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Laparoscopic repair of cesarean scar defect

Mohamed Mahmoud Elsayed*, Ayman Shehata Dawood, Hesham Mohamed Borg, Hesham Abdelaziz Salem

Department of Obstetrics and Gynecology, Faculty of Medicine, Tanta University, Tanta, Egypt

E-mail: senior alves112@gmail.com

Abstract: Background: The aim of this study istoevaluate the feasibility, efficacy and outcome of laparoscopic repair of cesarean scar defect. **Methods:** This is a prospective cohort clinical study conducted on (19) patients with Cesarean Scard effect attending Obstetrics and Gynecology Department in Tanta University Hospital under went laparoscopic repair of the defect and follow up by Transvaginal Ultrasound and MRI after three months for the remaining myometrial thickness and improvement of symptoms. **Results:** This study was conducted on (19) patients with CS defect attended Obstetrics and Gynecology Department in Tanta University Hospital. Two patients were missed during the follow up and were excluded from the data analysis. So the number of participating women was 17 case under went laparoscopic repair and showed significant improvement of symptoms and postoperative anatomic outcomes. **Conclusions:** Laparoscopic repair of cesarean scar defect in symptomatic patients with abnormal uterine bleeding, dysmenorrhea, chronicpelvic pain and/or infertility showed significant improvement of symptoms and good postoperative anatomic outcomes.
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Keywords: Cesarean section, Complications of Cesarean section, cesarean scar defect, Ultrasonography, MRI, Laparoscopy, Repair of isthmocele.

1. Introduction

Cesarean delivery is one of the most common surgical procedures in women, with rates of 30% or more. As a result, the rate is rising for cesarean scar defect, the presence of a "niche" at the site of cesarean delivery scar, with the reported prevalence between 24% and 70% in a random population of women with at least one cesarean delivery.

Other terms for cesarean scar defect include a niche, isthmocele, uteroperitoneal fistula, and diverticulum. [1,2]

Cesarean scar defect forms after cesarean delivery, at the site of hysterotomy or cesarean delivery, on the anterior wall of the uterine isthmus, While this is the typical location, the defect has also been found at the endocervical canal and mid-uterine body. Improper healing of the cesarean incision leads to thinning of the anterior uterine wall, which creates an indentation and fluid-filled pouch at the cesarean scar site. [3]

The exact reason why a niche develops has not yet been determined; however, there are several hypotheses, broken down by pregnancy-related and patient-related factors. Surgical techniques that may increase the chance of niche development include low (cervical) hysterotomy, single-layer uterine wall closure, use of locking sutures, closure of hysterotomy with endometrial-sparing technique, and multiple cesarean deliveries. Patients with medical conditions that may impact wound healing (such as diabetes, smoking, immune-compromised diseases, chemotherapy and radiotherapy) may be at increased risk for niche formation. [2]

Isthmocele can be asymptomatic or it can manifest symptoms such as: post- menstrual abnormal uterine bleeding (PAUB), chronic pelvic pain, dyspareunia, and infertility. [4-6]

Patients of childbearing age complaining of abnormal uterine bleeding and with a history of cesarean delivery, should raise the suspicion of isthmocele, although this symptom is also common to hormonal dysfunctional disorders such as endometrial hyperplasia and organic pathologies like submucosalmyomas, polyps, etc. [7]

2. Methods

This study was conducted on (19) patients with CS defect attending Obstetrics and Gynecology Department in Tanta University Hospital. During the period of the study from April 2018 to April2019.

Inclusion criteria:

1. Females with previous cesarean delivery

2. either single or multiple presented by pain or bleeding and or infertility.

3. Cesarean scar defect with remaining myometrium measuring less than 3 mm using U/S and MRI.

4. Symptomatic patients desire future pregnancy.

Exclusion criteria

1. Previous uterine surgery other than cesarean sections including myomectomy, hystroscopic resection of uterine septum or polyp, repair of perforated uterus from IUD application or D & C.

2. Congenital anomalies of the uterus including septate, subseptate, bicornuate uterus.

3. Medical disorders of the female constituting high anaesthetic risk or contraindicate future pregnancy including (uncompensated cardiac disease, renal impairment, liver disorders, immune-compromise disorders).

