



Published By : PERINASIA
The Indonesian Society of Perinatology

Use of Prophylactic Antibiotics in Third and Fourth Degree of Perineal Rupture



William Alexander Setiawan^{1*}

ABSTRACT

Numerous studies have demonstrated how routine episiotomies can cause additional problems like poor postpartum sexual function, ongoing perineal pain, and increased anal sphincter damage resulting in flatus or fecal incontinence. To combat the high frequency of maternal labor morbidity, antibiotic prophylaxis is recognized as a method of intervention that can be applied. . On the other hand, several studies seem to support the use of preventive antibiotics in situations of severe perineal rupture. It is not advised to use antibiotics excessively due to the rising prevalence of their use, which increases the danger of antibiotic resistance. As a result, following a serious perineal tear, the use of prophylactic antibiotics is crucial to preventing infection and determining whether a side effect is present in the mother or infant. Therefore it is necessary to assess the effectiveness of antibiotic prophylaxis to reduce maternal morbidity and side effects of third and fourth-degree perineal rupture during vaginal delivery.

Keywords: Antibiotic, prophylactic, third and fourth-degree perineal rupture.

Cite This Article: Setiawan, W.A. 2022. Use of Prophylactic Antibiotics in Third and Fourth Degree of Perineal Rupture. *Indonesian Society Of Perinatology* 3(2): 39-42. DOI: 10.51559/inajperinatol.v3i2.21

¹Obstetric & Gynecology Departement,
Universitas Udayana/Sanglah General
Hospital, Bali, Indonesia;

***Correspondence:**

William Alexander Setiawan;
Obstetric & Gynecology Departement,
Universitas Udayana /Sanglah General
Hospital, Bali, Indonesia;
william.alexanders11@gmail.com

Received: 2022-10-20

Accepted: 2022-11-13

Published: 2022-12-25

BACKGROUND

Episiotomy is defined as a procedure in which an incision is made in the perineal area to enlarge the vaginal opening and facilitate vaginal birth. Episiotomy acts come in two varieties: mediolateral and midline or median forms. Numerous studies have demonstrated how routine episiotomies can cause additional problems like poor postpartum sexual function, ongoing perineal pain, and increased anal sphincter damage resulting in flatus or fecal incontinence. This region of pain might interfere with a woman's daily activities and relationships with her partner and child. Prenatal perineal massage has also recently been offered in terms of perineal prevention.^{1,2} According to a prior study, digital prenatal perineal massage can help lower the risk of perineal injuries, particularly episiotomy.³

According to one study, the majority of women can give birth without causing any perineal harm, however, statistics suggest that serious perineal rupture during vaginal delivery occurs between 1% and 8% of the time. These tears are more frequent after surgical vaginal births, particularly when forceps are used. After the use of forceps, serious perineal lacerations were

documented in a total of 21% of third-degree tears and 7% of fourth-degree tears. Nulliparity, race, midline episiotomy, and high birth weight infants are other characteristics that are known to increase the likelihood of perineal tears.⁴

When a woman has a major perineal tear during vaginal delivery, there is a higher likelihood that she will get infected. First, second, third, and fourth-degree tears are the three classifications used to classify vaginal and perineal tears that happen after vaginal birth. Vaginal mucosa and connective tissue tears are referred to as first-degree tears. The vaginal mucosa, connective tissue, and underlying muscle are all affected by second-degree tears. Complete transection of the anal sphincter results in a third-degree tear. Rectal mucosa tears are tears of the fourth degree.⁵ When the rectal mucosa ruptures, wounds can be classified as dirty or clean dirty wounds. In most cases, an antibiotic prophylactic is given when the wound has been polluted.^{6,7} According to the literature, antibiotic prophylaxis has a significant impact on lowering puerperal morbidity.⁸ On the other hand, several studies seem to support the use of preventive antibiotics in situations of severe perineal rupture. It is not advised to

use antibiotics excessively due to the rising prevalence of their use, which increases the danger of antibiotic resistance.⁹

To combat the high frequency of maternal labor morbidity, antibiotic prophylaxis is recognized as a method of intervention that can be applied. As a result, following a serious perineal tear, the use of prophylactic antibiotics is crucial to preventing infection and determining whether a side effect is present in the mother or infant. This can be done by completing a thorough and methodical examination of the literature. This study was conducted to assess the effectiveness of antibiotic prophylaxis to reduce maternal morbidity and side effects of third and fourth-degree perineal rupture during vaginal delivery.

