhage (PPH) *http://fh.moh.gov.my/v3/index.php/component/jdownloads/send/18-sektor-kesihatan-ibu/344-quick-reference-guide-of-postpartum-hemorrhage?option=com_jdownloads. Accessed 3rd July 2017*	Usually associated with PPH

OBSTETRICS PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Episiotomy	Not indicated	NA	NA		
Anal sphincter repair (3rd and 4th degree)	IV Co-AmoxiClav 1.2 gm	IV Cefuroxime 1.5g + IV metronidazole 500mg	See remarks	National Antibiotic Guideline. 2014. 2nd Ed. Antibiotic prophylaxis for third- and fourth-degree perineal tear during vaginal birth. Cochrane Database Syst Rev 2010;(11):CD005125	To consult specialist on the duration. (contaminated procedures)
Chorionic villious sampling	Not indicated	NA	NA		
Amniocentesis	Not indicated	NA	NA		
Surgical TOP/ Evacuation	Not indicated	NA	NA		

Gynaecology procedures

Addendum:

- In penicillin/ cephalosporin allergy, use IV erythromycin 500mg
- If the procedure prolonged >3 hours or blood loss >1.5L, second dose of antibiotic should be administered 4 hours after the initial dose
- In obese women >35kg/m^2 the antibiotic dose should be doubled

GYNAECOLOGY PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE	DURATION	REFERENCES	REMARKS
Laparotomy: Hysterectomy (simple/ radical), lymphadenectomy, omentectomy, cystectomy, oophorectomy, myomectomy, salpingectomy/ tubal ligation Laparoscopic: Hysterectomy (TLH/ LAVH) or when need to access uterine cavity or vagina	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5 gm + IV Metronidazole 500mg Or IV Ampicilin/ Sulbactam 1.5g	1 dose pre op	NHS : IV Co-amoxiclav 1.2g alt Cefuroxime + metronidazole SCOG: 1st or 2nd Gen cephalosporin Chang WC, Lee MC, Yeh LS, Hung YC, Lin CC, Lin LY. Aust N Z J Obstet Gynaecol 2008;48:592–5.	
Laparoscopic sterilization	Not indicated	NA	NA	NA	Laparoscopic sterilization

GYNAECOLOGY PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE	DURATION	REFERENCES	REMARKS
Diagnostic Laparoscopy and Dye insufflation test	Not indicated	NA	NA		IV Co-amoxiclav 1.2g Or cefuroxime + metronidazole if Dye spillage to the intraabdominal cavity may introduce infection
Vaginal hysterectomy	IV Co-AmoxiClav 1.2 gm	IV Cefuroxime 1.5 gm + IV Metronidazole 500mg Or IV Ampicilin/ Sulbactam 1.5g	1 dose pre op	Antibiotic Prophylaxis in Gynaecologic Procedures SOGC Clinical Practice Guideline No 275, April 2012 ACOG practice bulletin No. 104:.2009. Obstet Gynecol.;113(5):1180.:	
Colporaphy , ligament fixation	Not indicated	NA	NA		Unless entering/ exposing the pelvic cavity
Ovarian cyst aspiration transvaginally	Not indicated	NA	NA		Prophylaxis may be indicated if not previously screened for vaginal infection

GYNAECOLOGY PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE	DURATION	REFERENCES	REMARKS
LEEP/LETZ	Not indicated	NA	NA		Unless positive bacterial/ unknown BV status- need Metronidazole
Hysteroscopy	Not indicated	NA	NA	Kasius J, Broekmans F, Fauser B, Devroey P, Fatemi H. Fertil Steril 2011;95:792–4.	
Cervical/ Vagina/ Vulva biopsy	Not indicated	NA	NA		
Vulvectomy (Total/ partial) radical vulvectomy	IV Co-AmoxiClav 1.2g	IV Cefuroxime 1.5g + IV Metronidazole 500mg	1 dose pre op		
Vaginectomy (Total/ partial)	IV Co-AmoxiClav1.2 g	IV Cefuroxime 1.5g + IV Metronidazole 500mg	1 dose pre op		
Inguinal lymphadenectomy	IV Co-AmoxiClav1.2 g	IV Cefuroxime 1.5g + IV Metronidazole 500mg	1 dose pre op		

