MJMR, Vol. 34, No. 2, 2023, pages (192-199).

Open Access
ISSN:2682-4558

Research Article

Comparison between uterine exteriorization and in-situ repair of uterus in caesarian section

Heba Reda Mohmed, Eisaa Mahmoud Mohamed and Gehad Mohammed Roshdy
Department of Obstetrics and Gynecology, Faculty of Medicine, El-Minia University

DOI: 10.21608/mjmr.2023.184649.1290

Abstract

Background: During a caesarean section, there is some debate over whether or not to exteriorize the uterus. Routine uterine exteriorization does not seem to be supported by enough evidence. It's still unclear whether this practice ought to be become standard operating procedure. Our goal was to compare the outcomes of Caesarean deliveries in which the uterine incision was repaired externally vs inside. **Methods:** A prospective Randomized and single-blinded trial spanned from February to December of 2022. Two groups, A and B, with A receiving repairs after exteriorization and B receiving in situ repair. Intraoperative internal bleeding, postpartum anemic, transfusion rate, mean operating time, perioperative wound infection rate, and postoperative nausea and vomiting are be measured. **Results:** A statistically significant increase in the frequency of nausea and vomiting among some of the women who had exteriorization compared to those whose uteri had repaired in-situ. Average preoperative haematocrit, postoperative haematocrit, estimated blood loss (575 vs 577 ml, p = 0.942), transfusion rate (15.3% vs 17.9%, p = 0.518), postpartum anaemia, operative time, and surgical site infections rate were not significantly different between the exteriorization and in situ groups. **Conclusion:** Exteriorization and in-situ repair of uterine incisions are equal in terms of intraoperative blood loss, postoperative anaemia, and infections at the surgical site, although the former is linked to significantly more nausea and vomiting than the latter. The results could not definitively prove that one was superior to the other.

Keywords: Uterine excision, uterine in situ repair, and caesarean section

Introduction

The Caesarean section is one of the longest medical procedures still in use today, with a history that dates to prehistoric times and also has developed into the modern treatment we use today[1]. When a fetus is delivered through Caesarean section, an incision is made in the mother's abdomen and uterus. It consists of a laparotomy and a hysterotomy, to be precise [1, 2]. The caesarean section rate, sometimes represented as a percentage, is the proportion of the amount of caesarean sections performed to the total number of births. Both industrialized and emerging nations are concerned about the rising prevalence of caesarean sections[3] .

Worldwide, the rate of Caesarean sections has risen during the last 40 years, in both industrialized and developing nations[4]. Similarly, the Previous cesarean rate seems to be rising in most Egyptian hospitals, perhaps due to the improved perception of the procedure's safety and increased awareness of its benefits among pregnant women[5].

Although not entirely mysterious, the factors that have led to this huge rise in C-sections are more nuanced than would at first seem. Indications for Caesarean sections have altered significantly in recent years and continue to evolve in response to new research and changing clinical practices. Caesarean

sections are presently mostly done for the baby's sake rather than the mother's [6,7,8]. Fetal discomfort, extended labor, breech presentation, numerous pregnancies, a history of caesarean section, and caesarean section on demand are all frequent and significant reasons. Non-medical reasons for caesarean section births have been the subject of an expanding amount of research in recent years [7, 8. 9, 10].

Although anesthetic and surgical safety have come a long way, Caesarean sections still have a higher mortality and morbidity rate than vaginal births[5,8]. Caesarean section rates, appropriate indications, preferred delivery methods, and whether or not this procedure exteriorizes the uterus have all been hotly debated in recent decades[3]. The caesarean section is among the most common major surgeries done every year. Based on the plant or nation, it may account for anything from 1% to 70% of total shipments [11, 12]. Caesarean section techniques have been refined in several ways over the years in an effort to cut down on operating time, make the delivery less traumatic for the mother, and increase the procedure's efficacy while decreasing its cost, reduce surgery complications, improve recovery time, and decrease hospital stays[11, 13].

