Guideline

Surgical Antibiotic Prophylaxis Guideline

1. Purpose

The purpose of this guideline is to optimise the use of antibiotic prophylaxis for surgical procedures at the Women's.

Surgical site infections (SSIs) are a common adverse event in hospitalised patients[1]; 8-10% of gynaecological surgery patients undergoing an operative procedure will develop an SSI [2]. SSIs have been shown to increase mortality, readmission rate and length of hospital stay[3,4]. Appropriate and timely antibiotic prophylaxis has been shown to be highly effective in reducing the incidence of SSI[5]. The need for surgical antibiotic prophylaxis varies according to the type of procedure and its associated risk of SSI.

A number of studies across a range of surgical procedures have shown that there is a narrow window of opportunity for the administration of effective antimicrobial prophylaxis[6]. Antibiotics need to be present in the tissue at the time of incision in order to be effective[7].

Ideally prophylactic antibiotics should cover the narrowest spectrum of organisms possible in order to minimise the development of bacterial resistance[8]. For this reason it is important to consider the likely source of pathogens in each type of surgery. For most infections that occur after obstetric or gynaecological surgery, the source of pathogens is the endogenous flora of the patient's vagina or skin. The endogenous flora of the genital tract is polymicrobial, consisting of anaerobes, Gram negative aerobes and Gram positive cocci. In contrast, laparoscopic procedures that do not breach any mucosal surfaces are more commonly contaminated with skin organisms only (usually Gram positive organisms such as Staphylococci).

This guideline or procedure outlines the requirement for surgical antibiotic prophylaxis at the Women's.

2. Definitions

Surgical site infection is an infection that occurs after surgery in the part of the body where the surgery took place.

Antibiotic prophylaxis is the use of antibiotics before, during, or after a diagnostic, therapeutic, or surgical procedure to prevent infectious complications. For surgical prophylaxis, these can generally be given prior to surgical incision.

3. Responsibilities

Surgeons are responsible for requesting the timely administration of appropriate antibiotic prophylaxis for their surgical patients.

Anaesthetists are responsible for liaison with surgeons and the provision of appropriate and timely antibiotic prophylaxis.

Pharmacists are responsible for ensuring prompt availability of required antibiotics. They are also responsible for provision of information to medical and nursing staff regarding doses of antibiotics and administration.

4. Guideline

Table 1 outlines recommended timing and choice of prophylactic antibiotics for surgical procedures at the Women's.

An alternative choice of antibiotic is provided where appropriate (e.g. for a patient with penicillin allergy).

The National Health and Medical Research Council (NHMRC) level of evidence for each recommendation is included in the Table. For some procedures, such as Caesarean section and hysterectomy, antibiotic prophylaxis is clearly indicated. For other procedures, such as insertion of an intra-uterine device, medical termination of pregnancy and diagnostic laparoscopy, antibiotic prophylaxis is usually not required. For other procedures, the evidence is less clear and recommendations are based upon expert agreement until further research evidence becomes available.

Table 1: Antibiotics for surgical prophylaxis

Patients with immediate hypersensitivity reactions (eg. urticaria, angio-oedema, bronchospasm, anaphylaxis) to penicillins, avoid use of penicillins and cephalosporins.

Patients allergic to penicillins (excluding immediate hypersensitivity reactions eg. urticaria, angio-oedema, bronchospasm and anaphylaxis), use of cephalosporins can be considered.

Surgery	1st line	Level of evidence[9]	Alternative	Comments
Obstetric				
Caesarean section[10-13] **Note:** Antibiotics prior to skin incision reduce maternal infection rate in emergency caesarean section.	Cefazolin (cephazolin) 2 g IV, within 60 minutes (ideally 15-30 minutes) before skin incision.	I	Clindamycin 600 mg IV over at least 20 minutes, within 60 minutes (ideally 15-30 minutes) before surgical incision **or** Vancomycin 25 mg/kg IV (maximum 2g)	
Termination of pregnancy **(surgical)**[13-16]	Screen patient for STIs: *C. trachomatis, N. gonorrhoeae, M. genitalium and* bacterial vaginosis. Treat the woman and her partner(s) prior to ToP[17].	Consensus	If STI screening **not** performed or results unavailable: Azithromycin 1 g oral stat	
Termination of pregnancy **(medical)**[13]	Not indicated	I		
Manual removal of placenta[18-19]	Cefazolin (cephazolin) 2 g IV, at the time *of induction* + Metronidazole 500 mg IV, ending the infusion at the time of induction	III-3	Clindamycin 600 mg IV + Gentamicin 2 mg/kg IV (maximum 560 mg)	
3rd and 4th degree vaginal tears[13,20-24]	Cefazolin (cephazolin) 2 g IV within 60 minutes (ideally 15-30 15-30 minutes) before the repair + Metronidazole 500 mg IV within 60 minutes (ideally 15-30 minutes) before the repair Followed by amoxicillin/clavulanic	Consensus	Clindamycin 600 mg IV + Gentamicin 2 mg/kg IV (maximum 560 mg) within 60 minutes (ideally 15-30 minutes) before the repair Followed by trimethoprim/sulfamethoxazole 160/800 orally BD + metronidazole 400mg orally BD for 7 days	