13. ORTHOPEDIC PROCEDURES

ORTHOPEDIC PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Diagnostic Arthroscopy & Meniscus repair	IV Cefazolin 2G	IV Clindamycin 900mg	1 dose	PPUKM guideline National guideline 2014	
Arthrsocopic ligamentous reconstruction	IV Cefazolin 2G	IV Clindamycin 900mg	1 dose , then 3 doses post op	PPUKM guideline National guideline 2014	
Joint replacements (shoulder, hip, knee, ankle)	IV Cefazolin 2g	IV Clindamycin 900mg	1 dose , then 3 doses post op	**Southwell-Keely et al. 2004.** *Clin Orthop Relat Res* (419):179–184. www.aaos.org/about/papers/advistmt/1027.asp (date last accessed 18 July 2017).: Berríos-Torres et al 2017. *JAMA Surg*. Published online May 3, 2017 : JA. Bosco, MD, et a 2015. J Am Acad Orthop Surg. Aug;23(8):e27-35. PPUKM guideline 2012 Yeap et al 2006. Med J Malaysia. 61(2) : 181-8	Cefazolin (< 120kg 2g, >120kg 3g; redose q 4 hrs) [1,2]
Open reduction and internal fixation of long bones fractures (closed)	IV Cefuroxime 1.5G	IV Clindamycin 900mg	1 dose, then 750MG TDS for 3 doses	Southwell-Keely et al. 2004.: a metaanalysis. *Clin Orthop Relat Res* (419):179–184 Bratzler et al. Am J Health Syst Pharm. 2013 Feb 1;70(3):195-283. National guideline 2014 2nd Ed Yeap et al 2006. Med J Malaysia. 61(2) : 181-8	

ORTHOPEDIC PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Open fracture	IV Co-AmoxiClav 1.2G tds	IV Cefuroxime 1.5G tds	Continue until 1st debridement	British Association of Plastic, Royal Society of Medicine Press.	
Open fracture (1st debridement)	IV Co-AmoxiClav 1.2G & Gentamicin 1.5mg/kg	IV Cefuroxime 1.5G & IV Gentamicin 1.5mg/kg	Given as stat dose and Co-AmoxiClav/cefuroxime continued until soft tissue closure or maximum of 72 hours		
Non instrumented spinal surgery/Disc	IV Cefazolin 2g (< 120kg :2g, >120kg :3g; redose every 4 hrs) **or** IV Cefuroxime 1.5G	IV Clindamycin 900mg	1 dose	Shaffer WO et al. 2013. An Evidence based clinical guidelines for multidisciplinary spine care. The Spine Jn (13) 1387-1392. Bratzler et al. 2013. Clinical practice guidelines for antimicrobial prophylaxis in surgery. Am J Health-Syst Pharm.2013;70:195-283. UMMC 2014 National Antibiotic Guideline 2014	

ORTHOPEDIC PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Instrumented Spinal Surgery	IV Cefazolin 2g (< 120kg: 2g, >120kg: 3g; redose every 4 hrs) **or** IV Cefuroxime 1.5G	IV Clindamycin 900mg	Follow by 2 doses post operatively: for 2 days in high risk patients (for pts with dura leak, to consult specialist)	Berríos-Torres et al. 2017 *JAMA Surg*.: In prosthetic joint arthroplasty Takemoto et al. 2015. ***J Bone Joint*** Surg Am **97 (12) p 979-986**	
All Spinal Surgeries	Vancomycin powder 1 ampoule	-	Subcutaneous application prior to skin closure	Bakhsheshian J. 2015 World Neurosurgery. 83(5)2015, 816-823. Kanayama et al. 2007 J Neurosurg Spine 2007;6:327–9.	