Experts disagree on the best way to perform a skin incision, make an incision in the uterus; close the uterus, whether or not to close the peritoneum, whether or not to use a blunt or sharp epigastric entry peritoneum, whether or not to use chromic catgut or Polyglactin-910 for uterine repair, and many other finer details of the operation. However, many standard Caesarean section procedures lack substantial evidence from randomized controlled studies [14]. Many researches have been conducted over the years to determine whether or not the uterus should really be exteriorized after uterine repair, and the findings have been mixed [15]. Uterine exteriorization was thought to provide risks, such as nausea, labor discomfort, and complications during delivery.

Exteriorization advocates point to the speed with which the vaginal incision may be closed as evidence of the technique's benefits, but critics say it also raises the risk of infection and the discomfort patients feel after surgery [14]. It has been the opinion of many surgeons that the exteriorized uterus can be repaired more quickly and with less blood loss during surgery [12]. Others, however, are opposed to uterine exteriorization, especially in conjunction with epidural or epidural anesthesia, citing worries about the nausea and vomiting induced by uterine traction, as well as diastolic instability, the exposure of the fallopian tubes to superfluous trauma, the possibility of infection, the rupture of the utero-ovarian veins upon replacement, and pulmonary embolism[14]. Extremely rare, but potentially fatal, complications have been documented after Caesarean sections, and they have been linked to the exteriorization of the uterus [11]. To the best of the knowledge, there has been no universally acknowledged statement on the need or not of uterine exteriorization during uterine repair after caesarean section. The purpose of this research was to provide further evidence for or against the safety of maternal exteriorization on maternal deaths during and after caesarean section. As such, the purpose of this research is to determine whether or not one of these methods is preferable, and whether or not it is linked to lower rates of maternal morbidity.

Patients and methods

The present research was a randomized, controlled experiment that took place between February 2022 - December 2022 at Minia Pregnancy University Clinic and El-Minia General Hospital. The intended sample size for this research was 200 women who had reached their full length of pregnancy and were planning to have an elective caesarean section. Both groups of patients were selected at random. One hundred women had in-situ uterine incision repairs, making up Group 1. In the second group, 100 women had uterine incisions that required exteriorization.

The hospital's Scientific and Ethic Committee authorized the study's methodology. Both written and verbal material about the trial and an invitation to join were provided to all pregnant women who had an indication for caesarean birth. People who were okay with participating completed "informed consent" papers. Women carrying a single baby

through full term (>37 weeks) were included in the analysis. Prior to surgery, all of the women who agreed to participate were screened for age, parity, pregnancy, and body mass index. (BMI). Preoperative blood tests also included measuring hemoglobin and hematocrit. Women with severe anemia (Hb 8gm/dL), multiple pregnancies, placenta previa, early rupture of membranes, vaginitis, preeclampsia, diabetes mellitus, a previous or current history of heart problems, liver, renal disorders, or known coagulopathy, and women who have undergone abdominal or pelvic surgical procedure other than CD to repair a ruptured uterus were not included in the study.

All caesarean sections were performed by experienced obstetricians who had received extensive training in both incision healing methods and were working under the close supervision of a specialist and the study's lead investigator. All 200 patients had identical surgical procedures up to the time of placental delivery, at which point the uterus was taken out of the lamina propria there in exteriorzation group for repair and left in situ in the in situ group. Other aspects of the sealing were likewise performed consistently throughout all 200 patients. The use of spinal regional anesthesia and the administration of oxytocin were standardized for all surgeries. Antibiotic premedication before surgery is becoming normal practice. Before any surgery was performed, the things were done for each case: Patient pre- and post-operative hemoglobin and hematocrit levels were assessed, and a thorough personal, obstetric, medical, and previous history was collected. Mean operational time, estimated blood loss, and hypotension (defined as a dip in blood pressure recorded by the anesthesiologist) were some of the metrics evaluated between the two groups (usually more than 20 mmHg). 6 hours after surgery, a 10-point Visual Analog Scale was used to evaluate the patient's level of discomfort (VAS). A score of 0–5 indicates no or little pain, whereas a score of 6–10 indicates moderate to extreme pain. Postoperative pain was managed by administering (50 mg Amlodipine capsules) per rectum every 8 hours; if the patient required additional analgesic doses, this was noted as a need for additional analgesia. Bowel function was monitored by performing an abdominal auscultation with a stethoscope every 4 hours.