METHOD

This literature review was written using a method called a literature review, in which the information was gathered from numerous sources and pertinent literature, namely by using search engines like Pubmed, NCBI, and Google Scholar. The acquired literature is then filtered using the predetermined inclusion and exclusion criteria. Journals discussing topics related

to keywords (antibiotic, prophylactic, third and fourth-degree perineal rupture), both journal review articles and research, and having a maximum journal period of the last ten years are included in the inclusion criteria. Journals without keyword information, protocol-only journal articles, and journals with a period span of more than ten years are excluded criteria unless there is no recent research pertinent to the reference. The data collected are both qualitative and quantitative data that are organized methodically and in line with each discussion, and topic to produce findings that encompass the entirety of the literature review's contents.

DISCUSSION

Prophylactic Antibiotics

Prophylactic antibiotics are antibiotics that can be used for patients who have not been infected, but have a high chance of becoming infected due to the wounds they have or, if exposed to infection, it can have a bad impact on the patient.¹⁰ Prophylactic antibiotics should be directed against organisms that are most likely to cause infection, but do not necessarily kill or attenuate all pathogens.^{11,12} Its use is initiated before surgery to reduce the risk of postoperative wound infection.¹³ Prophylactic antibiotics cannot be used as a substitute for septic technique in surgical procedures, but can be used as an additional method used to prevent and reduce the risk of infection in surgical wounds.¹⁴ Optimally, prophylactic antibiotics for microorganisms are given one hour before surgery and maintained until the operation is complete, precisely before the inflation of the tourniquet.¹⁵

The use of prophylactic antibiotics indicates the presence of contamination as well as the risk of infection. In surgical wounds, it can be classified into four main criteria, namely class I clean, then class II clean contaminated, class III contaminated, and class IV dirty infection. The use of prophylactic antibiotics will be adjusted to these criteria, especially prophylactic antibiotics used in class I and II surgical wounds. Meanwhile, in class III and IV surgical wounds, patients are required to receive antibiotic therapy.^{15,16}

Prophylaxis refers to the prevention of infection and can be categorized

Table 1. Summary of Prophylactic Antibiotics Choice.^{18,20,21}

Type of Surgery	Pathogens	Antibiotics Choice
Colorectal surgery	Enteric gram-negative bacteria, enterococci anaerobes	Intravenous metronidazole plus either intravenous cephalosporin or intravenous gentamicin
Upper respiratory tract surgery	Aerobic and microaerophilic streptococci, anaerobes	Intravenous cephalosporin or Intravenous cephalothin
Insertion Prosthetic heart valves	Staphylococci	Intravenous cephalothin or intravenous cephalosporin
Obstetric and Gynecologic Surgery	Gram-negative and anaerobic	Intravenous cephalosporin or Intravenous cefoxitin

into primary, secondary, or eradication prophylaxis. Primary prophylaxis is the prevention of early infection. While secondary prophylaxis is the prevention of the reappearance or reactivation of an existing infection. Also, eradication is the elimination of colonizing organisms to prevent the development of infection. Although prophylactic antibiotics can reduce the patient's risk of infection after surgery, several risks can be experienced such as allergies to anaphylactic reactions and diarrhea due to excessive use of antibiotics. This risk can be minimized by giving prophylactic antibiotics not to exceed 24 hours perioperatively.^{14,17-19}

The choice of prophylactic antibiotics depends on the type of wound and the site of the wound. Not only that, prophylactic antibiotics have different mechanisms of action based on their class. A history of allergy in patients who will receive prophylactic antibiotics such as penicillin allergy, this indicates that the patient is also contraindicated in the cephalosporin group. The selection of prophylactic antibiotics must be adjusted to the possibility of bacteria that are most likely to cause infection, so that the selection of prophylactic antibiotics must be of a narrow spectrum antibiotic group so as to prevent the emergence of multi-resistant pathogens.^{18,20,21}

Perineal Rupture

Perineal rupture is the most common complication that occurs during prevaginal delivery.¹ This condition is also characterized by a tear in the structure of the perineum due to various things, but the most common occurrence is during labor.^{22,23} In the majority of cases, perineal rupture can heal without complications, but severe perineal rupture can cause

various complaints such as sexual dysfunction, prolonged pain, increased risk of infection, embarrassment, and also dyspareunia.²⁴ In prevalence, more than 53-89% of women experience perineal rupture during prevaginal delivery. Most of the ruptures that occur are classified as first and second degrees. Then OASIS occurs in 4-11% of women, especially in the United States. The frequency and severity of rupture will decrease after the next birth.²⁵