14. PAEDIATRIC SURGERY (The list is not exhaustive)

PAEDIATRIC SURGERY	PREFERRED FIRST LINE	IF MAJOR REACTION TO BETA- LACTAMS++	DURATION	REFERENCES	REMARKS
HEAD AND NECK (Clean procedure e.g. excision biopsy/ benign lesion including thyroid surgery)	Antibiotic not recommended	Antibiotic not recommended	NA	National Antibiotic Guideline. 2014. 2nd Ed. Avenia N, Sanguinetti A, Cirocchi R, et al. Antibiotic prophylaxis in thyroid surgery: a preliminary multi-centric Italian experience. *Ann Surg Innov Res.* 2009; 3:10. Scottish Intercollegiate Guidelines Network. Antibiotic prophylaxis in surgery. www.sign.ac.uk/pdf/sign104.pdf CHOC Children's Antibiotic Prophylaxis for Surgery Guideline 2017.	Antibiotic is not recommended unless implant is used. Consider antibiotic in benign neck mass with risk of wound contamination
GASTROINTESTINAL **Esophageal, gastroduodenal** gastrostomy placement/revision/ conversion to other feeding tubes OR high-risk conditions	**Cefazolin*** 30 mg/kg (2 gm, 3 g for pts ≥ 120 kg.) Intraoperative redosing for normal renal function every 4 hrs +++High risk gastroduodenal: morbid obesity, oesophageal obstruction, decreased gastric acidity or decreased gastrointestinal motility	***Clindamycin plus gentamicin*** **Clindamycin** 10 mg/kg (900 mg) Intra-operative redosing for normal renal function every 6 hrs **Gentamicin** 2.5 mg/kg [based on dosing weight] (5 mg/kg [based on dosing weight] as a single dose) Intraoperative redosing for normal renal function every 8 hrs			Note that current protocol is only applicable to patient> 1 year old

PAEDIATRIC SURGERY	PREFERRED FIRST LINE	IF MAJOR REACTION TO BETA- LACTAMS++	DURATION	REFERENCES	REMARKS
GASTROINTESTINAL Biliary, including **lap cholecystectomy**	For high risk+++: **Cefazolin** 30 mg/kg (2 gm, 3 g for pts ≥ 120 kg.) Intraoperative redosing for normal renal function every 4 hrs *High risk biliary: acute cholecystitis, non-functioning gall bladder, obstructive jaundice or common duct stones	***Clindamycin plus gentamicin*** **Clindamycin** 10 mg/kg (900 mg) Intraoperative redosing for normal renal function every 6 hrs **Gentamicin** 2.5 mg/kg [based on dosing weight] (5 mg/kg [based on dosing weight] as a single dose) Intraoperative redosing for normal renal function every 8 hrs		Bratzler et al. 2013. Clinical practice guidelines for antimicrobial prophylaxis in surgery. Am J Health-Syst Pharm.2013;70:195-283. Berrios-Torres SI, Umscheid CA, Bratzler DW, et al. Centers for Disease Control and Prevention Guideline for the Prevention of Surgical Site Infection, 2017. JAMA Surg. Published online May 03, 2017. doi:10.1001/jamasurg.2017.090 CHOC Children's Antibiotic Prophylaxis for Surgery Guideline 2017.	Note that current protocol is only applicable to patient> 1 year old
GASTROINTESTINAL Colorectal** Appendectomy or ruptured viscus	***Cefazolin plus Metronidazole*** **Cefazolin** 30 mg/kg (2 gm, 3 g for pts ≥ 120 kg.) Intra-operative redosing for normal renal function every 4 hrs **Metronidazole** 15 mg/kg (500 mg) Intra-operative redosing for normal renal function every 6 hrs	***Clindamycin plus gentamicin*** **Clindamycin** 10 mg/kg (900 mg) Intraoperative redosing for normal renal function every 6 hrs **Gentamicin** 2.5 mg/kg [based on dosing weight] (5 mg/kg [based on dosing weight] as a single dose) Intraoperative redosing for normal renal function every 8 hrs			Note that current protocol is only applicable to patient> 1 year old

PAEDIATRIC SURGERY	PREFERRED FIRST LINE			IF MAJOR REACTION TO BETA- LACTAMS			DURATION	REFERENCES	REMARKS
THORACIC Lung resection, VATS	**Cefazolin**	30 mg/kg (2 gm, 3 g for pts ≥ 120kg .)	Intra-operative redosing for normal renal function every 4 hrs	***Vancomycin or Clindamycin***				CHOC Children's Antibiotic Prophylaxis for Surgery Guideline 2017.	Note that current protocol is only applicable to patient> 1 year old
				Vancomycin	15 mg/kg (15 mg/kg)	Intra-operative redosing for normal renal function every 6 hrs			
				Clindamycin	10 mg/kg (900 mg)	Intra-operative redosing for normal renal function every 6 hrs			