Infected surgical sites were identified by the presence of purulent incisional drainage or wound dehiscence. Length of hospitalization was recorded, beginning with the beginning of the caesarean delivery and ending with the patient's discharge. Endometritis was diagnosed based on signs of preoperative illness (> 38C° after the initial postoperative day), uterine tenderness, foul-smelling lochia, and leukocytosis (white phone add up >15,000/ml). This analysis focused mostly on the operation time and blood loss (blood transfusions, hemoglobin decreases, anticipated blood loss).-Incidence of postoperative complications such as endometritis and wound infection, recovery of bowel function, duration of hospital stay, surgical discomfort, fever, usage of postoperative analgesics, & hemodynamic instability were considered secondary outcomes. Reports of our main or secondary outcomes were required for inclusion.

Statistical analysis

In terms of the numbers, this is what we find: Statistics for the Social Sciences, Version 20.0 was used to evaluate the collected data (SPSS Inc., Chicago, Illinois, USA). Descriptive statistics were used to show the women's demographic information (using range, mean and standard deviation). All aspects of the two groups were compared, from their demographics to their main and secondary outcomes. Numerical data were given as Mean SD, and comparisons were made using the Student t - tests or Mann-Whitney U test. Categorical data were analyzed using the Chi-square test, and results were presented in the form of frequencies (number of instances) and percentages. The significance threshold was set at 5%, with a 95% confidence interval. Thus, we defined statistical significance as a P value below 0.05.

Results

One hundred and seventy women were randomized into either exteriorization (N=85) or in situ repair group (N=85). There was a protocol violation in one of the in situ group because she had inadequate spinal necessi-

tating general anaesthesia and endotracheal intubation and she was excluded. The data available for analysis was then, 169 (exteriorization [N=85] in situ repair group [N=84]). Based on the socio-demographic and reproductive characteristics (Table 1), there were no statistically significant differences found between the two groups with respect to the mean maternal age.

With regard to the category of Caesarean delivery (Table 2), no statistically significant differences were found between the two groups. Considering the cadre of surgeons that undertook the surgeries (Table 2); there were no statistically significant differences between the two groups in terms level of the surgeon (p – value = 0.248).
Table 3 displays the results; there is no significant statistical difference between exteriorization and in place uterine repair with respect to the mean pre haematocrit. Similar results were seen with regard to the mean postoperatively haematocrit level in the exteriorization as well as in situ group. Blood loss estimates were also similar across the two groups, with a mean of 575 ml and a median of 577 ml (p = 0.942). In this research, postpartum anaemia was defined as a haematocrit value of 30% or less in the postoperative period. There were higher cases of postpartum anaemia in the exteriorization group (30, 35.3%) than in the in situ repair group (22, 26.2%), but the difference was not statistically significant. There was also no statistically significant distinction between the groups on the other maternal variables, such as the length of the surgery or the incidence of infection at the surgical site. Exteriorization of the uterine for repair is linked to a higher incidence od nausea/vomiting (10.6% vs 2.4%; p-value= 0.031).

Table 1: Socio-demographic characteristics of women who had primary Caesarean Section.

	Exteriorization mean±SD	In situ mean±SD	p-value
Age	29.0±5.6	30.0±5.5	0.964*
Parity	2.0±1.7	2.0±1.8	0.652*
Gestational age	38.7±2.8	38.5±2.0	0.538*
Booking status			
Booked	68	66	0.819**
Unbooked	17	18	
Educational status			
None	2	0	0.497*
Primary	11	5	0.098**
Secondary	26	26	0.546**
Tertiary	46	53	0.236**

*T-test analysis **Chi-square

Table 2: Types of Primary Caesarean section and Cadre of the surgeon undertaking the Caesarean sections.

Caesarean section	Exteriorization	In situ	p-value
Elective	17 (20.0%)	26(31.0%)	0.072**
Emergency	68(80.0%)	58(69.0%)	
Senior registrars	76(89.4%)	80(95.2%)	0.248***
Consultants	9(10.6%)	4(4.8%)	

**Chi-square ***Fisher's exact test

Table 3: Outcome measures of the Parturient in both arms of the study.