Anatomically, the perineal body is located between the vestibular fossa and the anus. This structure contains the superficial muscles as well as the inner muscles of the perineal membrane. It is at this location that perineal rupture is most common.²⁶ Perineal ruptures can be classified into four basic categories and are determined based on the involvement of the ruptured organ. The first degree, is defined as a superficial injury, especially in the vaginal mucosa, and involves the skin of the perineum. The second-degree, first-degree rupture that has involved the perineal body and vaginal mucosa. The third degree, which is a continuation of the second-degree laceration, has involved the anal sphincter, and can be grouped into three sub-categories, namely less than 50% anal sphincter rupture, more than 50% anal sphincter rupture, and internal and external anal sphincter rupture. Then, fourth degree, a third-degree laceration that has involved the mucosal structures of the rectum. Ruptures that are classified as severe and also known as obstetric anal sphincter injuries (OASIS) are third and fourth-degree ruptures.^{27,28}

Bleeding is the most common complication of perineal rupture. Bleeding can cause large amounts of blood loss over a short period. However, applying

pressure and surgical repair can be used to control bleeding conditions that occur.²⁹ Then, the risk of immediate complications such as prolonged pain and suturing time can delay the mother-child relationship. The risk of wound damage in the perineal area and infection are secondary risks that can be experienced by patients so that wound healing is hampered and wound dehiscence. Long-term complications such as pain, dyspareunia, and urinary or rectal incontinence. This complication is more likely to occur in women who undergo an episiotomy compared to women who experience a natural tear during childbirth.³⁰⁻³²

In 25% of women suffering from OASIS experience wound dehiscence in the first six weeks after delivery, then 20% of them also experience infection due to delayed wound healing. Another complication that can occur in women who experience OASIS is the rectoperineal fistula which can develop into an OASIS injury that does not heal properly. Sexual function in patients with perineal rupture depends on the severity of the rupture experienced. The higher the rupture grade, the longer the patient's sexual function returns to normal.^{33,34}

Effectiveness of Prophylactic Use Of Antibiotics In Third and Fourth-degree Perineal Rupture)

The use of prophylactic antibiotics can be used in various medical indications. Especially in the perioperative period can reduce the rate of postoperative wound infection. In a study conducted by the Dutch Trauma Trial, with a randomized control trial (RCT) design, it was found that the effect of prophylactic antibiotics on the risk of postoperative infection was decreased. Not only that, Boxma et al (1996) conducted a study on 2,195 patients with closed fractures and compared placebo and single-dose prophylactic antibiotic ceftriaxone. It was found that the postoperative infection rate in the placebo group was 8.3%, whereas in the ceftriaxone group the infection rate was 8.3%. by 3.6%. This shows that prophylactic antibiotics can reduce the risk of infection in several medical indications other than perineal rupture.³⁵

In the case of perineal rupture,

prophylactic antibiotics, especially in patients with third and fourth-grade perineal rupture, gave significant results. This is evidenced by a study conducted by Neena et al (2008) with a randomized control trial study design. It was found that in 107 patients, 58 of them belonged to the placebo group and 49 patients received prophylactic antibiotics. A total of 4 (8.2%) from the antibiotic receiving group and 14 (24.1%) patients from the placebo group experienced complications in the perineal wound with ($p=0.037$). Thus, at 2 weeks postpartum, patients receiving prophylactic antibiotics had improvement in third and fourth-degree ruptures and had a lower complication rate than placebo.³⁶

The same thing was also found by Buppasiri et al (2014) comparing the placebo group with a single dose of prophylactic second-generation cephalosporin antibiotic, namely cefotetan or cefoxitin 1g intravenously in 147 patients with third-and fourth-degree perineal rupture. In the postpartum examination two weeks in a row, a comparison of the percentage of complications between the treatment and control groups was 8.20% versus 24.10%, the risk ratio (RR) was 0.34, then the 95% confidence interval (CI) was 0.12- 0.96.³⁷ And, the same thing was also obtained by Liabsuetrakul et al (2020) who stated that prophylactic antibiotics reduced the risk of infection of superficial perineal rupture with an RR of 0.53, then 95% CI of 0.40-0.69 and the administration of prophylactic antibiotics for rupture deep perineum with RR of 0.46 and 95% CI 0.31-0.69. Based on these data indicate that prophylactic antibiotics can prevent complications of third and fourth-degree perineal rupture.⁷