PAEDIATRIC SURGERY	PREFERRED FIRST LINE	IF MAJOR REACTION TO BETA- LACTAMS	DURATION	REFERENCES	REMARKS
GYNECOLOGIC	**Cefazolin OR Ampicillin *plus* Metronidazole *plus* Gentamicin** **Cefazolin** 30 mg/kg (2 gm, 3 g for pts ≥ 120 kg.) Intra-operative redosing for normal renal function every 4 hrs **Ampicillin/ Sulbactam** 50 mg/kg (2 gm) of ampicillin component **Metronidazole** 15 mg/kg (500 mg) Intra-operative redosing for normal renal function every 6 hrs **Gentamicin** 2.5 mg/kg [based on dosing weight] (5 mg/kg [based on dosing weight] as a single dose) Intra-operative redosing for normal renal function every 8 hrs	***Clindamycin plus Gentamicin*** **Clindamycin** 10 mg/kg (900 mg) Intra-operative redosing for normal renal function every 6 hrs **Gentamicin** 2.5 mg/kg [based on dosing weight] (5 mg/kg [based on dosing weight] as a single dose) Intra-operative redosing for normal renal function every 8 hrs	No additional antibiotic doses are needed for clean, clean-contaminated procedures, even in presence of a drain	CHOC Children's Antibiotic Prophylaxis for Surgery Guideline 2017.	Note that current protocol is only applicable to patient> 1 year old

PAEDIATRIC SURGERY	PREFERRED FIRST LINE	IF MAJOR REACTION TO BETA- LACTAMS	DURATION	REFERENCES	REMARKS
GENITOURINARY Bladder augmentation, pyeloplasty	For high risk only***: ***High risk genitourinary: urine culture positive or unavailable, preoperative catheter, transrectal prosthetic biopsy, placement of prosthetic material **Cefazolin OR Ampicillin *plus* Metronidazole *plus* Gentamicin** **Cefazolin** 30 mg/kg (2 gm, 3 g for pts ≥ 120 kg. Intra-operative redosing for normal renal function every 4 hrs **Ampicillin/ Sulbactam** 50 mg/kg (2 gm) of ampicillin component **Metronidazole** 15 mg/kg (500 mg) Intra-operative redosing for normal renal function every 6 hrs **Gentamicin** 2.5 mg/kg [based on dosing weight] (5 mg/kg [based on dosing weight] as a single dose) Intra-operative redosing for normal renal function every 8 hrs	**Clindamycin *plus* Gentamicin** **Clindamycin** 10 mg/kg (900 mg) Intra-operative redosing for normal renal function every 6 hrs **Gentamicin** 2.5 mg/kg [based on dosing weight] (5 mg/kg [based on dosing weight] as a single dose) Intra-operative redosing for normal renal function every 8 hrs	For other procedures, discontinue within **24** hrs of surgical end time	CHOC Children's Antibiotic Prophylaxis for Surgery Guideline 2017.	Note that current protocol is only applicable to patient> 1 year old

15. INTERVENTIONAL RADIOLOGY

INTERVENTIONAL RADIOLOGY PROCEDURES	PREFERRED FIRST LINE	ALTERNATIVE IF ALLERGY	DURATION	REFERENCES	REMARKS
Central Venous Access 1. Chemoport	IV Cefuroxime 1.5gm		1 dose	Venkatesan AM, Kundu S, Sacks D, et al. Practice Guideline For Adult Antibiotic Prophylaxis During Vascular And Interventional Radiology Procedures. J Vasc Interv Radiol. 2010; 21:1611–30.	
2. Perm Catheter	IV Cefuroxime 1.5gm		1 dose		
Percutaneous Drainage 1. PTBD	IV Cefuroxime 1.5gm & IV Metronidazole 500mg		1 dose		
2. Ureteric stenting and Nephrostomy	IV Co-AmoxiClav 1.2g		1 dose		
3. Abscess drainage	IV Co-AmoxiClav 1.2g		1 dose		
Embolization 1. Post TACE	Tab Metronidazole 400mg & Tab Co-AmoxiClav625mg		1 dose		Review duration in diabetics and history of ERCP
2. Uterine Artery Embolization	Co-AmoxiClav		1 dose		
3. Prostate Artery Embolization (Kidney + Bladder)	Co-AmoxiClav		1 dose		
<u>Stent Replacement</u> 1. EVAR/TEVAR/Iliac or Large Vessel Stenting	IV Co-AmoxiClav 1.2g		1 dose		
<u>Tumour Ablation</u> 1. Microwave Ablation or RFA Ablation > 3cm	Co-AmoxiClav& Metronidazole		1 dose		