	Exteriorization mean±SD	In situ mean±SD	p-value
Preoperative haematocrit	34.8±3.3	35.7±3.1	0.083*
Postoperative haematocrit	30.8±4.7	30.8±4.9	0.958*
Intraoperative blood loss	575±220.3	577±214.4	0.942*
Operation time (in minutes)	57.5±16.4	53.2±20.1	0.131*
Postpartum anaemia	30(35.3%)	22(26.2%)	0.200**
Blood transfusion rate	13(15.3%)	16(17.9%)	0.518**
Nausea/ Vomiting	9(10.6%)	2(2.4%)	0.031***
Surgical site infection	1(1.2%)	1(1.2%)	0.993

Statistical tests include the t-test, chi-square, and fisher's exact

Discussion

In this study, we aimed to compare their patients' outcomes across several key metrics, including intraoperative haemorrhage, postoperative anaemia, surgical duration, infection rates at the surgical site, and the occurrence of nausea and vomiting. Despite the fact that lower paroxysmal morbidity and extended hospital visit in the exteriorized group, the available evidence is insufficient to reach conclusions on which procedure (exteriorization or in silico repair of uterine restoration) offers advantages, according to a previous Review study that addressed this concern[(11)].

In this research, attempts were undertaken to standardise as many treatment factors as possible across the two groups, which is especially noteworthy given that previous studies on the topic had not standardised anaesthetic administration. To arrive at a reasonable conclusion on the option of uterine repair following Caesarean birth, this work may be included in a pool that would then be subjected to systematic review. In all, 169 women who had Caesarean sections for different reasons and were randomly assigned to either exteriorized womb repair (85 women) or in place uterine restoration (84 women) were included in the analysis. It is worth noting that no statistically significant variations in socio-demographic and reproductive variables were discovered between the two groups. This includes the mean mother age, mean parity, scheduling status, educational level, & mean gestational age at delivery. These findings are consistent with those from research involving a different demographic. No significant differences were seen between the two groups for preoperative haematocrit, postoperative haematocrit, estimated excessive bleeding, transfusion rate, postpartum anaemia, operational time, or the prevalence of surgical site infection. However, there was a significant increase in the frequency of cases of sickness and vomiting in the exteriorization group compared to the in situ group. The estimated intraoperative blood loss was not significantly different between the two uterine repair techniques (575220.3mls vs 577214.4 mls; P=0.942). This result is quite close to what was observed by Rio et al., 33 and Nasir et al., (625 mls vs 653.0 mls) [(12)]. Nasir and his team recruited primiparous and multiparous women who had Caesarean deliveries. Edi-Osagie et alresearch's supports this as well [(9)]. This finding, however, conflicts with others that have shown that uterine reconstruction by exteriorization may dramatically decrease blood loss in surgery in some populations[(5)].

Wahab et al.,.20 achieved a similar finding on decreased blood loss with exteriorization; however, they used both global and spinal anesthesia, which may have skewed their results. The uterus is brought to the outside of the body to facilitate mending, and this is

linked to fewer complications and less excessive bleeding [3]. The results of this investigation failed to show any connection between the two surgical methods and the occurrence of either an increase or decrease in blood loss. Contrary to the results found by Ezechi and colleagues, who found that the in situ group required four times as many blood transfusions as the exteriorization group, these data did not support their conclusions [13]. However, they remained mute when it came to the anaesthetic options available to their patients. In the in-situ group, 16 women (17.9%) required further blood transfusions, whereas only 13 women (15.3%) required exteriorization. The p-value for the test indicating whether or not the two groups were different was 0.518. Primary postpartum haemorrhage occurred in 5 women in the 1969 to 1973 group (2 owing to ectopic pregnancy and 2 dues to lateral expansion of the uterus), requiring intraoperative transfusions. After 48 hours postpartum, the exteriorization group had a cumulative transfusions rate of 15.3% owing to the discovery of severe to moderate anaemia in eight additional women. Seven women of the in situ subgroup had primary postpartum haemorrhage, all caused by uterine atony, and they were all transfused, along with nine additional women who had substantial anaemia after 48 hours postoperative haematocrit measurement, for a total transfusion rate of 17.9%. Women who suffered from atony-related postpartum haemorrhage reacted well to oxytocics and uterine massage.In addition, it's important to remember that women whose Caesarean sections were planned saw less of a drop in haematocrit than those whose deliveries were conducted during active labour.

