

EFFECT OF CLOSURE VERSUS NON-CLOSURE OF PARIETAL PERITONEUM AT CAESAREAN SECTION ON ADHESION FORMATION.



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ABSTRACT

Background

Caesarean section (CS) is a standard obstetric procedure, and it is rate increasing worldwide. However, intra-abdominal adhesion is one complication of caesarean section and other obstetric and gynaecological surgeries.

Objectives

This study aims to compare the frequency and severity of post-surgical adhesions among patients with closed and non-closed parietal peritoneum at their first caesarean section.

Patients and Methods

A cross-sectional study was conducted in maternity and private hospitals in Sulaymaniyah/Kurdistan/Iraq, from July 2015 to December 2020. Involved 190 pregnant ladies entered second CS at term. Patient records were then abstracted to assess prior CS techniques, including parietal peritoneal closure, which the same obstetrician did. A total of 190 patients were checked for that purpose; each was checked to know whether she has intra-abdominal adhesion or not and at the same time to know whether her previous CS was performed by peritoneal closure or not. The main parameters were adhesion formation in the second CS and the type of adhesion. The maternal age, occupation, parity, and gestational age were also recorded—Chi-square test used for statistical analysis of variables.

Results

Based on the outcome, two groups (one with peritoneal closure and the other without it) were identified, they were compared regarding their maternal age, parity, gestational age and occupation. There was significantly more adhesion between the omentum and Scarpa fascia in the non-closure group (28.3%) compared to (13.1%) in the closure group with (p-value 0.01), which is significant. On the other hand, filmy adhesion was more in the closure group (63.6%), while thick adhesion was more in the non-closure group (53.3%) with (p-value 0.34), which is not significant.

Conclusion

Parietal peritoneum closure at first caesarean section was associated with less adhesion formation. Therefore, the practice of non-closure of parietal peritoneum at caesarean delivery is not recommended.

Keywords: *Caesarean section, Peritoneum, Closure, Non-closure, Adhesion.*

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INTRODUCTION

Caesarean section is a routine part of modern obstetric practice to reduce maternal and perinatal morbidity and mortality. There is significant geographical variation in CS rates throughout the world, ranging from 0.4 per cent in Chad to 45.9 per cent in Brazil, with significantly higher rates seen in developed countries. The reasons for higher CS rates in developed countries are not all clear. However, they include socio-demographic factors, clinical practices and importantly, the attitudes of healthcare professionals and women towards the procedure. The 'right' CS rate is unknown, but in 1985 WHO recommended a CS rate of no higher than 15 per cent ⁽¹⁾.

Women undergoing CS fall into three groups: those who have a clinical indication for CS, women with previous CS who may opt for either vaginal birth after CS (VBAC) or elective repeat CS (ERCS), and those who considering CS with no clinical indication (maternal request CS- MRCS). The risk of respiratory morbidity in the neonate decrease after 39 weeks gestation; for this reason, CS should be performed after 39 weeks unless there is a maternal or fetal reason for earlier delivery ^(1,2).

Types of CS include:

1. Lower uterine segment incision: The most common CS procedure uses a transverse incision in the lower uterine segment (LUS). The abdomen is usually opened with a Pfannenstiel incision and Maylard incision, which differ from Pfannenstiel. The bellies of the rectus abdominis muscle are transected horizontally to widen the operating space. Vertical. Usually, a midline sub-umbilical incision allows access to the abdomen and the pelvis. It, therefore, is often employed if access to the upper uterine segment is required or other surgical procedures are anticipated. However, it is associated with increased pain, a higher incidence of wound dehiscence, and more concerns regarding cosmetic appearance ^(2,3).

2. Upper uterine segment incision: a method for surgically delivering a baby through a vertical midline incision into the uterus's body, which extends from above the lower segment and reaches the uterine fundus (UUS), classical CS. The vertical Delee incision is sited one-third in the lower segment and two-third in the upper. However, it has a higher risk of rupture in labour, and elective CS is recommended in future pregnancies at 37-38 weeks. Indications stem from difficulty in

exposing or safely entering the lower uterine segment: for example, a densely adhered bladder from previous surgery, lower uterine or cervical fibroid, the cervix has been invaded by cancer, rupture membranes with a transverse lie and the back presenting, preterm delivery where the lower uterine segment is poorly formed, placenta praevia with anterior implantation, especially those complicated by placenta accrete syndromes, fetal abnormality (example conjoint twins, massive hydrocephaly, large sacrococcygeal teratomas)⁽¹⁻⁴⁾.