Others:

INTERVENTIONAL RADIOLOGY PROCEDURES		Antibiotic Prophylaxis
Neuro		
Cerebral	• Diagnostic	Not indicated
	• Stenting	Indicated
	• Embolisation	Indicated
	• Stenting assisted coiling	Indicated
Head & Neck	• Diagnostic	Not indicated
	• Embolisation	Indicated
Spine	• Diagnostic	Not indicated
	• Embolisation	Indicated
Oncology	PTBD Diagnostic	Indicated
	PTBD stent	Indicated
	TACE	Indicated
	TACE DC Beads	Indicated
	Hepatic diagnostic	Not indicated
	Hepatic embolisation	Indicated
	Mesentric diagnostic	Not Indicated
	Mesenteric embolisation	Indicated
	RFA(Needle)	indicated
	SIRT Y90	Indicated
	RFA (CRYO)	-

INTERVENTIONAL RADIOLOGY PROCEDURES		Antibiotic Prophylaxis
Peripheral Vascular	TEVAR	-
	EVAR	-
	C. Venogram Diagnostic / Plasty	Not indicated
	Venogram Diagnostic /Plasty	Not indicated
	Upper Limb Sclerotherapy/EMBO	-
	Lower Limb Diagnostic/Plasty	Not indicated
	Lower Limb Sclerotherapy/EMBO	Indicated
	Uterine Artery Diagnostic	Not indicated
	Uterine Artery Embolisation	Indicated
	Thoracic Diagnostic	Not indicated
	Thoracic Embolisation	Indicated
	Aortogram	Not indicated
Venous Access	CVL insertion	Indicated
	Permanent Catheter/ Readjustment	Indicated
	Chemoport insertion/ removal	Indicated
	Cathetogram	-
	PICC	Indicated
	IPSS/IPVS	Not indicated
	AVS	Not indicated
	IVC Filter / Removal	Not indicated
	IJC Insertion	Indicated
Urology/Nephrology	Renal Angio	Not indicated
	Renal or Prostate Embolisation	Indicated
	Nephrostomy	Indicated
	Antegrade Stenting	Indicated
	Fistulogram Diagnostic/Plasty	Not indicated
	Mechanical Thrombectomy	Not indicated

Timing of administration preoperative and intraoperative Surgical Antibiotic Prophylaxis (SAP)

Wan Rahiza Wan Mat

SAP refers to the prevention of infectious complications by administering an antimicrobial agent before exposure to contamination during surgery. Successful SAP requires delivery of the antimicrobial agent in effective concentrations to the operative site through intravenous administration at the appropriate time.

