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ORIGINAL ARTICLE

Combined procedure of cesarean delivery and preperitoneal mesh repair for inguinal hernia: An initial experience

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KEYWORDS

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Summary *Background:* Combined surgery for cesarean delivery and preperitoneal mesh repair for inguinal hernia has not been previously reported.

Objectives: Our aim was to describe the method and to present the results of this simultaneous surgery through a single incision.

Methods: From 2012 to 2014, 15 patients underwent cesarean delivery combined with preperitoneal mesh repair for inguinal hernia. All patient characteristics and perioperative findings were recorded.

Results: Among 15 patients, 13 had unilateral inguinal hernias and two had bilateral hernias. The mean times spent for unilateral and bilateral hernias were 35.8 minutes (range, 30–45 minutes) and 67.5 minutes (range, 65–70 minutes), respectively. Direct and indirect hernias were present in one and 15 patients, respectively. One patient had mixed hernia. No significant complication was observed perioperatively. Hospital stay ranged from 1 day to 3 days (mean, 1.87 days), and all patients were discharged without any problem. No recurrence was found during the follow-up periods.

Conclusion: Single anesthesia, single incisional scar, and single hospitalization are the major advantages of this simultaneous approach of cesarean delivery and preperitoneal mesh repair for inguinal hernia. Our analysis suggests that this combined procedure can be performed safely in selected cases.

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1. Introduction

Surgery for abdominal wall hernias, particularly inguinal herniorrhaphy, is among the most common general surgical procedures.¹ The lifetime risk of having an inguinal hernia has been estimated to be 27% for men and 3% for women.² During pregnancy, inguinal or umbilical hernias have a reported incidence of approximately 1:2000, and are usually treated after delivery on an elective basis.³ By contrast, inguinal hernia repair at the time of cesarean delivery (CD) has not been well described except a few single case reports or small case series.^{4–6} Preperitoneal inguinal hernia repair with mesh use is a well-known and frequently performed surgical technique. To the best of our knowledge, there is only a single study about preperitoneal mesh repair for inguinal hernia during CD in the current literature.³ The aim of this prospective study is to evaluate the short- and long-term outcomes of this combined surgery.

2. Methods

2.1. Patients

Between 2012 and 2014, 15 consecutive pregnant women with groin hernia underwent hernioplasty by using preperitoneal mesh repair technique at the time of CD. All participants were planned CD patients, and had no serious obstetric pathology. Painful inguinal swelling was present in all cases, and the diagnosis of inguinal hernia was also confirmed by ultrasonography preoperatively. The surgical procedure was explained in detail to the patients, and then a written informed consent form was obtained from all patients. Any serious complication during CD was accepted as a contraindication to subsequent mesh repair of inguinal hernia. The operations and postoperative follow-ups of the patients were performed by a single obstetrician and general surgeon. Demographic and clinical data of the patients were recorded. Intraoperative and postoperative findings were also noted in detail. All the patients were operated on under epidural anesthesia. Perioperative antibiotic prophylaxis with 1 g cephalosporin was given to all patients intravenously.

2.2. Definition of the combined procedure

After disinfection of the surgical area with povidone iodine, the operation was started with an approximately 10 cm classic Pfannenstiel incision. Exposure of the uterus was provided with routine steps, and a standard CD was performed by the obstetrics team. After the uterine wound was closed carefully, the operative wound was washed with saline. Then, the preperitoneal space was entered between rectus muscle and peritoneum with blunt dissection by the general surgery team. Firstly, the dissection started into the retropubic region, also called the Retzius and Bogros spaces. Then, the retroinguinal region was dissected through the posterior of epigastric vessels. Subsequently, the dissection was extended to the iliopsoas muscle laterally. Finally, the dissection of the surgical area was successfully completed, and the direct or indirect hernia sac

reduction was performed (Figure 1). A 15 cm × 11 cm polypropylene mesh was spread out to a keyhole as shown in Figure 2A. Although the round ligament is an embryological remnant and is usually cut during the mesh placement, lack of this ligament has been reported to be associated with uterine retroversion that can cause chronic pelvic pain. For this reason, the round ligament was engaged from the keyhole, and the lateral keyhole interval was sutured and closed (Figure 2B). Later, the mesh was fixed with a nonabsorbable 2-0 polypropylene stitch to three points, the posterior rectus sheath, the pectineal ligament and the spina iliaca anterior superior, to prevent dislocation. The same procedure was performed for the other side in patients with bilateral hernias. Finally, the wound was closed without using a drain (Figure 3).