Methods

All cases were subjected to the following:

1. Written informed consent from every patient included in this study. The consent is proved by the Medical Ethical Committee of Tanta University Hospital.

2. Full history taking with special attention on:

- Personal History including age of the patient, duration of marriage, occupation, address and any special habits.
- Menstrual history including postmenstrual spotting, prolonged menstrual period, menorrhagia, dysmenorrhea, dyspareunia, chronic pelvic pain and infertility.
- Obstetric history included any antenatal, natal, postnatal complications as fever or puerperal sepsis.
- Past History of surgical operations especially history of uterine surgery either caesarean section, myomectomy, hysterotomy or even dilatation, hysteroscopic procedures and curettage in previous abortion.
- Operative details of previous cesarean section including number, type (elective CS or urgent), rupture uterus, any intra operative complications.
- Past history of medical disorders like diabetes mellitus and smoking.

3. Full general, abdominal and local examination:-

- General examination: including height, weight, and BMI.
- Abdominal examination: including scars of previous CS or any operation.
- Local examination: inspection, vaginal examination, speculum and bimanual examination (for size and mobility of uterus, palpation of adnexa, direction of cervix, any abnormal discharge).

4. Routine laboratory investigations including: (CBC, ABO-Rh, Coagulation profile, Renal function tests, Liver function tests).

5. Imaging investigations:-

A) Transvaginal ultrasound using a Samsung ultrasound machine, model H60, USS- H60NF4K/WR (Samsung, Korea) with Samsung Medison 3D4-9 3D Endocavitary Probe Hz: 4 – 9 MHz, The patients were asked to empty the urinary bladder just before the procedure. The transducer tip was covered with ultrasound coupling gel and introduced into protective rubber sheet (condom), and then, the probe tip was covered with a small amount of gel and was gently inserted into the vagina while the patient was in the lithotomy position. To obtain images in varying directions, planes and depths, tilting or angling of the shaft by its handle slowly along the longitudinal axis of the probe to change the scanning plane at 360 degreerange for detecting of presence of niche, its site, extent, depth and width of the scar defect and the remaining myometrial thickness.

B) MRI examination for confirmation of presence of niche, its site, extent, depth and width of the scar defect and the remaining myometrial thickness.

6. Diagnostic Hysteroscopy.

- Preoperative preparation:-The patient kept on liquid diet for day and bowel preparation done by castor oilintak.
- Using laparoscopic tower formed of the following:-

-T. V monitor (neovo, china)
-Light source (XENON, Germany)
-Insufflator (KARL STORZ, Germany)
-Hysteromatte (KARL STORZ, Germany)
-Endoscopy camera (KARL STORZ, Germany)
-Video recorder (Sony, Japan)
-Electerosurgical Generator (The Valleylab Force 2, Germany)

- Position: patient put in lithotomy position, painting and drapping of towels with support of both legs.
- General anesthesia through endotracheal intubation.
- Evacuation of bladder by urethral catheter.
- Examination under general anathesia (EUA) to determine position of uterus (AVF or RVF) and bimanual examination of adenexia.
- Holding the cervix by multi too the dvolsullum.
- Dilatation done by Hegar dilator up to hegar number6.

- Introduction of Hysteroscope.
- The endocervical canal was seen then the uterine cavity was visualized, both tubal ostia were seen then the scar defect can be seen & visualized.

7. . Surgical procedure.

- All patients underwent Laparoscopy for repair of cesarean scar defect through the following:-

A) Pneumoperitonium.

✓ A veress needle is inserted into the peritonium through vertical incision 10 mm at base of umbilicus in the middle line then insufflation start in rate of 1 L/ min. then 15 L/min. with CO_2 gas through automatic insufflation (KARLSTORZ)

B) Trocers & Cannulae.

✓ Trocer & cannula (10 mm) was inserted at umbilicus in middle line infra- umbilical.

✓ Trocer & cannula (5 mm) was inserted as the following:-

(a) First at supra pubic in the middle line.

(b) Second one at the right iliac fossa in the mid-clavicularline.