CONCLUSION

The prevention of the high incidence of maternal labor morbidity is known as antibiotic prophylaxis, and it is a form of intervention that can be applied. However, even though preventive antibiotics, particularly for serious injuries, are known to prevent complications of perineal wounds after perineal tears, more research is still required. To completely understand the effects and implications of antibiotic prophylaxis, more research with varied

designs and methodologies is required.

AUTHOR CONTRIBUTION

All authors contributed to this study's conception and design, data analysis and interpretation, article drafting, critical revision of the article, final approval of the article, and data collection.

FUNDING

This work was funded by the author's funds.

CONFLICT OF INTEREST

The authors report no conflict of interest.

ETHICAL CONSIDERATION

This study protocol has been approved by the Human Research Ethics Committees, Faculty of Medicine Universitas Udayana and Sanglah General Hospital Denpasar, Bali.

REFERENCES

1. Ugwu EO, Iferikigwe ES, Obi SN, Eleje GU, Ozumba BC. Effectiveness of antenatal perineal massage in reducing perineal trauma and postpartum morbidities: A randomized controlled trial. *J Obstet Gynaecol Res.* 2018;44(7):1252-8.
2. Demirel G, Golbasi Z. Effect of perineal massage on the rate of episiotomy and perineal tearing. *Int J Gynaecol Obstet Off organ Int Fed Gynaecol Obstet.* 2015;131(2):183-6.
3. Beckmann MM, Stock OM. Antenatal perineal massage for reducing perineal trauma. *Cochrane database Syst Rev.* 2013;(4):CD005123.
4. Buppasiri P, Lumbiganon P, Thinkhamrop J, Thinkhamrop B. during vaginal birth (Review). *Cochrane Libr.* 2014;1(10):1-21.
5. Cunningham F, Leveno K, Bloom S, Hauth J, Rouse D, Spong C. *Williams Obstetrics.* United States: McGraw-Hill Education; 2018.
6. Bonet M, Ota E, Chibueze CE, Oladapo OT. Antibiotic prophylaxis for episiotomy repair following vaginal birth. *Cochrane database Syst Rev.* 2017;11(11):CD012136.
7. Liabsuetrakul T, Choobun T, Peeyanjanjarassri K, Islam QM. Antibiotic prophylaxis for operative vaginal delivery. *Cochrane database Syst Rev.* 2020;3(3):CD004455.
8. Mathai M, Engelbrecht S, Bonet M. Managing complications in pregnancy and childbirth: a guide for midwives and doctors. 2017.
9. Edmonds D, Lees C, Bourne T. *Dewhurst's textbook of obstetrics & gynaecology.* 9th ed. Wiley/Blackwell: Hoboken; 2018.
10. Mark AM. What is antibiotic prophylaxis? *J Am Dent Assoc.* 2016;147(6):526. Available from: <http://dx.doi.org/10.1016/j.adaj.2016.03.016>
11. Lukito JI. Antibiotik Profilaksis pada Tindakan Bedah. *Cermin Dunia Kedokt.*

