

Postpartum Endometritis and Cesarean Section: A Literature Review

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Abstract

Background: Endometritis is considered one of the most common complications after cesarean delivery. If it is not diagnosed and treated properly, it will cause infertility, septicemia, DVT, and pulmonary embolism.

Methods: We searched the MEDLINE database using PubMed. Two independent reviewers reviewed the resulting papers and reviewed them based on our inclusion criteria.

Results: Based on the review results, endometritis is common in younger age women with low socioeconomic level. It is associated with amniotomy but other surgical techniques did not increase the risk of endometritis. Using vaginal antiseptics before the surgery decreased the risk of endometritis. The standard treatment of endometritis is intravenous antibiotics.

Conclusion: Endometritis is a common post-partum cesarean section complication. Antenatal care and use of antiseptics before the surgery will significantly decrease the incidence of endometritis.

Keywords: Cesarean Section; Endometritis; Cesarean Delivery; Surgical Site Infection; Post-Partum Complications

Introduction

Recently, there is an overshooting in the incidence of cesarean delivery worldwide. World health organization has reported that there is an increase of 10 to 15% of cesarean delivery beyond the required threshold [1]. Cesarean delivery is considered an invasive surgical procedure that is overused nowadays. Nowadays, It is done without a clear indication for the fetus or the mother based on the mother's request and it is called elective cesarean delivery [2]. 20% of mothers request cesarean delivery because they were afraid of childbirth and prevention of side effects associated with vaginal delivery like prolapse and urinary incontinence [2].

Recommended Cesarean delivery is usually due to intra-abdominal bleeding, intra-abdominal abscess, or bladder, and bowel complications [3,4]. However, the complications of cesarean delivery are many and sometimes hard to handle [3]. Reported complications are wound infection, hemorrhage, ureteric injury, bowel injury, sepsis, postoperative ileus and Ogilvie syndrome. The highest reported complications are sepsis and postoperative ileus [5].

Sepsis is either wound infection reported in 6.8% to 9.7% of cases or endometritis reported in 3.9 - 18.4% of cases [5]. The endometrium is considered the most common site of infections compared to the wound, nervous tissue, and urinary tract. Endometritis is associated with heavy lochia, which has a foul odor and is associated with abdominal pain [5-8].

Endometritis is the inflammation of the endometrial lining of the uterus. It is caused by the contamination of endometrium with vaginal and cervical commensal bacteria [9]. It is divided into two types wither early-onset endometritis which is usually 48 hours after the delivery or late-onset endometritis which usually occurs in the first six weeks after delivery. It is usually diagnosed after 1% to 3% of vaginal delivery and increased in cases of cesarean delivery up to 13% [9].

It is usually caused by polymicrobial infection with both anaerobic and aerobic bacteria present in 10% to 20% of cases and like other diseases severity depends on the causing organism level [6,10]. Complications of endometritis are usually severe and life-threatening. The infection can spread to the blood causing septic shock [6,7]. In addition, it can extend to the peritoneal cavity causing peritonitis, intra-abdominal abscess, or sepsis. Septic pelvic thrombophlebitis, which will result in septic pulmonary emboli, can occur rarely as a complication of postpartum endometritis. It also has a long term effect on reproduction and may lead to infertility [6,7].

Methods

A PubMed search was performed using the following search terms: (“cesarean delivery” OR “cesarean section” OR “postcesarean endometritis”) AND (“endometritis” OR “endometrial inflammation”). We included all studies that reported the epidemiology and risk factors for endometritis after cesarean delivery. No language or study design restrictions were included in the criteria.

Results and Discussion

Prevalence of post-cesarean endometritis

There is a higher risk of endometritis following cesarean section compared to vaginal delivery [11]. It is reported in 2 to 16 women per 100 delivered by cesarean section [12-15]. The incidence of post-cesarean endometritis depends on the stage of labor and the presence or absence of ruptured membranes [14,16,17]. CS performed on patients in labor had a higher risk of endometritis estimated to be 3 to 11 women per 100 surgeries which is higher than CS performed on patients in prelabour which ranges from 0.5 to 5 women per 100 surgeries [14,16,17]. For cases with a ruptured membrane, endometritis occurred in 3-15% of cases compared to only 1-5% in cases with the intact membrane [14,16,17].

The burden on the health care system

Endometritis after CS is associated with longer hospital stay increases the financial burden on the patients, their families, and the health care system [12]. In the United States, it costs the patients and the health care system 4500\$ approximately [18].

Risk factors associated with increased endometrial risk

Intraoperative techniques

Uterine exteriorization is a method performed to allow better visualization of the uterus which is needed for the repair of the intra-uterine incision. It was believed that it increased the incidence of endometritis [19]. However, a recent meta-analysis revealed that it did not affect the risk of endometritis in these patients [19].