2.3. Statistical analysis

SPSS 21.0 software (SPSS Inc., Chicago, IL, USA) was used for data analyses. Descriptive analysis was carried out for demographic and clinical features. The results are presented as mean ± standard deviation/percentages for continuous variables, and number/percentage for categorical variables.

3. Results

Fifteen female patients (mean age, 32.2 ± 2.98 years; range, 28–37 years) underwent preperitoneal mesh repair for inguinal hernia combined with CD. Previous CD was the leading indication for CD ($n = 14$, 93.3%); however, only one patient (6.7%) underwent CD due to cephalopelvic disproportion. None of the cases had concomitant medical problem. In 12 patients, inguinal hernia was detected during pregnancy. By contrast, three patients had a diagnosis of groin hernia before their pregnancies. Thirteen (86.7%) patients had unilateral hernias, and two (13.3%) had bilateral hernias. None of these was recurrent hernia. Of the unilateral hernias, eight were on the right and five were on the left. Most of the hernias ($n = 15$) were in

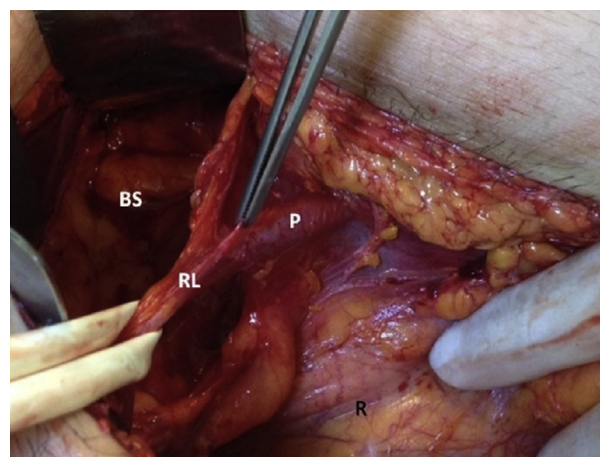


Figure 1 View of retzius (R), round ligament (RL), peritoneum (P), and bogros space (BS) after blunt dissection and hernial sac reduction.

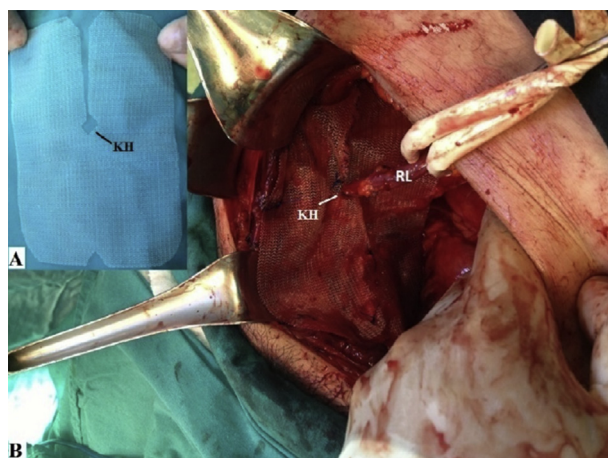


Figure 2 (A) 15 cm × 11 cm polypropylene mesh with keyhole (KH) and (B) mesh placement after closure of lateral key hole interval and view of round ligament (RL) with mesh.

