



Review of Cesarean Delivery Infection in Nigeria

Adeyinka O, Egagifo O and Igberase GO*

Department of Obstetrics and Gynecology, Delta State University Teaching Hospital, Nigeria

Abstract

Cesarean delivery complications are common in Nigeria and it is an important contributor to the occurrence of puerperal sepsis and post Cesarean morbidities and mortalities. A review of the literature was carried out using various search engines such as PUBMED, GOOGLE and African Journal online (AJOL).

The conclusion was that the prevalence Cesarean delivery infection remains high in Nigeria. There is therefore the urgent need to prevent and promptly treat these infections in order to prevent the immediate and long term complications of Cesarean wound infections in Nigeria.

Introduction

In the recently conducted African Surgical Outcomes Study, of which Cesarean delivery constituted a third of all the patients studied, postoperative complications occurred in 18.2% of the 10,885 participants. Post-operative infection was the most common complication occurring in 10.2% of the patients, of whom 9.7% died [1]. This brought to the fore the public health importance of postoperative infection in the developing world. Cesarean delivery constitutes an important risk factor for the occurrence of puerperal sepsis. Puerperal sepsis on the other hand is one of the commonest complications of Cesarean delivery, and a major cause of post Cesarean morbidities and mortalities [2-4]. Cesarean surgical infection has the potential not only to cause postoperative sepsis, but also to cause multiple organ failure from systemic inflammatory response syndrome, emotional stress of the women involved, prolonged hospital stay, increased overall cost of care, and long term maternal morbidities (including infertility, chronic pelvic pain, ectopic pregnancy [2-5].

Maternal death is the most unfortunate consequence of post-cesarean infection. Postpartum infection remains an important cause of maternal death and morbidities, despite significant advances in diagnosis, medical management and antimicrobial therapy [2,3]. In developing countries, sepsis is the third most common cause of maternal mortality, next to post partum hemorrhage and hypertension; accounting for 10.7% of maternal deaths [6] Sepsis was the commonest (27.4%) cause of maternal death in Benin, Nigeria; and second commonest(16%) in Enugu [7,8]. Post-cesarean infection accounted for 9%, 9.9% and 24% of maternal mortality in studies conducted by Ugwu et al. in Enugu, Adekanle et al. in Ogbomoso, and Igberase et al. in Eku respectively [9-11]. The prevention of infection of Cesarean surgical sites should be a healthcare priority, especially in developing countries.

Although attention had focused more on surgical site infections which implies infection at or near surgical incisions or any other organ handled or manipulated during surgery within thirty days of an operative procedure [12], post cesarean infection should also include any other bacterial infections occurring after and related to surgery such as urinary tract infections, breast abscesses, pneumonias, and even bed sores resulting from prolonged immobilizations.

Incidence of Cesarean Section Infection in Nigeria

Unlike in advanced countries where post-cesarean wound infections complicates 3.7% to 9.9% of cesarean births, [13-16] post cesarean infection rates in some centers in Africa range between 7.1% and 19% [17-19] and in Nigeria between 9% and 16.2% [11,20-26]. As alarming as these rates are, they may in fact have been underestimated to start with, as most of the studies conducted on cesarean infections were limited to the first week after surgery when patients were still on admission whereas the vast majority of surgical site infections occur after patients have left the hospital [5,15,27]. Besides, many cases occurring outside the health institutions may not have been documented at all.

Risk Factors for Post Cesarean Infection in Nigeria

Infection of surgical sites depends on several factors: the amount of bacteria introduced into

OPEN ACCESS

*Correspondence:

Gabriel Igberase, Department of Obstetrics and Gynecology, Delta State University Teaching Hospital, Oghara, Nigeria,

E-mail: gabosaa@yahoo.ca

Received Date: 30 Apr 2018

Accepted Date: 06 Jun 2018

Published Date: 15 Jun 2018

Citation:

Adeyinka O, Egagifo O, Igberase GO. Review of Cesarean Delivery Infection in Nigeria. *Ann Clin Case Rep.* 2018; 3: 1518.

ISSN: 2474-1655

Copyright © 2018 Igberase GO. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

the wound during surgery, the virulence of the organisms, the microenvironment of the wound, and the patients host defense mechanisms [12,28]. Several demographic, medical, obstetrics and operative situations have been studied and found to favor one or more of these etio-pathogenic mechanisms, although only a few of these have been studied and demonstrated to be of significance in the Nigerian settings.