Oedema and abdominal swelling of the lower segment, as well as the administration of oxytocic medications during labour, may contribute to uterine atony in the postpartum period, explaining this observation. However, there was no statistically significant difference in the numbers of emergency and caesarean sections performed across the two groups (P-value = 0.072).Our research showed that there were more anaemic women in the exteriorization group (30, 35.3%) than in the control group (22, 26.2%). While there were more cases of postpartum anaemia in the exteriorization group, the difference really wasn't statistically significant (P=0.200), suggesting there is no causal link between the two. However, a research conducted in Lagos found the opposite: that more women in the in situ group than the exteriorization group suffered from postpartum anaemia[9]. There were also strong connections between visually assessed blood loss and postoperatively hct after Caesarean births, which is an interesting finding. Women with a haematocrit value between 27% and 29% were found to be hemodynamically stable and so did not need transfusions. Although the mean operating time was somewhat shorter because when uterus was repaired in situ (57.516.4 vs 53.220.1 minutes), the difference was not clinically significant (p=0.131).

Consistent with previous research' results, this is a strong conclusion [10]. However, counter to these results this research did not correspond with previous studies which indicated a considerable shorter duration in in situ womb repair comparison t exteriorization [7]. While Gode et al., 38 reported on a higher sample size, their research was retrospective rather than prospective. The projected design has been placed higher in the order of evidence in the past. However, our main outcome of postpartum anaemia means that we did not have enough participants to draw any conclusions about other factors. Furthermore, contrary to the results of previous research, we did not observe that the exteriorization group had substantially shorter operating times than the in situ group [11]. In both groups, the rate of infections at the surgical site was modest and comparable, at 1.2%. Good antiseptic and antiseptic procedures, as well as the preventive administration of strong antibiotics to all patients in accordance with the study's guidelines, may account for these results. No statistically significant difference was found (p=0.993). Primary post haemohrrage & severe post operational anaemia struck the patient in the in situ group, whereas protracted surgical exposure was experienced by the affected individual there in exteriorization group who required repair of a transverse uterine extension. These results did not come as a surprise and supported the findings of Dhar et al., who found that women with anaemia had a greater risk of wound infection

than women without anaemia[12]. According to the research, there is a correlation between the length of time a surgery takes and the probability of it developing an infection [8]. This conclusion, that the two groups' infection rates are comparable, is in line with those of prior research. Nonetheless, it contradicted previous research that found in situ uterine repair to be associated with a decreased incidence of surgical site infection.

According to these data the incidence of preoperative delivery nausea/vomiting was much greater when uterine repairs were conducted exteriorized (10.6%), compared with something in situ (2.4%) correspondingly, and there was statistically significant difference between the two, p-value \s<0.031. Numerous investigations have found a robust correlation between the presence of nausea and vomiting and the degree to which the uterus was exposed during the repair [13]. There were no statistically significant changes in the onset of nausea and vomiting between exteriorization and then in situ repairs of the uterus, which contradicted these results [6]. The cause of nausea and vomiting after surgery has been attributed to a variety of reasons. Visceral discomfort and hypotension are two of the most significant yet easily avoided causes of disability[13]. Nausea and vomiting were reported by participants in the exteriorization arm both immediately after the procedure (especially during discomfort or pulling of the uterus) and again when the uterus had to be repositioned back into the abdominal cavity.

To sum up comparing intraoperative blood loss, after anaemia, operation duration, and surgical wound infections between exteriorization or in situ closure of uterine wounds shows no significant difference between the two. However, more people in the exteriorization group had nausea and vomiting than those in the in-situ group. However, the results did not provide enough evidence to say that one was clearly better than the other. Therefore, if symptoms of nausea and vomiting can be watched and treated, any technique of repairing the uterine incision following Caesarean birth is acceptable.