- Factors influencing the effectiveness of the SAP:
  - The underlying condition(s) of the individual patient (e.g., body mass index, or renal or liver function)
  - The time needed to complete the procedure
    - In additional to the classification of operation, the duration of surgery is positively associated with risk of wound infection.
    - Redosing may be considered when the procedure exceeds the half-life of the prophylactic antimicrobial agent or is longer than 3-4 hours
  - The half-life of the agent used
    - Antibiotic prophylaxis administered too late or too early reduces the efficacy of the antibiotic and may increase the risk of SSI.
    - Antibiotics with shorter half-life should be administered closer to incision time. (See PPUKM Surgical prophylaxis: Half-life of and proposed redosing interval of antibiotic).
  - The protein binding of the antibiotic should be taken into account to achieve adequate serum and tissue concentrations at the surgical site at the time of incision and up to wound closure—in particular to prevent incisional SSI.
- Optimum time to administer SAP
  - SAPs should be given prior to and as closest to time of incision as practically possible.
  - WHO recommends administration of SAP not more than 120 minutes prior to skin incision and CDC recommends the exact time for SAP administration prior to incision is determined by the half-life of the antimicrobial. (See PPUKM Surgical prophylaxis: Half-life of and proposed redosing interval of antibiotic).
- Intraoperative redosing of SAP
  - The precise effects of blood loss and fluid replacement are difficult to predict.
    - It will depend upon the particular antibiotic used, the time and rate of blood loss and fluid replacement.
    - Serum antibiotic concentrations are reduced by blood loss and fluid replacement, especially in the first hour of surgery when drug levels are high.
  - WHO recommends redosing if the duration of the procedure exceeds two half-lives of the drug, or if there is excessive blood loss during the procedure.
    - Redosing may be indicated for longer surgery or shorter-acting agents to maintain activity for the duration of the operation.
  - Redosing should be done after fluid replacement:
    1. Adult: Intraoperative Blood loss > 1.5L
    2. Children: Intraoperative Blood loss 25mL/kg

- Highlight for certain surgical procedures
    - Caesarean section:
        - In elective surgeries, CDC strongly recommends to administer SAP prior to skin incision.
        - In emergency surgeries, if time permits, to still administer SAP prior to skin incision. In instances when tine is limited, SAP is still effective given after cord clamping.
    - There was evidence of a significant reduction in maternal hospital stay among women receiving antibiotics preoperatively compared with women receiving it during caesarean section (MD -0.17, 95% CI -0.30 to -0.04; 2 trials, 1342 women).

Half-life of and proposed redosing interval of antibiotic

Chee Lan Lau

Antimicrobial	Half-life in Adults (hours) Normal Renal Function	Recommended Redosing Interval (**hours**) From Initiation of Preoperative Dose [In normal renal function]
Co-AmoxiClav [Amoxicillin/ Clavulanic acid)	1-1.3	4*
Ampicillin/ Sulbactam	0.8 - 1.3	4*
Cefazolin	1.2 - 2.2	4
Cefuroxime	1 - 2	4
Ceftriaxone	5.4–10.9	NA
Clindamycin	2 - 4	6
Gentamicin	2 - 3	N/A
Vancomycin	5 - 11	N/A
Fluconazole	30	N/A
Metronidazole	6 - 8	N/A

*Redosing according to prolonged procedures.

References:

1. Bratzler et al. 2013. Clinical practice guidelines for antimicrobial prophylaxis in surgery. American journal of health-system pharmacy. 2013;70:195-283.
2. WHO Guidelines for the Prevention of Surgical Site Infection see http://www.who.int/gpsc/ssi-guidelines/en/index.html www.thelancet.com/infection Vol 16 December 2016
3. Scottish Intercollegiate Guidelines Network (SIGN). Antibiotic prophylaxis in surgery. Edinburgh: SIGN; 2008. (SIGN publication no.104). [July 2008, Updated April 2014]. Available from URL: http://www.sign.ac.uk
4. WHO recommendations for the prevention and treatment of maternal peripartum infections. World Health Organization, Geneva; 2015 http://www.who.int/reproductivehealth/publications/maternal_perinatal_health/peripartum-infections-guidelines]
5. Kasatpibal Nongyao, Whitney Joanne D., Dellinger E. Patchen, Nair Bala G., and Pike Kenneth C.. Failure to Redose Antibiotic Prophylaxis in Long Surgery Increases Risk of Surgical Site Infection. Surgical Infections. May 2017, 18(4): 474-484. https://doi.org/10.1089/sur.2016.164
6. Berríos-Torres SI[1] et al. Centers for Disease Control and Prevention Guideline for the Prevention of Surgical Site Infection, 2017. JAMA Surg. 2017 May 3.

Duration of Surgical Antibiotic Prophylaxis

Isa Naina Mohamed & Chee Lan Lau

A systematic review of 69 randomized control trials was conducted by Allegranzi et al(2016) and concluded that there was no additional benefit in prolonging antibiotic prophylaxis compared to single dose (OR 0.89; 95% CI: 0.77 to 1.03), except in cardiac and orthognathic surgeries. Berríos-Torres et al (2017) also evaluated 45 randomized control trials in cardiac; thoracic; vascular; ear, nose and throat, gynecologic, orthopedic, and general surgical procedures, and concluded that continuing antibiotic prophylaxis after surgical incision closure was not beneficial.