Demographic risks factors of significance in the causation of caesarean infections include low socio economic status and poor nutritional state of the women. Morhason-Bello et al. [22] in an observational descriptive studies conducted in Ibadan found that women with up to primary school were 20 times more likely than those with secondary education & above to develop wound infection (95% CI OR = 1.8 to 250.0). This is because low educational attainment, a marker for low socio economic status, is a predictor of poor nutrition and hence increased susceptibility to infections. Also, low educational attainment predicts poor health seeking behaviour including utilization of antenatal services. Morhason-Bello found that unbooked patients were more likely to have post caesarean infections (OR-1.28: 0.20-8.33)

Medical risks factors for post caesarean infections includes maternal obesity, diabetes, hypertension, immune suppressive illnesses, prolonged preoperative hospital stay, and coexisting infection at a remote site [12,16,28]. Ezechi et al. [24] in a case-control study conducted in Lagos demonstrated that body mass index >25 doubled the odds for post-operative infections (OR 2.34 CI 1.12 - 4.23). Obesity is a precursor of glucose intolerance, and together with diabetes mellitus, may be associated with impairment of immunity.

Obstetrics events such as prolonged premature rupture of membranes, passage of offensive liquor, frequent vaginal examinations before surgery, emergency category of cesarean delivery have been shown to be risk factors for post caesarean infections [11,12,16,28]. Ezechi et al. showed that prolonged ruptured of membrane increased the odds of post-caesarean infection four times (OR=4.45. 95% CI=2.34-8.51). Similarly, Onyegbule et al. [23] in a cross sectional study in Nnewi showed that Women with rupture of membrane less than 24 hours had 89.0% lower odds compared with those with ruptured membrane >24 hours of developing post caesarean wound. Ruptured membrane exposes the otherwise sterile amniotic cavity to vaginal flora, increasing the odds for infections. It is not uncommon in Nigeria for women to present with prolonged rupture of membrane with frankly offensive liquor. Morhason-Bello [22] showed that offensive liquor had 4.29 times the odds of post-caesarean infection (CI 0.66-28.04).

Morhason-Bello et al. [22] also showed that more than two vaginal examinations before surgery had more than 3 odds of post-caesarean infections (0.51-21.72). This is because digital vaginal examination directly introduces vaginal flora into the cervical canal and uterine cavity. Prolonged labour is a common occurrence in Nigeria, and it is an important risk factor for wound infection. Onyegbule et al. [23] found that women with labour duration less than 12 hours have 93.0% lower odds of developing post caesarean wound infection compared to those who labored for >12 hours. Similarly, Jido et al. in Kano [20] in a case control study demonstrated that labour lasting >6 hours was associated with higher risk for infections.

Operative factors play important role in the pathogenesis of post-operative infections. Factors that had been studied and established

as predictors of infections include prolonged duration of operation; vertical skin incision; junior category of surgeon; excessive operative blood loss; poor surgical techniques; inadequate sterilization of surgical equipments; preoperative skin shaving; improper surgical antimicrobial prophylaxis; development of subcutaneous hematomas; and inadequate antiseptic skin preparation [12,16,28]. Ezechi et al. [24] showed that prolonged operating time increases risk of post-caesarean infections almost three times (OR 2.87 CI 1.96-5.97). Jido et al. [20] in Kano also showed a significantly higher incidence of post-caesarean infections in those with operating time exceeding 60 minutes. Prolonged exposure of pelvic tissue increases the likelihood of peritoneal contaminations especially in the less than standard hygiene state of the operating theatres in the developing countries. Abdominal incision types have also been implicated. Onyegbule et al. [23] demonstrated that the use of sub-umbilical midline incision increases the odds of infection by 79% (OR=0.21: 95% CI 0.05-0.91) when compared with transverse incisions. Meanwhile, a midline incision is the choice emergency incision prevalent in the developing countries.

Jido also showed that increased operative blood loss, postoperative anemia, and hospital stay beyond 8 days are risk factors for infections. In the developing countries where women go into pregnancy with decreased iron stores and where malaria and worm infestation is prevalent, anaemia in pregnancy is a common finding. With dearth of skilled surgeons, increased operative blood loss is not uncommon. The consequence of these is postoperative infection.

Prevention of Post-Cesarean Infections in Nigeria

In Nigeria where only 36% of women deliver in health facilities and only 38% of deliveries are attended by skilled providers, [29] it is not surprising that most patients who have labored elsewhere and arrive at referral centers for cesarean surgeries are already exposed to the settings for postoperative infections. Increased access to and acceptance of antenatal care and institutional deliveries will therefore necessarily reduce infective morbidities after surgeries.