Another observed intraoperative maneuvers that increased the risk for endometritis is the manual removal of the placenta and traction of the umbilical cord [19,20]. The manual removal of the placenta was associated with a higher risk of bleeding, infections, and residuals of the placenta. The manual removal of the placenta was associated with a higher risk of endometritis [19,20].

Another procedure that was found not effective in decreasing the risk for endometritis is intraabdominal irrigation [21,22]. In a clinical trial, it was found that intraabdominal irrigation was not associated with an increased risk of endometritis, but it had a higher risk of vomiting [21,22].

Amniotomy was found to increase the risk of the introduction of infection from the vaginal and cervix and its increased endometritis one and half times compared to the control group [23].

Cesarean section techniques

The CORONIS trial assessed the risk of endometritis difference between Blunt versus sharp abdominal entry and found no significant difference between both on the risk for endometritis. This was also confirmed by the results of another clinical trial [24].

Cervical dilatation was also assessed in two studies and found that cervical dilatation before the cesarean section did not increase the risk for endometritis compared to the control group [25].

For the closure of the uterine wound closure, it was found that there was no difference in the risk of endometritis between Single-layer uterine closure versus double-layer closure [19,26,27]. The same was found in the case of peritoneal closure; it was found that there was no significant endometritis risk difference between cesarean section with peritoneal closure versus cesarean section with no peritoneal closure [19,28]. The duration of the surgery was not associated with increased risk of endometritis despite speculation that increased surgical time will be associated with more risk for endometritis [24,27].

The health of a pregnant woman

Endometritis risk was high in younger patients diagnosed with anemia. Endometritis was evident in these cases after low transverse cesarean section. Anemia was associated with immunosuppression and increased transfusion rates which result in the release of inflammatory materials from white blood cells [23]. Surprisingly, patients with private health insurance had less risk of endometritis compared to those who have not. This significant link was mainly due to the high incidence of low nutritional status and nutrient deficiency in pregnant women [29]. Furthermore, these women had a high incidence of sexually transmitted infections and a higher risk of Group B Streptococcal colonization. Usually, these infections are not diagnosed due to fewer prenatal visits [29].

Bodyweight of the pregnant women

There is an increased risk of endometritis in obese females compared to control groups [30]. In addition, in this cohort of obese women, the site of cesarean incision influenced the risk of endometritis in obese pregnant females. It was also found that vertical incision increased the risk of endometritis in obese females [30].

Preventive measures for endometritis after cesarean section

Preoperative antibiotics

Intravenous first-generation cephalosporins had decreased the risk of endometritis compared to antibiotics [13]. Besides, it decreased the risk of endometritis when it is given before the start of CS than after the cord clamp [31]. It is recommended to give an intravenous infusion of 1g Cefazolin one hour before skin incision and the dose can be increased with higher BMI [32]. Nevertheless, another study did not find any difference in efficacy of the dosage in higher BMI which means lower dosage can be used for an obese or overweight woman [33].

Another recommended antibiotic is intravenous Azithromycin which had better efficacy than other standard antibiotics [34]. In addition, it did not affect the neonate health or neonatal intensive care admission rate [15].

Preoperative vaginal cleansing

It is suggested that preoperative vaginal cleansing is associated with lower rates of endometritis. Chlorhexidine vaginal cleansing had a lower incidence of endometritis compared to the control group [35]. For povidone-iodine, many studies found that it also lowered the risk of endometritis [14,17,36,37]. Povidone-iodine had a significant effect on decreasing the risk of endometritis in cases of a ruptured membrane [14,17,36,37]. It is also recommended in many studies to use Povidone-Iodine instead of Chlorhexidine. Chlorhexidine was only recommended to use in cases with allergies to Iodine [38].

Management of endometritis

Imaging of the abdomen and pelvis is important to exclude any pelvic or abdominal hematoma. Antibiotic treatment is the gold standard for treatment. It is usually treated with combined antibiotics either clindamycin or gentamycin [9]. The dose of clindamycin is usually 900 mg every eight hours meanwhile for Gentamicin, it has two known doses either 5 mg/kg or 1.5 mg/kg every 8 hours [39,40]. Both doses are similarly effective, but the higher doses provided more time for nurses. Ampicillin is usually added if the fever persists as it covers enterococcal infection [9].

Conclusion

Cesarean section is associated with a high incidence of endometritis. Nevertheless, the risk factors increasing the risk of endometritis after cesarean section can be addressed and the incidence should be decreased. With the increased incidence of the elective cesarean, these risk factors should be identified and addressed. The management of endometritis is considered available and easy to prevent dangerous complications of endometritis.

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