Furthermore, Allegranzi et al performed a meta-analysis of 7 randomized control trials which showed that prolonged antibiotic prophylaxis in the presence of a wound drain has no benefit in reducing SSI compared with perioperative prophylaxis alone (OR 0.79; 95% CI: 0.53 to 1.20). Therefore antibiotic should not be continued in the presence of wound drain. Berríos-Torres et al (2017) also strongly recommended the same for clean and clean-contaminated procedures with drain as well as prosthetic joint arthroplasty patients who are on systemic corticosteroids or immunosuppressive therapy.

Reference:

1. Allegranzi et al 2016 WHO Guidelines for the Prevention of Surgical Site Infection see http://www.who.int/gpsc/ssi-guidelines/en/index.html www.thelancet.com/infection Vol 16 December 2016

2. Berríos-Torres SI et al. Centers for Disease Control and Prevention Guideline for the Prevention of Surgical Site Infection, 2017. JAMA Surg. 2017 May 3. doi: 10.1001/jamasurg.2017.0904.

Implementing the guideline

Isa Naina Mohamed, Chee Lan Lau, Nordiah Hj Awang Jalil

Key Indicators

- *Data Source :*
  - *HCTM PPUKM OT Schedule database, OT forms , Bed Head Tickets, Post op notes*

Process measure

1. Was prophylaxis given for an operation included in local guidelines?
2. If prophylaxis was given for an operation not included in local guidelines, was a clinical justification for?
3. Prophylaxis recorded in the OT schedule notes?
4. Was the first dosage of prophylaxis given **within 120 minutes** of the start of surgery?
5. Were the **choice, dosage and route of administration** consistent with local guidelines for that procedure?
6. Was intraoperative antibiotic repeated in operation longer than 4 hours or when there is blood loss> 1.5L?
7. Was the post-operative antibiotic order and duration stated in the Post-Op notes?
8. Was the duration of prophylaxis **greater than 24 hours [48 hours for Cardiothoracic surgery]**?

Measurement for process 4 to 8:
Starting point : Surgical Incision; End point: last administration of antibiotic

2. Outcome measure [surveillance data from Infection control]

Surgical site infection rate

Surgical infection identified through post discharge surveillance at <= 30 days or 31 -90 days post operatively

1. **Surgical site infection rate**=number of SSIs occurring postoperatively vs total number of operative procedures.
2. **Rate of SSIs** occurring postoperatively in patients who receive **prophylaxis** compliant with guideline (as defined in the guideline) compared with rate of this infection in patients who receive prophylaxis noncompliant with guideline, expressed as a ratio.

Limitation:

a. Patient usually come back as outpatient
b. no cultures (only those with wound breakdown and admitted to hospital are taken cultures)

Reference:

1. Barnaby et al. 2011, Nonconcordance With Surgical Site Infection Prevention Guidelines And Rates Of Surgical Site Infections For General Surgical Neurological, And Orthopedic Procedures , Antimicrobial Agents And Chemotherapy P. 4659–4663 Vol. 55, No. 10.
2. Janine Zweigner, Anna-Pelagia Magiorakos, Lea-Maxie Haag, Sabine Gebhardt, Elisabeth Meyer, Petra Gastmeier.2013, European Centre for Disease Prevention and Control. Systematic review and evidence-based guidance on perioperative antibiotic prophylaxis. Stockholm: ECDC
3. PREVENT SURGICAL SITE INFECTIONS Getting Started Kit. Available at http://www.patientsafetyinstitute.ca/en/toolsResources/Pages/SSI-resources-Getting-Started-Kit.aspx

