



WOUND INFECTION PREVENTION BY INPWT IN OBESE PATIENTS FOLLOWING CESAREAN DELIVERY

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ABSTRACT

A cesarean section is a surgical procedure in which incisions are made through a woman's abdomen and uterus to deliver her baby. Surgical site infections are a common surgical complication among patients delivered with cesarean section. Further it caused to increase maternal morbidity, stay of hospital and the cost of treatment. A number of evidence-based interventions have been proposed to reduce post cesarean wound complications. Obesity is an important risk factor of cesarean section and is associated with an increased risk of wound complications such as infections. Choice of antiseptic solution, appropriate dose and type of antibiotic prophylaxis, suture closure of subcutaneous fat, suture skin closure and closed incision negative pressure wound therapy may reduce the risk of wound infections associated with cesarean section in obese patients.

Keywords: Cesarean section, iNPWT, Obesity, Surgical site infection

INTRODUCTION

Of definition, cesarean delivery defines the birth of a fetus via laparotomy and then hysterotomy. More than 85% of these operations are performed for four reasons- prior cesarean deliveries, dystocia, fetal jeopardy, or abnormal fetal presentation. The latter three compose the main indication for primary cesarean delivery.

Maternal obesity is associated with a higher risk of caesarean section and surgical site infection[1]. Surgical site infection occurs in about 10% of obese women undergoing caesarean section despite prophylactic strategies (e.g. antibiotics)[2]. This can be explained partly by a decreased blood flow in adipose tissue and an obesity-associated inflammation causing vascular dysfunction, which results in a local hypoxic response[3]. Hypoxia impairs oxidative bacterial killing and leads to an increased risk of surgical site infection[4]. Incisional negative pressure wound therapy (iNPWT) increases blood flow[5] and has been shown to reduce the risk of surgical site infection after nonobstetric surgery[6]. Furthermore, iNPWT reduces the risk of haematoma/seroma due to improved lymphatic drainage[7], and reduces the risk of wound dehiscence[8], by decreasing the lateral and shear stress on sutures. However, iNPWT is relatively expensive as compared with standard postoperative dressings. Therefore, it should be considered judiciously for patients at high risk of surgical site complications or if the consequences of a surgical site complication are high. As a result, Surgical site infections are the most common postoperative complications even in hospitals with most modern facilities and standard protocols of preoperative preparation and antibiotic prophylaxis[9]. Contamination of the wound is present to some extent in all incisions thus adding significant morbidity and mortality[10]. These infections may affect the pelvic organs, the surgical Wound and the respiratory and urinary tracts[11]. Further it caused to increase stay of hospital and the cost of treatment[12]. All hospitals with surgical services are recommended to undertake surveillance of surgical site infection[13].

Cesarean delivery is the most common major surgical procedure performed in the United States, with over 1.2 million performed per year[14]. These complications represent a significant burden to the patient and contribute to rising healthcare costs[15]. Barber et al reported that the rate of cesarean delivery operations increased by over 40% from 2003 to 2009[16]. Additionally, more women with obesity are becoming pregnant than recorded at any other period of time[17]. Obesity was determined as a major risk factor to undergo a cesarean delivery rather than a vaginal delivery[18]. As cesarean deliveries become more common, the risk of obesity should be considered, and appropriate SSI prevention techniques implemented.

The reported incidence of post cesarean wound complications varies from 3% to 30%[19]. Obesity has been shown to be an independent risk factor for postoperative wound infections after cesarean delivery,[20] and has reached epidemic proportions in the United States, with 35.8% of American women having a body mass index of 30 kg/m² or greater in 2012[21]. Negative pressure therapy (NPT) has long been used to promote healing in infected or open abdominal incisions[22]. Recent studies have provided evidence that NPT may be effective in reducing wound complications when placed over a closed surgical incision,[23] Proposed

mechanisms of action of the NPT include promotion of blood flow, decrease in seroma formation, increase in angiogenesis, reduction of the wound surface area, and induction of cell proliferation.[24]

