

Subcutaneous Infiltration of Gentamycin Saline Solution to Reduce Rates of Cesarean Section Surgical Site Infection in Primigravidas Scheduled for Elective Cesarean Section

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Abstract

Cesarean section is a daily practice with the incidence in Egypt exceeding 40 percent, and surgical site infection is an uncommon morbidity, and efforts have been made extensively to lower the infection rate. The presented work aimed at lowering surgical site infection in cesarean section with the use of gentamycin solution pre-closure to reduce CS-SSI rates. The presented work was a controlled trial involving 200 cases of elective cesarean section done in Zinat Alhyat hospital for delivery in Benha city. Two hundred cases recruited from Zinat al-Hayat hospital in Benha were divided into two groups: group one [gentamycin group] hundred cases receiving pre-closure irrigation of the subcutaneous tissue with a gentamycin vial 40mg diluted in 10 ml syringes, then closing the wound with Prolene sutures. Group 2 hundred cases not [control non-intervention] receiving gentamycin infiltration and taken as the control group, the wound was closed with Prolene sutures without infiltration with gentamycin. Written consent was signed by all participants in the trial. The study gave the following. Cesarean section surgical site infection dropped from 8 percent in the control group to 1 percent in the trial group with gentamycin. Surgical site infection post-cesarean section can be reduced by subcutaneous infiltration with gentamicin saline solution.

Keywords: Post-cesarean section surgical site infection, Wound infiltration

Introduction

Cesarean section is one of the most common surgeries worldwide, and rates vary from 10 percent in industrialized countries to a very high rate reaching 80 percent in Brazil. Cesarean section wound infection is a significant morbidity in particularly in obese patients, and the incidence of this complication ranges from 0.3 to 30 percent in some countries, especially in developing and low socioeconomic countries (1). Surgical site infection in cesarean sections can cause adverse outcomes, including poor general conditions, anemia, necrotizing fasciitis, and may reach up to septicemia and septic shock, prolonged stay, and additionally the high cost of wound repair and the antibiotics given to improve the surgical sites of those patients. Wound infection presents with redness, serous exudation, induration, dehiscence, and gapping. After two days of wound infection, certain pathogens colonize the surgical site, including *E. coli* and *Staphylococcus epidermidis*. Intense inflammation follows colonization and may invade deep tissues (2, 3). Risk factors for surgical site infections include subcutaneous hematoma, amnionitis, tobacco smoking in pregnancy, long wounds, infrequent prenatal visits (fewer than 7 visits), morbid obesity, corticosteroid administration, subcutaneous fat thickness > 3 cm with neglected serous transudation, nonuse of antibiotic prophylaxis, pre-gestational diabetes, operating time ≥ 40 min, pregnancy-induced hypertension, prolonged labor, premature rupture of membranes, antepartum and postpartum hemorrhage, emergency unscheduled delivery, and rupture of membranes, especially when prolonged more than 24 hours (5-7). CS rates increased all over the world, without obstetrical or fetal

indications that should warrant CS. CS is an important risk the factor for postpartum infection with a twenty-fold increase compared to vaginal delivery (8-11).

Methodology

Setting

Zinat al-Hayat hospital located in Benha city- Egypt.

Study design and sample

The controlled clinical trial included 200 cases of primigravidas scheduled for cesarean delivery at full term.

Duration of the study

One year from January 2020 to January 2021.

Inclusion criteria

Primigravidas scheduled for elective cesarean section due to a contracted pelvis and malpresentation

Exclusion criteria

- Pre-gestational diabetes
- Body mass index of more than 30
- Gestational diabetes
- Preeclampsia eclampsia spectrum
- Placenta previa and accreta
- Previous cesarean section
- Anemic cases when hemoglobin below 10.5 gm/dl
- Premature rupture of membrane

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Groups

Group one [*the study intervention group*]; includes one hundred cases of primigravidas at full term who received gentamycin saline solution infiltrated in the subcutaneous tissue before skin closure with Prolene. Group two [*the control nonintervention group*] skin was closed with Prolene without subcutaneous infiltration with gentamycin saline solution.

Clinical evaluation

All cases were subjected to full history and clinical examination, including general abdominal local examination with complete ultrasound evaluation to confirm dates, fetal weight, liquor, and fetal heart with Doppler evaluation of the uteroplacental circulation, with complete local examination and pelvimetry to evaluate pelvic diameters.