Surgical Procedures and Common Organisms

Mei Kuen Yin

Surgical Site	Common pathogen
Cardiac procedures: coronary artery bypass, cardiac device insertion procedures (e.g., pacemaker implantation), placement of ventricular assist devices	Staphylococcus aureus, S. epidermidis
Gastroduodenal Biliary tract surgery (including pancreatic procedures) • Appendectomy • Small intestine surgery -Nonobstructed -Obstructed • Hernia repair • Colorectal	Enteric gram-negative bacilli, gram-positive cocci Enteric gram-negative bacilli, enterococci, clostridia Enteric gram-negative bacilli, anaerobes, enterococci Enteric gram-negative bacilli, gram-positive cocci Enteric gram-negative bacilli, anaerobes, enterococci Aerobic gram-positive organisms Enteric gram-negative bacilli, anaerobes, enterococci
Genitourinary	Enteric gram-negative bacilli, enterococci
Gynaecologic and obstetric	Enteric gram-negative bacilli, anaerobes, group B Streptococcus, enterococci.
head and neck • Clean with placement of prosthesis (excludes tympanostomy tube placement) • Clean-contaminated	*Staphylococcus aureus*, *S. epidermidis*, streptococci Anaerobes, enteric gram-negative bacilli, *S. aureus*
Neurosurgery • Elective craniotomy • Cerebrospinal fluid shunting procedures • Implantation of intrathecal pumps	Staphylococcus aureus, S. epidermidis
Orthopaedic • Clean operation involving hand, knee, or foot with no implantation of foreign material • Spinal procedures • Hip fracture	N/A *Staphylococcus aureus*, *Staphylococcus epidermidis*

• Internal fixation • Total joint replacement	
Surgical Site	**Common pathogen**
thoracic (noncardiac) • lobecotomy, pneumonectomy, lung resection, thoracotomy	*Staphylococcus aureus*, *S. epidermidis*, streptococci, enteric gram-negative bacilli
vascular • Arterial surgery involving a prosthesis, the abdominal aorta, or a groin incision • Lower extremity amputation for ischemia	*Staphylococcus aureus*, *S. epidermidis*, enteric gram-negative bacilli S. aureus, S. epidermidis, enteric gram-negative bacilli, clostridia
percutaneous procedures • Angiography, angioplasty, thrombolysis, arterial closure device placement, stent placement • Endograft placement • Superficial venous insufficiency treatment • IVC filter placement • Tunnelled central venous access	S. aureus, S. epidermidis
Breast • Reduction mammoplasty • Mammoplasty • Lumpectomy • Mastectomy • Axillary node dissection • Breast cancer procedures	N/A *Staphylococcus aureus*, *S. epidermidis*, streptococci*

Reference:

1. Antimicrobial prophylaxis for surgery. Med Lett Drugs Ther 2016; 58:63.
2. Bratzler DW, Dellinger EP, Olsen KM, et al. Clinical practice guidelines for antimicrobial prophylaxis in surgery. Surg Infect (Larchmt) 2013; 14:73.
3. Clinical practice guidelines for antimicrobial prophylaxis in surgery. Am J Health Syst Pharm 2013; 70:195.
4. ACOG practice bulletin No. 195: Prevention of infection after gynecologic procedures. Obstet Gynecol 2018; 131:e172.
5. ACOG practice bulletin No. 120: Use of prophylactic antibiotics in labor and delivery. Obstet Gynecol 2011;117:1472.
6. Venkatesan AM, Kundu S, Sacks D, et al. Practice guideline for adult antibiotic prophylaxis during vascular and interventional radiology procedures. J Vasc Interv Radiol 2010; 21:1611.

Antibiotic Spectra among common clinical isolates

Ramliza Ramli & Mei Kuen Yin

Microorganism	Ampicillin/sulbactam	Co Amoxi Clav	Cefazolin	Cefuroxime	Ceftriaxone	Clindamycin	Erythromycin
MSSA	+	+	+	+	+		+
MRSA							
CONS			v				
Streptococcus sp				NT			+
Streptococcus pneumoniae				NT			+
Enterococcus faecalis				0			NT
Enterococcus faecium							
Enterococcus sp							
Acinetobacter	v	NT		NT			
Enterobacter		+		+			
Escherichia coli		+		+			
Klebsiella		+		+			
Proteus mirabilis sp		+		+			
ESBL		0		0			
Amp-C producer							

Abbreviations:	
+	> 60%
v	30-60%
o	<30%
S	synergistic when used with a beta lactam