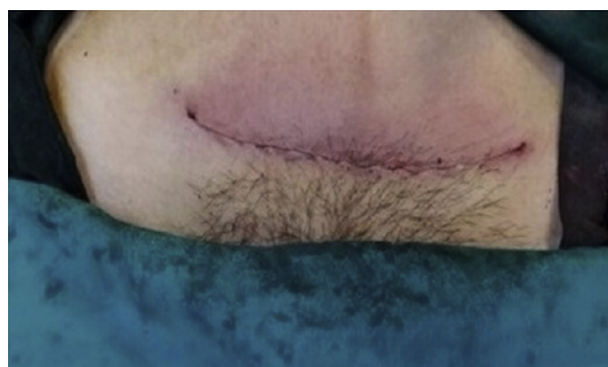


Figure 3 Immediate postoperative view of the Pfannenstiel incision.

indirect form; however, one was direct and one was mixed type. Patient demographics, obstetric data, and hernia characteristics are summarized in [Table 1](#). All hernias were repaired successfully by preperitoneal mesh repair technique through Pfannenstiel incision. The mean operative time for unilateral preperitoneal mesh repair was 35.8 minutes (range, 30–45 minutes). However, preperitoneal mesh repair for bilateral hernias took 67.5 minutes (range, 65–70 minutes). Intraoperative blood loss was insignificant (mean, 18 mL; range, 10–40 mL). No intraoperative, postoperative, or perinatal complication was recorded. The mean hospitalization time was 1.87 days (range, 1–3 days), and all patients were discharged uneventfully. There was no recurrence during the follow-up periods (mean, 17 months). All patients were satisfied by the combined procedure. Perioperative findings are presented in [Table 2](#).

4. Discussion

In pregnancy, intraabdominal pressure is increased due to an enlarging uterus, and this condition predisposes to the occurrence of abdominal wall hernias. Although these hernias are not common in pregnancy,⁷ groin hernia is the

Table 1 Demographic, obstetric and clinical data of the study population

Number of cases	15
Age (y), mean (range)	32.2 (28–37)
Indications for CD	
Repeated CD	14 (93.3%)
Cephalopelvic disproportion	1 (6.7%)
Gravidity–parity	
G2P1	7 (46.7%)
G3P2	5 (33.3%)
G3P1A1	1 (6.7%)
G5P1	1 (6.7%)
G4P3	1 (6.7%)
Number of hernias	17
Site of hernias (inguinal)	
Right	8 (53.3%)
Left	5 (33.3%)
Bilateral	2 (13.3%)
Types of hernias (inguinal)	
Direct	1 (5.8%)
Indirect	15 (88.2%)
Mixed	1 (5.8%)

G = gravidity; P = parity.

Table 2 Summary of intraoperative and postoperative data

Operating time (min), mean (range)	
Unilateral hernia repair	35.8 (30–45)
Bilateral hernia repair	67.5 (65–70)
Type of anesthesia	Epidural (n = 15)
Estimated intraoperative blood loss, mean ± SD	18 ± 8.19 mL
Complications	
Intraoperative	None
Postoperative	None
Perinatal	None
Mortality	None
Mean hospital stay (d), mean ± SD (range)	1.87 ± 0.743 (1–3)
Mean follow-up time (mo), mean ± SD (range)	17.1 ± 5.68 (8–30)
Hernia recurrence	None

SD = standard deviation.

most frequent type with a reported incidence of one in 1000.⁸ Traditionally, the “watchful waiting” strategy has been widely accepted in the management of inguinal hernias during pregnancy, and therefore such patients are usually operated on after delivery.⁵ By contrast, simultaneous inguinal hernia repair can be performed safely during other operations such as prostatic surgery. In a report by Antunes et al,⁹ it was shown that the combination of inguinal hernia repair with prostatectomy did not lead to increase operative and postoperative morbidity. They also showed a significant reduction in hospitalization time and health costs by the combined surgery. In the literature,