	acid 875/125 orally BD for 7 days (Cefalexin [cephalexin] 500mg orally QID + metronidazole 400mg orally BD can be used as an alternative regimen)			
Gynaecological Note: Prophylactic antibiotics for vaginal packs can be administered for the duration of vaginal pack use which is usually 24-48 hours.[33]				
Hysterectomy **(vaginal)**[13,25]	Cefazolin (cephazolin) 2 g IV, within 60 minutes (ideally 15-30 minutes) before surgical incision (repeat dose if procedure > 3 hours) + Metronidazole 500 mg IV, within 60 minutes (ideally 15-30 minutes) before surgical incision	I	Clindamycin 600mg IV + Gentamicin 2mg/kg IV (maximum 560 mg)	Patients should be screened and treated for bacterial vaginosis before hysterectomy[27]
Hysterectomy **(abdominal)** [13,26]	Cefazolin (cephazolin) 2 g IV, within 60 minutes (ideally 15-30 minutes) before surgical incision (repeat dose if procedure > 3 hours)	I	Clindamycin 600mg IV over at least 20 minutes, within 60 minutes (ideally 15-30 minutes) before surgical incision **or** Vancomycin 25 mg/kg IV (maximum 2g)	
Hysterosalpingography or Hysterosocopy or Chromotubation for patients with dilated tubes or a history of PID or tubal damage[28]	Azithromycin 1 g oral stat	Consensus		
Hysterosalpingography or Hysterosocopy or Chromotubation with NO history of PID and normal tubes on visualisation[29]	Not indicated	IV		
IUD insertion[30]	Not indicated	I		Patients should be screened and

				treated for STIs prior to insertion: *C. trachomatis, N. gonorrhoeae, M. genitalium and* bacterial vaginosis.
Endometrial biopsy[31]	Not indicated	IV		
Laparoscopy[32] (diagnostic or laparoscopy without breaching bowel/uterine/vaginal cavity)	Not indicated	II		
Laparoscopy (breach of bowel/uterine/vaginal cavity or conversion to operative laparotomy)	Cefazolin (cephazolin) 2 g IV, within 60 minutes (ideally 15-30 minutes) before surgical incision (repeat dose if procedure > 3 hours) + Metronidazole 500 mg IV, within 60 minutes (ideally 15-30 minutes) before surgical incision	Consensus	Clindamycin 600 mg IV + Gentamicin 2 mg/kg IV (maximum 560mg)	

NHMRC Levels of Evidence[9]:

Level I: A systematic review of level II studies

Level II: A randomised controlled trial

Level III-1: A pseudo-randomised controlled trial

Level III-2: A comparative study with concurrent controls

Level III-3: A comparative study without concurrent controls

Level IV: A case series with either post-test outcomes or pre-test/ post-test outcomes

5. Evaluation, monitoring and reporting of compliance to this guideline

Compliance to this guideline or procedure will be monitored, evaluated and reported through:

1. Review of hysterectomy and caesarean surgical site infection rate
2. Spot audits of practice under the Quality Use of Medicines program
3. Laboratory review of infection clusters and antimicrobial resistance