- 2019;46(12):777–83. Available from: <http://www.cdkjournal.com/index.php/CDK/article/download/401/197>
12. Bratzler DW, Houck PM. Antimicrobial prophylaxis for surgery: an advisory statement from the National Surgical Infection Prevention Project. *Clin Infect Dis* an Off Publ Infect Dis Soc Am. 2004;38(12):1706–15.
13. Alemkere G. Antibiotic usage in surgical prophylaxis: A prospective observational study in the surgical ward of Nekemte referral hospital. *PLoS One*. 2018;13(9):e0203523. Available from: <https://doi.org/10.1371/journal.pone.0203523>
14. American College of Obstetricians and Gynecologists. Clinical Management Guidelines for Obstetricians & Gynecologists-Use of Prophylactic Antibiotics in Labor and Delivery. *Obstet Gynecol*. 2018;132(3):103–19.
15. Holtom PD. Antibiotic prophylaxis: Current recommendations. *J Am Acad Orthop Surg*. 2006;14(10):98–100.
16. Mangram AJ, Horan TC, Pearson ML, Silver LC, Jarvis WR. Guideline for prevention of surgical site infection, 1999. Hospital Infection Control Practices Advisory Committee. *Infect Control Hosp Epidemiol*. 1999;20(4):250–80.
17. ACOG Practice Bulletin No. 199: Use of Prophylactic Antibiotics in Labor and Delivery. *Obstet Gynecol*. 2018;132(3):e103–19.
18. Crader MF, Varacallo M. Preoperative Antibiotic Prophylaxis. In *Treasure Island (FL)*; 2022.
19. Ierano C, Nankervis J-AM, James R, Rajkhowa A, Peel T, Thursky K. Surgical antimicrobial prophylaxis. *Aust Prescr*. 2017;40(6):225–9.
20. Development G. Clinical Practice Guidelines for Antimicrobial Prophylaxis in Surgery.
21. World Health Organization (WHO). Summary of Recommended and Non-Recommended Practices to Prevent and Treat Maternal Peripartum Infections. 2015;375:1–6.
22. Vieira F, Guimarães J V, Souza MCS, Sousa PML, Santos RF, Cavalcante AMRZ. Scientific evidence on perineal trauma during labor: Integrative review. *Eur J Obstet Gynecol Reprod Biol*. 2018;223:18–25.
23. Goh R, Goh D, Ellepola H. Perineal tears - A review. *Aust J Gen Pract*. 2018;47(1–2):35–8.
24. Cassandra N. Ramar. Perineal Lacerations. In: *The Boston Medical and Surgical Journal*. StatPearls Publishing; 2022. p. 1–6. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK559068/?report=printable>
25. Møllerup Sørensen S, Bondesen H, Istre O, Vilmann P. Perineal rupture following vaginal delivery. Long-term consequences. *Acta Obstet Gynecol Scand*. 1988;67(4):315–8.
26. ACOG Practice Bulletin No. 198: Prevention and Management of Obstetric Lacerations at Vaginal Delivery. *Obstet Gynecol*. 2018;132(3):e87–102.
27. Kalis V, Laine K, de Leeuw JW, Ismail KM, Tincello DG. Classification of episiotomy: towards a standardisation of terminology. *BJOG*. 2012;119(5):522–6.
28. Priddis H, Dahlen H, Schmied V. Women's experiences following severe perineal trauma: a meta-ethnographic synthesis. *J Adv Nurs*. 2013;69(4):748–59.
29. Meister MR, Rosenbloom JI, Lowder JL, Cahill AG. Techniques for Repair of Obstetric Anal Sphincter Injuries. *Obstet Gynecol Surv*. 2018;73(1):33–9.
30. Leenskjold S, Høj L, Pirhonen J. Manual protection of the perineum reduces the risk of obstetric anal sphincter ruptures. *Dan Med J*. 2015;62(5).
31. Islam A, Hanif A, Ehsan A, Arif S, Niazi SK, Niazi AK. Morbidity from episiotomy. *J Pak Med Assoc*. 2013;63(6):696–701.
32. Ogilvie JW, Ricciardi R. Complications of perineal surgery. *Clin Colon Rectal Surg*. 2009;22(1):51–9.
33. Quist-Nelson J, Hua Parker M, Berghella V, Biba Nijjar J. Are Asian American women at higher risk of severe perineal lacerations? *J Matern neonatal Med Off J Eur Assoc Perinat Med Fed Asia Ocean Perinat Soc Int Soc Perinat Obstet*. 2017;30(5):525–8.
34. Vale de Castro Monteiro M, Pereira GMV, Aguiar RAP, Azevedo RL, Correia-Junior MD, Reis ZSN. Risk factors for severe obstetric perineal lacerations. *Int Urogynecol J*. 2016;27(1):61–7.
35. Boxma H, Broekhuizen T, Patka P, Oosting H. Randomised controlled trial of single-dose antibiotic prophylaxis in surgical treatment of closed fractures: the Dutch Trauma Trial. *Lancet (London, England)*. 1996;347(9009):1133–7.
36. 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(6):1268–73.
37. Buppasiri P, Lumbiganon P, Thinkhamrop J, Thinkhamrop B. Antibiotic prophylaxis for third- and fourth-degree perineal tear during vaginal birth. *Cochrane database Syst Rev*. 2014;(10):CD005125.



This work is licensed under a Creative Commons Attribution