(c) Third one at the left iliac fossa in the mid-clavicularline.

(C) Diagnostic laparoscopy and visualization of peritoneal cavity.

(D) Operative laparoscopy:-

The peritoneum over the bladder was incised and the bladder was mobilized inferiorly over the cervix.

✓ Hysteroscopic examination was done, and hysteroscopic view of the cervical canal showed an anterior pseudo cavity at the level of the dehiscence.

✓ When the light of the laparoscope was turned off, red light is visible by laparoscopy at the site of the scar during hysteroscopic examination, the upper and lower edge of the scar was recognized.

✓ The scar was excised and running suture in single layer was done using special type of suture (Stratafix 2/0) of Ethicon, USAlaparoscopically.

8. Post-operative follow-up:

- All patients used OCPs for three months.
- Transvaginal ultrasound and MRI to detect myometrial thickness and coapitation of edges after three months.
- Improvement of symptoms or not.

Potential risks

- No potential risks are considered by using Color Doppler.
- Side effects of nitroglycerine include: hypotension and headache.
- Any unexpected risks appeared during the course of the research will be cleared to participants and the ethical committee on time.

Ethical committee

- The study was started after medical ethical committee approval.
- Written consent from all included patients.
- All included patient knows about the aim of present study, risk factors, possible complications and risk of failure.

Statistical Analysis

Data were statistically described in tens of mean ± standard deviation (± SD), and range, or frequencies (number of cases) and percentages when appropriate. Comparison of numerical variables between the study groups was done using McNemar test. Agreement was tested using kappa statistic. Accuracy was represented using the terms sensitivity, specificity, +ve predictive value, -ve predictive value, and overall accuracy. p values less than 0.05 was considered statistically significant. All statistical calculations were done using computer program SPSS (Statistical Package for the Social Science; SPSS Inc., Chicago, IL, USA) release 15 for Microsoft Windows (2006). Accuracy Calculations: Sensitivity = T (+)ve ^ [T (+)ve + F (-)ve] Specificity = T (-)ve ^ [T (-)ve + F (+)ve] Positive predictive value = T (+)ve ^ [T (+)ve + F (+)ve] Negative predictive value = T (-)ve ^ [T (-)ve + F (-)ve] Overall accuracy = [T (+)ve + T (-)ve] ^ All sample

3. Results

This study was conducted on (19) patients with CS defect attended Obstetrics and Gynecology Department in Tanta University Hospital. Two patients were missed during the follow up and were excluded from the data analysis. So the number of participating women was 17 cases.

Table (1): shows: The mean age for the patients was 27.32 ±4.298 years. The mean BMI for the patients was 23.50±2.397. The mean parity for them was 2.93 ± 0.824. The mean HB concentration (gm/dl) was 11.556±0.5276.

Table (2): showed the patients complained of postmenstrual spotting & dysmenorrhea (35.29 %) of cases, the patients that not improved postoperative were (6.25%) and this is statistically significant (P.value 0.0005). the patients complained of chronic pelvic pain were (29.41%) of cases, all patients were improved postoperative which is statistically significant (P.value 0.003). the patients complained of infertility were (35.29 %) of cases, only 6.25 % not get pregnant which is statistically significant (P.value 0.0005).

Table (3): Ultrasound was used to measure the thickness of the residual myometrium covering the defect. These measurements were correlated with

pelvic MRI measurements (T2-weighted and T1-weighted images with saturation of fatty tissue). Ultrasound revealed a normal-sized uterus and adnexa in all cases, the longitudinal view showing the mean thickness of there sidualmyometrium covering the defect tobe 1.918± 0.465 (mm). MRI confirmed the presence of a normal pelvis. On sagittal views, the mean residual myometrium covering the dehiscence was 1.542 ± 0.365 (mm) with no statistically significant difference between them (P-value 0.12). On T1-weighted images with saturation of fatty tissue. Three months after surgery, the mean residual myometrium was evaluated via US, The mean thickness of the residual myometriumwas8.262 ± 0.501 with statistical significance between pre and post operative measurement (P-value 0.005*). post operative MRI show mean thickness of the residual myometrium was 9.5±0.744 (mm) with statistical significance between pre and postoperative measurement (P-value 0.005*) but there is no statistically significant difference between US and MRI post operatively (P-value 0.15).