More recently in 2014, a pilot study investigating the use of NPT to decrease wound infection after cesarean delivery at the University of Maryland showed a non-significant decrease in wound infection in women with body mass index (BMI) >45 kg/m². [25] A study from the University of Iowa in 2015 showed a significant decrease in postoperative infection rate when NPT was applied in patients who underwent cesarean delivery and who had high-risk characteristics, which included BMI >30 kg/m². [26]

Outcomes:

The primary outcome, surgical site infection, was defined as surgical site infection requiring antibiotic treatment within the first 30 days after caesarean section. The outcome comprised data from the Prescription Registry [27] (dispensed prescriptions), the Patient Register [28] (hospitalisation and diagnosis codes), medical records and the questionnaire. Medical records were reviewed to identify antibiotic treatment during hospitalisation if a woman was hospitalised for more than 4 days, was readmitted or registered with a diagnostic code that could be related to a complication after caesarean section, or responded 'yes' to the question 'Have you received any antibiotic treatment after your caesarean section?' but did not redeem an antibiotic prescription. For participants who did not respond to the questionnaire, data on antibiotics and diagnostic codes related to postpartum complications were extracted from the registers and medical charts. Secondary outcomes were deep surgical site infection defined as an infection requiring surgery, and patient-reported wound exudate, minor dehiscence (defined as a gap between the sides of the wound) and health-related quality of life (EQ-5D-5L). The EQ-5D-5L questionnaire covers five dimensions of health status (mobility, self-care, usual activities, pain/discomfort and anxiety/depression) and a 0–100 visual analogue scale (EQ VAS) to describe overall self-rated health status. [29] Each EQ-5D dimension has five levels, ranging from no problems to extreme problems. The composite health status can subsequently be converted into a country-specific index value between 0 and 1 (where 1.0 represents full health) to calculate quality-adjusted life years for economic evaluation of healthcare interventions. [30]

Infection Prevention:

Antibiotic Prophylaxis:

Numerous good quality trials show that a single dose of an antibiotic given at the time of cesarean delivery significantly decreases infectious morbidity. One recent pharmacokinetic analysis showed sufficient tissue levels with a 2-g dose for cesarean deliveries lasting 1.5 hours. Authors recommended consideration for redosing in obese women if surgeries were longer. A growing body of evidence supports extending the antibiotic spectrum.

Antibiotic administration before surgical incisions lowers postoperative infection rates without adverse neonatal effects compared with drug administration after umbilical cord clamping. Prophylaxis is

ideally administered within 60 minutes prior to the start of planned cesarean delivery. For emergent delivery, antibiotics are given as soon as feasible. Postoperative preparation of the abdominal wall skin is effective to prevent wound infection. Either chlorhexidine or povidone-iodine solutions are suitable. In studies that found a difference, chlorhexidine was favored, and this is our practice. In addition, preoperative vaginal cleansing with a povidone-iodine scrub has been evaluated in small randomized trials.

Incisional negative pressure wound therapy:

Incisional Negative Pressure Wound Therapy is also called negative topical pressure, subatmospheric pressure therapy, vacuum sealing vacuum pack therapy, and sealing aspirate therapy. The aim of incisional negative pressure wound therapy is to use negative pressure to create suction, which drains the wound and influences the shape and growth of the surface tissues in a way that promotes healing.

During the procedure, a piece of foam is placed over the wound and a drain tube is placed over the foam. A large piece of transparent tape is placed over the whole area, including the surrounding healthy tissue, to secure the foam and drain the wound.

The tube is connected to a vacuum source, and fluid is drawn from the wound through the foam into a disposable container. Thus, the entire wound area is subjected to the negative pressure. The device can be programmed to provide varying degrees of pressure either continuously or intermittently.

CONCLUSION

iNWPT is a best procedure for preventing post cesarean section wound infection along with prophylactic antibiotics. Although it is an expensive procedure which decreases formation of hematoma/seroma, minor dehiscence, hospital stay and enhance better wound healing even though improves quality of life.

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