In LUS, the utero-vesical peritoneum is divided, the bladder is reflected caudally, and a transverse incision is made in the LUS, taking care to avoid injury to the fetus. Enlarging the incision with scissors increases the risk of unintended extension compared with digital expansion. Next, a hand is inserted to guide the delivery of the presenting part through the lower segment. Wrigley's forceps may be used to assist delivery in cephalic presentation. After delivery of the placenta, the uterine cavity should be checked to ensure it is empty. There is no advantage in inserting a finger through the cervix to facilitate drainage of lochia, even an elective CS ⁽²⁾.

At present, the traditional two-layer repair is recommended based on observational data showing a fourfold increase in uterine rupture with single-layer closure, mainly if a locking suture technique is used. Whichever closure method is used, it is vital to ensure optimum alignment of all layers. Blood loss is much less with LUS compared to UUS caesarean section. Before abdominal closure, undertake a careful peritoneal toilet to remove excess blood and liquor and inspect both adnexae ⁽²⁾.

Regarding the peritoneal closure, the reason for it is to establish normal anatomical relations, prevent adhesion formation between the intestine and fascia or between uterus and fascia, reduce the risk of infection, and reduce the risk of herniation or dehiscence. However, prospective randomized trials have not proved the advantage of this technique. On the other hand, personalization tends to cause tissue ischemia, necrosis, inflammation, and foreign body reaction to suture material. These factors may slow down the healing process and are considered a necessary precursor for visceral and bladder adhesion formation and is not cost-effective. However, no follow-up studies are addressing potential long-term complications such as adhesion formation and bowel obstruction ^(1,5).

If the peritoneum is left open, experimental studies have shown that a spontaneous reperitonealisation will appear within 48-72 hours after injuring the peritoneum with complete healing after 5-6 days. Non-closure of the visceral and the parietal peritoneum is recommended at CS. The associated with lower early postoperative complications, including wound hematoma, postoperative febrile morbidity, wound infection, and postoperative pain and analgesia. It is associated with significantly shorter operating times and postoperative hospital stay. It leads to a quicker return of bowel activity and improves maternal satisfaction. Closure of the anterior abdominal wall depends on the type of incision. In the case of midline skin incision, mass closure of the rectus sheath and subcutaneous tissues should be employed using a slowly absorbable continuous suture as this is associated with reduced wound pain, sinus formation, incisional hernia and wound dehiscence. In transverse skin incision, the rectus sheath is closed using non-locking, continuous, absorbable suture. If there is more than 2 cm of subcutaneous fat, this layer should be closed with an absorbable suture, decreasing the incidence of wound infection ^(1,5).

There are different wound closure methods, including subcuticular sutures (either absorbable, which do not require material removal such as proline which does require removal), interrupted sutures (which require removal), or staples. In women with an increased risk of hematoma or infection, an interrupted method has the advantage of removing one or two to allow drainage if required. Staples, although quicker to insert, is associated with more pain. Subcuticular absorbable sutures benefit painless, have an excellent cosmetic effect and have no need for removal ^(1,5).

Justification for the study is increasing the practice of non-closure of parietal peritoneum at CS by obstetricians.

The Objective of this study was to find the prevalence or rate of post-surgical adhesions and their relation with the practice of parietal peritoneal closure during first CS, and to compare the severity of intra-abdominal adhesion between the closure and non-closure group.

PATIENTS AND METHODS

A cross-sectional study was conducted in a maternity teaching hospital, and private hospitals in Sulaymaniyah/Kurdistan/Iraq, performed over (July 2015- December 2020), which included 190 pregnant

ladies who entered second CS at term. Patient records were abstracted to assess prior surgical techniques, including Peritoneal parietal closure. The visceral peritoneum was not closed in all cases. Therefore, a total of 190 patients were reviewed regarding their peritoneal closure in previous CS (as an exposure and risk) for adhesions. At the same time, they were checked to know whether each has an adhesion (as an outcome).

One obstetrician did all cases of first CS as the technique may affect the result. Exclusion criteria were history of other abdominal surgery, presence of adhesion in the first CS, unavailable first postoperative note, pelvic infection, wound infection or breakdown following first CS, immune-compromised patients, patients on immunosuppressant drugs, uncontrolled diabetes mellitus, and CS during the late first or second stage of labour. In addition, maternal age, occupation, parity, and gestational age were recorded. Observation of filmy and thick adhesion of omentum to Scarpa fascia done. Bowel and uterine adhesions to the anterior abdominal wall were also recorded during the second CS.

The data was coded and entered into an excel sheet then transferred to IBM SPSS version 24.0 for analysis.