Table (1): The characteristic data of the patients:

	Age (years)	**BMI** (kg/m^2)	**Parity**	**Number of previous CS**	**HB concentration** (gm/dl)
Range	21 – 35	20 – 27	1-4	1-3	10.5 – 12.5
Mean + SD	27.32 ±4.298	23.50±2.397	2.93±0.824	2.48±0.653	11.556 ±0.5276

Table (2): Pre & post-operative symptoms of patients included in the study.

Symptoms	**Pre-operative symptomatic patients**		**Post-operative of symptomatic patients (percentage)**		Type of test (value)	p.value
	number	**percentage**	**number**	**percentage**		
postmenstrual spotting, Dysmenorrhea	6	(35.29%)	1	(6.25%)	**T-test (2.2)**	0.0005
Chronic pelvic pain	5	(29.41%)	0	0 %	**T-test (2.1)**	0.003
infertility	6	(35.29%)	1	(6.25%)	**T-test (2.2)**	0.0005

Table (3): The change in the myometrial thickness (mm) pre and post operative after three months during the period of the study.

Myometrial thickness	pre-operative		post-operative after three months		p.value Type of test (its value)
	Range	Mean ± SD	Range	Mean ±SD	
US (mm)	1.1 – 2.5	1.918 ±0.465	7.5-9.2	8.262 ± 0.501	0.005* T-test (2.3)
MRI (mm)	1 – 2.1	1.542 ± 0.365	8.4-10.9	9.5±0.744	0.005* T-test (2.4)
p-value	0.12		0.15		
Type of test (its value)	T-test (1.88)		T-test (1.86)		

4. Discussion

Cesarean delivery is one of the most common surgical procedures in women with increasing rate of cesarean deliveries, the rate is rising for cesarean scar defect, the presence of a “niche” at the site of cesarean delivery scar, Cesarean scar defect forms after cesarean delivery, at the site of hysterotomy or cesarean delivery, on the anterior wall of the uterine isthmus. [1,2]

The objective of this study was to evaluate the feasibility, efficacy and outcome of laparoscopic repair of cesarean scar defect.

The present study started with nineteen (19) patients with CS defect attending Obstetrics and Gynecology Department in Tanta University Hospital, the age of the patients range between (21 to 35) years old, the parity of the patients range between 1-4, Hb % > 11gm/dl, body mass index "between" (20-27 kg/m^2), with history of previous cesarean sections.

During the follow up of the selected cases Two patients were missed during the follow up and were excluded from the data analysis. So the number of

participating women was 17 cases.

Transvaginal ultrasound using a Samsung ultrasound machine for detecting presence of niche, its site, extent, depth and width of the scar defect and the remaining myometrial thickness was done.

MRI examination for confirmation of presence of niche, its site, extent, depth and width of the scar defect and the remaining myometrial thickness, then all patients underwent Laparoscopy for repair of cesarean scar defect.

From the results of the present study, it was found that the mean age for the patients was 27.32 ±4.298 years. The mean BMI for the patients was 23.50±2.397. The mean parity for them was 2.93 ± 0.824. The mean HB concentration for the patients was 11.556 ±0.5276 (gm./dl).

Patient symptoms included dysmenorrhea, postmenstrual spotting chronic abdominal pain and infertility. In the present study, six patients (35.29%)) complained of dysmenorrhea, postmenstrual spotting, five patients (29.41%) complained of chronic pelvic pain, six patients (35.29%) complained of infertility. After surgery, all patients showed relief of symptoms except 2 patients complained from inter-menstrual bleeding and infertility. Also, the study agreed with Donnez et al. [8] that was conducted on three patients underwent cesarean section and presented with symptomatic dehiscence at the level of the incision. It was concluded that evaluation of uterine scar dehiscence after cesarean section can be performed by ultrasound and magnetic resonance imaging, and laparoscopic surgical repair may be performed with good postoperative anatomic outcomes.