there are also many studies consistent with that work.^{10,11} However, the combination of CD with other surgical procedures is not a common approach. This may be explained by the widespread belief regarding the possible association between combined operations and maternal or perinatal complications. Therefore, a limited number of studies on the combined procedure of CD and hernia repair have been reported in the literature.^{3–6,12} One of those is a case study about preperitoneal herniorrhaphy adjunct to CD, which was also the first report on simultaneous groin hernia repair with an obstetric surgery.⁴ The others are also small-scale studies that consist of inguinal hernia or umbilical hernia cases. For instance, a clinical study of 12 cases with seven open inguinal herniorrhaphies and five umbilical herniorrhaphies was reported by Buch et al⁶ in 2008, without any complication or recurrence. In another study with 28 pregnant women, Lichtenstein hernia repair was performed for 19 patients with inguinal hernia while the remaining nine patients who had umbilical hernia underwent herniorrhaphy with mesh use or primary suture.⁵ The authors did not report any significant postoperative complication or recurrence. Furthermore, patient satisfaction was quite good because of the elimination of the potential risk of a second surgery. The other outcomes such as intraoperative blood loss, operating time, and hospitalization time were similar in these two studies when compared with CD alone. The findings of our case series also correlated with these results.

Although various surgical methods on groin hernia repair have been described to date, the Stoppa procedure, first described in early 1990s, is a safe and effective surgical approach which is performed by placement of a patch into the preperitoneal area.^{13,14} This technique, named as giant prosthetic reinforcement of the visceral sac, leads to occlude all the potential hernial points, and can be easily performed by Pfannensteil incision. Lower recurrence rate is also one of the main advantages of this method. In a study of 234 patients with Stoppa groin hernia repair, the authors reported a recurrence rate of 0.85% (2 of 234) per patient.¹⁵ Fernández-Lobato et al¹⁶ reported only three recurrences in 210 patients who underwent Stoppa hernia repair for bilateral inguinal hernia in their work. Our technique is a modified form of the Stoppa procedure, and is generally known as preperitoneal mesh repair. This technique also leads to occlude all potential hernia points, and has low recurrence rates as seen in the Stoppa procedure. Similarly, no recurrence was observed in our study population.

Today, it is well known that combined operations have many benefits for patients, such as one single anesthesia and one single incision. However, some concerns related to combined procedures, including increased intraoperative blood loss, increased analgesic requirement, delayed wound healing, increased wound infection, difficulties of first breastfeeding, increased hospital stay, and prolongation of return to daily activities, may limit its widespread use. In addition, it is generally considered that the laxity of the abdominal wall due to hormonal changes and enlarged uterus during pregnancy can lead to a weak and unreliable hernia repair, which can predispose to recurrence.¹⁷ Incorrect or inadequate mesh placement due to the stretched abdominal wall is also another concern of hernia

repair at full-term pregnancy. For this reason, the majority of surgeons perform hernia repair in pregnant patients only in acute conditions such as strangulation and incarceration.^{18,19} The clinical outcomes of our case series showed that this view was unfounded. In this pilot study we observed that the abdominal wall was noticeably reduced immediately after CD, and both dissection of the surgical area and mesh placement were not difficult, contrary to the general belief. At this point, it should be noted that addition of preperitoneal mesh repair to CD prolonged the operation time in the present study. However, the operating time of combined surgery was found to be shorter than the total operating time of the operations when performed separately. Single anesthesia and single incision in combined surgery were the main reasons for this advantage. In our opinion, the operating times in our study were longer than those previously reported, but at acceptable levels. The combination of CD and preperitoneal mesh repair for inguinal hernia also did not increase the perioperative complications, mortality, and recurrence rates. In addition, postoperative pain control by routine analgesics was sufficient, and no problem was observed in the first breastfeeding.

It is known that patient satisfaction is one of the most important indicators of all novel surgical methods. In the present study, all patients were satisfied with the simultaneous operation, and stated that they could recommend this approach to all pregnant women with inguinal hernia. It is clear that one of the benefits of this combined procedure is avoiding the separation of mother from newborn caused by the second operation. It appears that this advantage led to an increase in the satisfaction of our patients.

In conclusion, CD and simultaneous preperitoneal inguinal hernia repair with mesh use can be considered as a safe, effective, and alternative surgical option for selected cases. This combined procedure provides many benefits such as the presence of two operations in one session with single anesthesia, single incision, avoiding rehospitalization, and reducing medical costs.

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