Descriptive statistics were performed to show different study variables' frequency and relative frequency in tables and graphs. Then, the variables were compared to find an association between them using the Chi-square test; a P value of 0.05 was considered a cut-off point for statistical significance.

RESULTS

A total of 190 cases were taken during their second CS, 84 cases had peritoneal closure during their first CS (closure or exposed group), and 106 cases had peritoneal non-closure in their first CS (non-closure or non-exposed group).

The two groups were comparable regarding maternal age, parity, gestational age, and occupation (i.e. they are matched with these characteristics), as shown in table 1. There was no statistically significant difference in maternal age between the two groups (p-value 0.14). 76 cases (90.5%) were para 1-2 inclosure group compared with 99 cases (93.4%) in non-closure group, 8 cases (9.5%) in closure group were para 3 or more compared with 7 cases (6.6%) in non-closure group with (p-value 0.46). There was no statistically significant difference between the two groups (p-value 0.06 and 0.35), respectively.

Table 2 shows the difference between the two groups concerning intra-abdominal adhesion formation in the second CS.

Regarding omental adhesion to the anterior abdominal wall, 11 cases (13.1%) in the closure group have adhesions compared to 30 cases (28.3%) in the non-closure group, 73 cases (86.9%) in the closure group, and 76 cases (71.7%) in the non-closure group have no adhesions (also shown in figure 1), with (p-value 0.01) which is statistically significant.

Thick and filmy omental adhesions were 4 (36.4%) and 7 (63.6%) cases in the closure group, respectively, 16 (53.3%) and 14 (46.7%) cases in the non-closure group,

respectively (also shown in figure 2), with (p-value 0.34) which is statistically insignificant.

Other types of visceral adhesions were more in the non-closure group, 1 case (1.2%) in the closure group and 3 cases (2.9%) in the non-closure group with (p-value 0.43) which is statistically insignificant. The only case seen in the closure group was adhesion between the small bowel and Scarpa fascia. While in the non-closure group, the first case was adhesion between small bowel and Scarpa fascia, the second case was adhesion between uterus and Scarpa fascia, and the last case was adhesion of uterus with small bowel and omentum.

Table 1. Demographic characteristics of cases in study groups

	Peritoneal closure		Total	P-value
	Yes	No		
Age				
≤ 30 years	45 (64.2%)	68 (53.6%)	113 (59.5%)	0.14
> 30 years	39 (35.8%)	38 (46.4%)	77 (40.5%)	
Parity				
One - Two Children	76 (90.5%)	99 (93.4%)	175 (92.1%)	0.46
≥ Three Children	8 (9.5%)	7 (6.6%)	15 (7.9%)	
Gestational Age				
37 - 38 weeks	39 (46.4%)	64 (60.4%)	103 (54.2%)	0.06
39 - 41 Weeks	45 (53.6%)	42 (39.6%)	87 (45.8%)	
Occupation				
Housewife	60 (71.4%)	82 (77.4%)	142 (74.7%)	0.35
Employee	24 (28.6%)	24 (22.6%)	48 (25.3%)	

Table 2. Visceral adhesions and type of adhesions in study groups.

Adhesions	Peritoneal closure		Total	P-value
	Yes	No		
Omental adhesions to Scarpa fascia				
Yes	11 (13.1%)	30 (28.3%)	41 (21.6%)	0.01
No	73 (86.9%)	76 (71.7%)	149 (78.4%)	
Types of Omental adhesions				
Filmy adhesion	7 (63.6%)	14 (46.7%)	21 (51.2%)	0.34
Thick adhesion	4 (36.4%)	16 (53.3%)	20 (48.8%)	
Other types of visceral adhesions				
Yes	1 (1.2%)	3 (2.9%)	4 (2.1%)	0.43
No	83 (98.8%)	102 (97.1%)	185 (97.9%)	