The intervention

cases in the intervention received subcutaneous infiltration with gentamycin ampoule 40 mg mixed with 10 ml saline infiltrated in the subcutaneous tissue after securing all bleeding points then skin closed with prolene sutures.

Preoperative laboratory investigations

Complete blood count, fasting blood sugar, s creatinine, SGOT, SGPT, ESR, prothrombin time activated partial thromboplastin time with INR.

Outcome measures

- Wound pain
- Wound tenderness
- Serous exudation underdressing
- Wound bleeding.
- Wound dehiscence less than 2cm.
- Wound dehiscence more than 2cm.
- And cases with tenderness or serous exudate or bleeding kept under observation, the cover of the wound is removed to assess induration, erythema, pus, and wound dehiscence which is measured using a ruler to determine if it was less or more than 2 cm
- Cases monitored on the 2nd day and the 4th day postoperatively and the 7th day with evidence of infection cases were admitted for wound observation cleansing and dressing cover and also evaluated by ultrasound.
- In None infected cases, the cover was removed on the 7th day.

Results

There was no statistically significant difference between age body mass index and prenatal comorbidities. Regarding wound pain, there was a statistically significant difference with 15 out of 100 cases in the control group versus 2 cases. In the intervention gentamycin group P value=0.001. Regarding wound tenderness, there were 10 cases out of 100 in the control nonintervention group that showed wound tenderness compared to only one case in the intervention group with a two-sided P value of 0.005 with a very high statistically significant difference. Regarding total wound infection there were 8 cases in the control group compared to 1 case only in the intervention group with a P value of 0.01 and a high statistically significant difference see table one.

Discussion

Cesarean sections are a daily practice for obstetricians despite the simplicity and daily practice; cesarean section can

have morbidity for women, and the most frequent morbidity is wound infections, efforts have been made by many to lower the surgical site infection in cesarean sections, some added povidone iodine instillation in the wound or chlorhexidine, others used different new sets of surgical instruments to avoid contamination. Povidone iodine is a vasodilator and can cause vasodilatation with minor wound subcutaneous bleeding also, povidone-iodine is toxic to normal cells and can retard healing for many days.

Table 1. Outcome measures in the cases and controls

Item	Group one (gentamycin)	Group two (control)	P value
Wound pain	2	15	0.001
Wound tenderness	1	10	0.005
Serous exudate	1	8	0.01
Wound bleeding	0	5	0.0235
Wound Dehiscence more than 2cm	0	5	0.0235
Wound Dehiscence <2cm	0	3	0.08
Total wound infection	1	8	0.01
Pus	0	5	0.02

The presented work was an effort to reduce surgical site infection in cesarean sections, cases were recruited from those who attended zinat al-Hayat hospital and scheduled for primary cesarean section due to contracted pelvis or malpresentation, all cases were full term. Regarding wound pain, there was a statistically significant difference with 15 out of 100 cases in the control group versus 2 cases In the intervention gentamycin group P value=0.001. Regarding wound tenderness, there were 10 cases out of 100 in the control nonintervention group that showed wound tenderness compared to only one case in the intervention group with a two-sided P value of 0.005 with a very high statistically significant difference. Regarding total wound infection, there were 8 cases in the control group compared to 1 case only in the intervention group with a P value of 0.01 and a high statistically significant difference. The intervention in the presented study included subcutaneous infiltration of gentamycin ampoule 40 mg mixed with 10 ml saline the idea was that gentamycin is active against gram-negative bacteria like E Coli (the main guilty pathogen in surgical site infection) then closing the skin by prolene sutures. Cases were divided into two groups group one intervention gentamycin group with a total number in the group 100 and group 2 the control or the nonintervention group in whom the subcutaneous space was left without infiltration with gentamycin, the incidence of wound infection was 8 percent in the control group compared to 1 percent in the intervention group that dignified the efficacy of gentamycin infiltrations. Special steps are also required before infiltration like nonuse of povidone-iodine, securing all bleeding points in the subcutaneous space, short skin incision, the closure of the skin with a non-absorbable suture that is neutral and inert to the skin, and non-inflammatory like prolene sutures. The most important part also in reducing surgical site infection with cesarean sections is adequate prenatal care with correction of anemia and proper picking and treatment of cases with pre-gestational and gestational diabetes. The presented work reduced the surgical site infection significantly with the use of subcutaneous infiltration with gentamycin mixed with saline.

Funding statement

None

Conflict of Interest

The author declared that there is no conflict of interest.

Authors' contribution

The author of this study has a complete contribution to data collection, data analyses, and manuscript writing.

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