Implementation of infection control measures has the potential to reduce post-operative infections. The institutionalization of infection control policies, practice of standard surgical protocols, and use of adjunctive measures such as antimicrobial prophylaxis are some of the time-tested recommendations for reducing surgical infections [4,5,12,28]. Brisibe et al. in Port-Harcourt and Abubakar et al. in Kano have demonstrated improvement in surgical infection rate following implementation of these infection control measures [21,30] However, the knowledge and implementation of these measures in developing countries remain suboptimal. Brisibe et al. [31] in another study demonstrated poor adherence to infection control policy in tertiary hospitals in Port-Harcourt. In the study, the reasons given by the health professionals for non-adherence to the infection control policy included poor supervision (39.39%), lack of in-service training (21.21%), inadequate supply of consumables (34.29%), and absence of a hospital policy on infection control (22.88%) [31]. Therefore, institutional commitment to infection control policies with clear definition of objectives, development of pragmatic implementable guidelines, creation of awareness among hospital health professionals, enforcement of compliance to the guidelines, and monitoring through regular audits will go a long way to entrench standard infection control practices and ultimately reduce the incidence of post caesarean infections.

Antibiotics play a central role both in the prevention and the treatment of post cesarean infections. Abuse and misuse of antibiotics in Nigeria is indeed alarming, providing the scenarios for the emergence of widespread antibiotic resistance. The sale of substandard antibiotic products has not helped the situation. Even when genuine brands are available, many parturient cannot afford its prohibitive cost. Thus, government regulation of antibiotics sales and use, and government subsidy of cost of antibiotics will go a long way to optimize its benefit to women requiring it. The recent WHO initiatives on antibiotics use is a welcome development, and compliance with the recommended practice should be encouraged in Nigeria.

Conclusion

Studies in many Nigerian institutions show that cesarean birth rate is quite high, being between 11.8% and 40.1%, and still rising [9,11,32,33] This rising cesarean prevalence, the high incidence of post-caesarean infections, and the dire short and long term consequences of this problem make organized actions on prevention of post-operative infections among women who had cesarean birth a very important and timely initiative.