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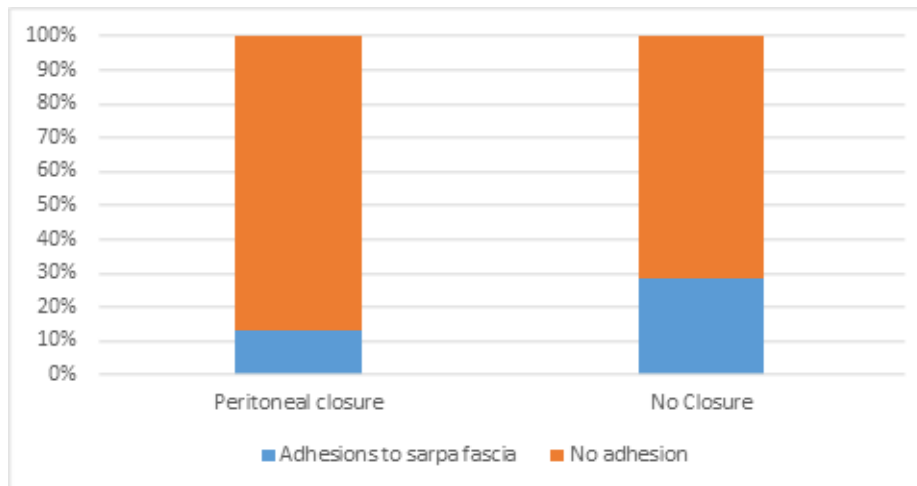


Figure 1. Adhesions of omentum to Scarpa fascia in study groups.

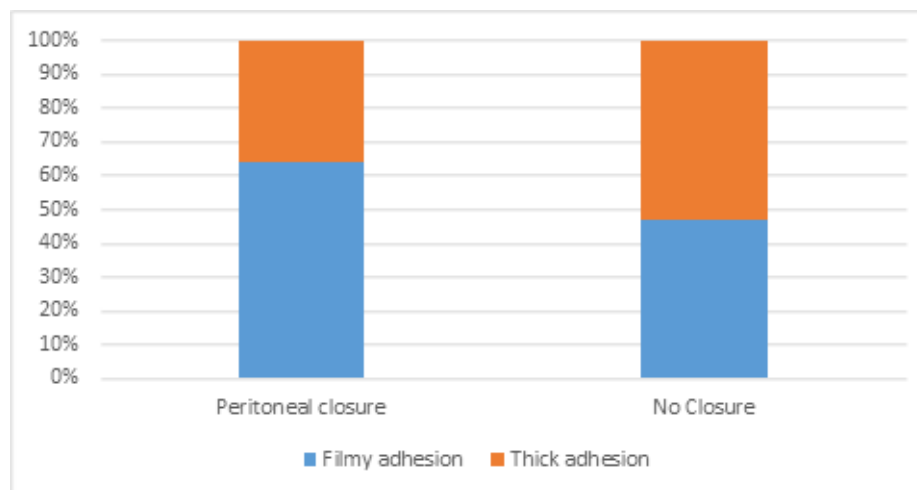


Figure 2. Type of adhesions in study groups.

DISCUSSION

Cesarean section is a standard obstetric procedure, and its rate varies widely across the world. There are many studies about the technique of C/S and the effect of closure and non-closure of peritoneum on intra-abdominal adhesion and other parameters like postoperative pain, infection, recovery rate with different results. Closure and non-closure of the peritoneum are all-time discussed between surgeons.

This study is to compare intra-abdominal adhesion formation in closed and non-closed parietal peritoneum at their first CS. Confounding factors can be excluded as they are matched by the chi-square test for maternal age, parity, gestational age, occupation.

Adhesion of peritoneum to Scarpa fascia is more in the

non-closure group (p-value 0.01), which is going with studies done by Myers SA et al., Takreem A, Lyell DJ et al., Zairean Z et al., Gultekinm N, Z Yiyang et al. which showed less omental and other visceral adhesions in closure group⁽⁶⁻¹¹⁾. However, contrary studies were done by Kapustian V et al., Sparic R et al. (literature review), which showed no increase in the risk of adhesion among the peritoneal non-closure group or even the risk lower among them^(12,13). A literature review done by Doret M et al. reveals that non-closure does not increase or even reduce the adhesions risk⁽¹⁴⁾. A systematic review done by Bamigboye AA et al. found no difference in adhesion formation between both groups⁽¹⁵⁾; the results of the last two reviews are not going with my study.

The severity of adhesions is more in the non-closure group; filmy adhesion in the closure group is 63.6% and 46.7% in the non-closure group. However, thick

adhesion is more in the non-closure group 53.3% and 36.4% in the closure group with a p-value of 0.34, which is statistically insignificant; these results go with studies done by Yiyang Z et al. ⁽⁹⁾. Nevertheless, they are not going with studies done by Lyell DJ et al. and Myer SA et al., which reveal that severity of adhesion is statistically significant in the non-closure group ^(10,11). These differences between the study and the previous two studies may be related to the small sample size in the study groups.

In conclusion, parietal peritoneum closure at first caesarean section was associated with less adhesion formation. Therefore, the practice of non-closure of parietal peritoneum at caesarean delivery is not recommended.

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