6. References

1. ACOG practice bulletin No. 104: antibiotic prophylaxis for gynecologic procedures. Obstet Gynecol 2009;113:1180-9.
2. Kamat AA, Brancazio L, Gibson M. Wound infection in gynecologic surgery. Infect Dis Obstet Gynecol 2000;8:230-4.
3. Australian Council for Safety and Quality in Health Care. Preventing Surgical Site Infection: Toolkit. In; 2011.
4. Kirkland KB, Briggs JP, Trivette SL, Wilkinson WE, Sexton DJ. The impact of surgical-site infections in the 1990s: attributable mortality, excess length of hospitalization, and extra costs. Infect Control Hosp Epidemiol 1999;20:725-30.
5. Steinberg JP, Braun BI, Hellinger WC, et al. Timing of antimicrobial prophylaxis and the risk of surgical site infections: results from the Trial to Reduce Antimicrobial Prophylaxis Errors. Ann Surg 2009;250:10-6.
6. Classen DC, Evans RS, Pestotnik SL, Horn SD, Menlove RL, Burke JP. The timing of prophylactic administration of antibiotics and the risk of surgical-wound infection. N Engl J Med 1992;326:281-6.
7. Burke JF. The effective period of preventive antibiotic action in experimental incisions and dermal lesions. Surgery 1961;50:161-8.
8. Weinstein JW, Roe M, Towns M, et al. Resistant enterococci: a prospective study of prevalence, incidence, and factors associated with colonization in a university hospital. Infect Control Hosp Epidemiol 1996;17:36-41.
9. National Health and Medical Research Council. NHMRC levels of evidence and grades for recommendations for developers of guidelines: National Health and Medical Research Council; 2009.
10. Smaill FM, Gyte GM. Antibiotic prophylaxis versus no prophylaxis for preventing infection after cesarean section. Cochrane Database Syst Rev 2014:CD007482.
11. Costantine MM, Rahman M, Ghulmiyah L, et al. Timing of perioperative antibiotics for cesarean delivery: a metaanalysis. Am J Obstet Gynecol 2008;199:301 e1-6.
12. Gyte GM, Dou L, Vazquez JC. Different classes of antibiotics given to women routinely for preventing infection at caesarean section. Cochrane Database Syst Rev 2014:CD008726.
13. eTG July 2016 edition: Antibiotics. Accessed via https://tgldcdp.tg.org.au.acs.hcn.com.au/topicTeaser?guidelinePage=Antibiotic&etgAccess=true on 4th Oct 2016.
14. Low N, Mueller M, Van Vliet HAAM, Kapp N. Perioperative antibiotics to prevent infection after first-trimester abortion. Cochrane Database Syst Rev 2012:CD005217.
15. The care of women requesting induced abortion. RCOG Evidence-based Clinical Guideline, Number 7. November 2011. (Accessed at https://www.rcog.org.uk/globalassets/documents/guidelines/abortion-guideline_web_1.pdf)
16. Sawaya GF, Grady D, Kerlikowske K, Grimes DA. Antibiotics at the time of induced abortion: the case for universal prophylaxis based on a meta-analysis. Obstet Gynecol 1996;87:884-90.
17. Cameron ST, Sutherland S. Universal prophylaxis compared with screen-and-treat for Chlamydia trachomatis prior to termination of pregnancy. BJOG 2002;109:606-9.
18. Ely JW, Rijhsinghani A, Bowdler NC, Dawson JD. The association between manual removal of the placenta and postpartum endometritis following vaginal delivery. Obstet Gynecol 1995;86:1002-6.
19. WHO guidelines for the management of postpartum haemorrhage and retained placenta 2009.
20. Duggal N, Mercado C, Daniels K, Bujor A, Caughey AB, El-Sayed YY. Antibiotic prophylaxis for prevention of postpartum perineal wound complications: a randomized controlled trial. Obstet Gynecol 2008;111:1268-73.
21. Robson S, Higgs P. Third- and fourth-degree injuries. RANZCOG O&G Magazine 2011; 13(2): 20-22.

22. The management of third- and fourth-degree perineal tears. RCOG Green-top Guideline No.29. June 2015.
23. Monash Health Clinical Guideline: Perineal trauma management. 2015.
24. Women and Newborn Health Service, King Edward Memorial Hospital Clinical Guideline: Management of third & fourth degree perineal trauma. 2014.
25. Duff P, Park RC. Antibiotic prophylaxis in vaginal hysterectomy: a review. Obstet Gynecol 1980;55:193S-202S.
26. Tanos V, Rojansky N. Prophylactic antibiotics in abdominal hysterectomy. J Am Coll Surg 1994;179:593-600.
27. Larsson PG, Carlsson B. Does pre- and postoperative metronidazole treatment lower vaginal cuff infection rate after abdominal hysterectomy among women with bacterial vaginosis? Infect Dis Obstet Gynecol 2002;10:133-40.
28. Antibiotic prophylaxis in gynaecologic procedures. SOGC Clinical Practice Guideline No.275. April 2012
29. Kasius JC, Broekmans FJ, Fauser BC, Devroey P, Fatemi HM. Antibiotic prophylaxis for hysteroscopy evaluation of the uterine cavity. Fertil Steril 2011;95:792-4.
30. Grimes DA, Schulz KF. Prophylactic antibiotics for intrauterine device insertion: a metaanalysis of the randomized controlled trials. Contraception 1999;60:57-63.
31. Foden-Shroff J, Redman CW, Tucker H, et al. Do routine antibiotics after loop diathermy excision reduce morbidity? Br J Obstet Gynaecol 1998;105:1022-5.
32. Kocak I, Ustun C, Emre B, Uzel A. Antibiotics prophylaxis in laparoscopy. Ceska Gynekol 2005;70:269-72.
33. Georgiou C. Balloon tamponade in the management of postpartum haemorrhage: a review. BJOG 2009;116:748-757.

7. Legislation/Regulations related to this guideline

C. trachomatis and *N. gonorrhoeae* infection are Department of Health notifiable conditions. Forms for notification can be found at http://ideas.health.vic.gov.au/notifying/what-to-notify.asp.

8. Appendices

Not applicable.