References

- Biccard BM, Madiba TE, Kluyts HL, Munlemvo DM, Madzimbamuto FD, Basenero A. African surgical outcome investigators. Perioperative patient outcomes in the african surgical outcomes study: A 7-day prospective observational cohort study. *Lancet*. 2018;391(10130):1589-98.
- Royal College of Obstetricians and Gynaecologist. Bacterial Sepsis following Pregnancy. Green-top guideline No. 64b. 2012.
- Van Dillena J, Zwartb J, Schuttec J, van Roosmalen J. Maternal sepsis: Epidemiology, etiology and outcome. *Curr Opin Infect Dis*. 2010; 23(3):249-54.
- National Collaborating Centre for Women's and Children's Health. Surgical site infection: Prevention and treatment of surgical site infections. National Institute for Health and Clinical Excellence clinical guideline 74. Evidence Updated 2013.
- World Health Organization. WHO guidelines for safe surgery. Patient's Safety. 2009.
- Lale Say, Doris Chou, Alison Gemmill, Özge Tunçalp, Ann-Beth Moller, Jane Daniels, et al. Global causes of maternal death: A WHO systematic analysis. *Lancet Glob Health*. 2014; 2(6): e323-33.
- Onah HE, Okaro JM, Umeh U, Chigbu CO. Maternal mortality in health institutions with emergency obstetric care facilities in Enugu State, Nigeria. *J Obstet Gynaecol*. 2005; 25(6): 569-74.
- Abe E, Omo-Aghoja LO. Maternal mortality at the central hospital, benin city nigeria: A ten year review. *Afr J Reprod Health*. 2008; 12(3):17-26.
- Igberase GO, Ebeigbe PN, Andrew BO. High caesarean section rate: a ten year experience in a tertiary hospital in the Niger Delta, Nigeria. *Niger J Clin Pract*. 2009;12(3):294-7.
- Adekanle DA, Adeyemi AS, Fasanu AO. Caesarean section at a tertiary institution in Southwestern Nigeria-A 6-year audit. *OJOG*. 2013; 3: 357-361.
- Ugwu EO, Obioha KCE, Okezie OA, Ugwu AO. A Five-year Survey of caesarean delivery at a nigerian tertiary hospital. *Ann Med Health Sci Res*. 2011;1(1):77-83.
- Mangram AJ, Horan TC, Pearson ML, Silver LC, Jarvis WR. Guideline for Prevention of Surgical Site Infection, 1999. Centers for Disease Control and Prevention (CDC) Hospital Infection Control Practices Advisory Committee. *Am J Infect Control*. 1999;27(2):97-132.
- Schneid-Kofman N, Sheiner E, Levy A, Holcberg G. Risk factors for wound infection following cesarean deliveries. *Int J Gynaecol Obstet*. 2005;90(1):10-5.
- Opøien HK, Valbø A, Grinde-Andersen A, Walberg M. Post-cesarean surgical site infections according to CDC standards: Rates and risk factors. A prospective cohort study. *Acta Obstet Gynecol Scand*. 2007;86(9):1097-102.
- Griffiths J, Demianczuk N, Cordoviz M, Joffe MA. Surgical site infection following elective caesarean section: A case-control study of post discharge surveillance. *J Obstet Gynaecol Can*. 2005;27(4):340-4.
- Ward VP, Charlett A, Fagan J, Crawshaw SC. Enhanced surgical site infection surveillance following caesarean section: experience of a multicentre collaborative post-discharge system. *J Hosp Infect*. 2008;70(2):166-73.
- Chu K, Maine R, Trelles M. Caesarean section surgical site infections in sub-saharan africa: A multi-country study from medecins sans frontieres. *World J Surg*. 2015;3:350-5.
- Koigi-Kamau R, Kabare LW, Wanyoike-Gichuhi J. Incidence of wound infection after caesarean delivery in a district hospital in central Kenya. *East Afr Med J*. 2005;82(7):357-61.
- Demisew A, Tefera B, Fitsum A. Surgical site infection rate and risk factors among obstetric cases of jimma university specialized hospital, south west ethiopia. *Ethiop J Health Sci*. 2011;21(2):91-100.
- Jido TA, Garba ID. Surgical-site infection following cesarean section in kano, Nigeria. *Ann Med Health Sci Res*. 2012;2(1): 33-6.
- Brisibe SFA, Ordinioha B, Gbeneolol PK. The effect of hospital infection control policy on the prevalence of surgical site infection in a tertiary hospital in south-south nigeria. *Niger Med J*. 2015; 56(3): 194-8.
- Morhason-Bello IO, Oladokun A, Adedokun BO, Obisesan KA, Ojengbede OA, Okuyemi OO. Determinants of post-caesarean wound infection at the university college hospital ibadan nigeria. *Niger J Clin Pract*. 2009;12(1):1-5.
- Onyegbule AO, Akujobi CN, Ezebialu IU, Nduka AC, Anahalu IC, Okolie VE, et al. Determinants of Post-caesarean wound infection in nnewi, nigeria. *Br J Med Med Res*. 2015;5(6):767-74.
- Ezechi OC, Edet A, Akinlade H, Gab-Okafor CV, Herbertson E. Incidence and risk factors for caesarean wound infection in lagos nigeria. *BMC Res Notes*. 2009; 2:186.
- Aworinde O, Olufemi-Aworinde K, Fehintola A, Adeyemi B, Owonikoko M, Adeyemi A, et al. Antiseptic skin preparation for preventing surgical site infection at caesarean section. *Obstet Gynecol*. 2016;6(4):246-51.
- Omo-Aghoja LO, Abe E, Feyi-Waboso P, Otoide V. Post-caesarean wound infection in urban south south Nigeria. *The Nig J Gen Pract*. 2008;8(2):14-22.
- Couto RC, Pedrosa TM, Nogueira JM, Gomes DL, Neto MF, Rezende NA. Post-discharge surveillance and infection rates in obstetric patients. *Int J Gynaecol Obstet*. 1998;61(3):227-31.
- Reichman DE, Greenberg JA. Reducing surgical site infections: A review. *Rev Obstet Gynecol*. 2009;2(4):212-21.
- National Population Commission (NPC) [Nigeria] and ICF International. Family Planning. Nigeria Demographic and Health Survey 2013. Abuja, Nigeria and Rockville, Maryland USA. 2014.
- Abubakar S. Implementing infection control programme in Kano, Northern Nigeria. Presented at the: 8th Congress of the International Federation of Infection Control. 2007; 18-27.
- Brisibe SFA, Ordinioha B, Gbeneolol PK. Knowledge, attitude, and infection control practices of two tertiary hospitals in Port-Harcourt, Nigeria. *Nig J Clin Pract*. 2014;17(6):691-5.

32. Geidam AD, Audu BM, Kawuwa BM, Obed JY. Rising trend and indications of caesarean section at the university of maiduguri teaching hospital, Nigeria. *Ann Afr Med.* 2009;8:127-32.
33. Akinola OI, Fabamwo AO, Tayo AO, Rabi KA, Oshodi YA, Alokha ME. Caesarean section-an appraisal of some predictive factors in Lagos Nigeria. *BMC Pregnancy Childbirth.* 2014; 14:217.