Conclusion

Exteriorization and in- situ repair of uterine incisions have similarity in associated intraoperative blood loss, postoperative anaemia, duration of operation time and surgical site infections but, the former is associated with significant higher perception of nausea/vomiting. The choice of either method may therefore be at the surgeon's discretion and familiarity provided the complaints of nausea/vomiting can be monitored and addressed accordingly. The findings could not categorically affirm the superiority of one over the other and perhaps, a large multi centre trials may be necessary to address the dilemma of which is to be considered superior.

Source of funding: This project was locally funded from El-Minia University.

Conflict of interest: None.

Acknowledgments: We acknowledge all participants included in this investigation.

References

1. Abdellah MS, Abbas AM, Ali MK, MAhmoud A and Abdullah S. A.: Uterine exteriorization versus intraperitoneal repair: effect on intraoperative nausea and vomiting during repeat cesarean delivery– A randomized clinical trial. Facts Views Vis Obgyn, 10(3):131-137(2018).
2. Al Rifai RH.: Trend of caesarean deliveries in Egypt and its associated factors: evidence from national surveys, 2005– 2014. BMC Pregnancy and Childbirth, 1:417-23(2017).
3. Betran AP, Torloni MR and Zhang JJ.: WHO statement on caesarean section rates. Int J Obstet Gy., 123(5):667–670(2016).
4. Bharathi KR, Mahendra G, Vindhyshree S and Sherawath S.: A comparative study of exteriorization and intraperitoneal closure of uterus in caesarean delivery. Int J Reprod Contracept Obstet Gynecol., 6: 5415-9(2017).
5. Chauhan S, Devi SPK.: A randomized comparative study of exteriorization of uterus versus in situ intra-peritoneal repair at cesarean delivery. Int J Reprod Contracept Obstet Gynecol., 7:281-6(2018).

6. Dodd JM, Anderson ER and Gates: Surgical techniques for uterine incision and uterine closure at the time of cesarean section. Cochrane Database Syst Rev., 7: 4732-38(2014).
7. El-Khayat W, Elsharkawi M and Hassan A.: A randomized controlled trial of uterine exteriorization versus in situ repair of the uterine incision during cesarean delivery. International Journal of Gynecology and Obstetrics, 127(2): 163-166(2014).
8. Gode F, Okyay RE, Saatli B, Ertugrul C, Guclu S and Altunyurt: Comparison of uterine exteriorization and in situ repair during cesarean sections. Archives of Gynecology and Obstetrics, 285(6): 1541-1545(2012).
9. Jacobs-Jokhan D and Hofmeyr G.: Extra-abdominal versus intra- abdominal repair of uterine incision at cesarean section. The Cochrane Database of systemic Reviews, 4: 85- 93(2010).
10. Mireault D, Loubert C, Drolet P, Tordjman L, Godin N, Richebé P and Zaphiratos V.: Uterine Exteriorization Compared With In Situ Repair of Hysterotomy After Cesarean Delivery: A Randomized Controlled Trial. Obstet Gynecol., 135(5):1145- 1151(2020).
11. Mohr-Sasson A, Castel E, Lurie I, Heifetz S, Kees S and Sivan E.: Uterine exteriorization versus intraperitoneal repair in primary and repeat cesarean delivery: a randomized controlled trial. The Journal of Maternal-Fetal and Neonatal Medicine, 20: 1-6(2020).
12. Orji EO, Olaleye AO, Loto OM and Ogunniyi SO.: A randomised controlled trial of uterine exteriorisation and non-exteriorisation at caesarean section. Australian and New Zealand Journal of Obstetrics and Gynaecology, 48(6): 570-574(2010).
13. Shiya A, Akhtar S and Khan S.: Comparison of intraoperative and post-operative complications of intraabdominal versus extra abdominal uterine repair at cesarean delivery. Pak Armed Forces Med J., 65: 191-94(2015).
14. Walsh CA and Walsh SR.: Extraabdominal vs intraabdominal uterine repair at cesarean delivery: a metaanalysis. American Journal of Obstetrics and Gynecology, 200(6): 625-26(2010).
15. Zaphiratos V, George RB, Boyd JC and Habib AS.: Uterine exteriorization compared with in situ repair for Cesarean delivery: a systematic review and meta-analysis. Canadian Journal of Anesthesia, (2015)