The present study went with Sen et al [9] which proposed a critical cutoff value of2.5 mm for LUS thickness during pregnancy to enable trials of labor after cesarean section. We subsequently proposed a cutoff of >3 mm to recommend laparoscopic repair of defects in non-pregnant women.

Ultrasound was used to measure the thickness of the residual myometrium covering the defect. These measurements were correlated with pelvic MRI measurements (T2-weighted and T1-weighted images with saturation of fatty tissue). Ultrasound revealed the mean thickness of the residual myometrium covering the defect to be 1.918± 0.465. MRI confirmed it as the mean residual myometrium covering the dehiscence was 1.542 ± 0.365 with no statistically significant difference between them (P-value 0.12). Three months after surgery, the mean residual myometrium was 8.262 ± 0.501 by U/S with statistical significance between pre and post operative measurement (P- value 0.005*). Post operative MRI show mean thickness of the residual myometrium was 9.5±0.744 with statistical significance between pre and post operative measurement (P-value 0.005*) but there is no statistically significant difference between U/S and MRI post operatively (P-value0.15).

Naji et al [10] proposed a standardized approach to measure cesarean section scar defects using ultrasound in non-pregnant women. We agree that a standardized approach is mandatory and would be useful to correlate apparent defects with defect function in further studies. However, residual myometrial thickness values must be correlated with the risk of uterine rupture or dehiscence to define a critical cutoff value in non-pregnant women. *Maria-Laura, et al.* [11] that was conducted on 13 patients which had laparoscopic repair of uterine scar defects after cesarean section and pregnancy outcomes in a series of 13 patients. Defects and the residual anterior uterine wall were evaluated using ultrasound and magnetic resonance imaging (MRI). Patients' clinical symptoms were recorded. Pregnancy outcomes were investigated after laparoscopic surgical repair. Intervention included laparoscopic repair of the defect, including excision of fibrotic tissue and laparoscopic closure of the anterior uterine wall. The defect was completely corrected using this technique in all 13 patients. Four patients became pregnant spontaneously, 3 delivered via cesarean section between 38 and 39 weeks, and 1 is currently pregnant. Evaluation of uterine scar defects after cesarean section can be performed using ultrasound and MRI, and the defect can be repaired via laparoscopy, with reproducible postoperative anatomic and functional outcomes, also showed an agreement with our results.

Conclusion

From the study we could conclude that laparoscopic repair of cesarean scar defect in symptomatic patients with abnormal uterine bleeding, dysmenorrhea, chronic pelvic pain and / or infertility showed significant improvement of symptoms and good postoperative anatomic outcomes.

References

1. Martin JA, Hamilton BE, Osterman MJ, Curtain SC, Matthews TJ. National Vital Statistics Report. centers for disease control and prevention national center for health statistics, U.S Depart of Health and Human Services.2015;64(1):1–65.
2. Bij de Vaate AJ, van der Voet LF, Naji O, et al. Prevalence, potential risk factors for development and symptoms related to the presence of uterine niches following cesarean section: systematic review. Ultrasound Obstet Gynecol.2014;43(4):372–382.
3. Vervoort AJ, Uittenbogaard LB, Hehenkamp WJ, Brolmann HA, Huirne JA. Why do niches develop in Caesarean uterine scars? Hypotheses

on the aetiology of niche development. Hum Reprod.2015;30(12):2695-2702.
4. Florio P, Gubbini G, Marra E, Dores D, Nascetti D, Bruni L, et al. A retrospective case–control study comparing hysteroscopic resection versus hormonal modulation in treating menstrual disorders due to isthmocele. Gynecological Endocrinology. 2011;27(6):434-8.
5. Uppal T, Lanzarone V, Mongelli M. Sonographically detected caesarean section scar defects and menstrual irregularity. Journal of Obstetrics and Gynaecology. 2011;31(5):413-6.
6. Wang C-J, Huang H-J, Chao A, Lin Y-P, Pan Y-J, Horng S-G. Challenges in the transvaginal management of abnormal uterine bleeding secondary to cesarean section scar defect. European Journal of Obstetrics & Gynecology and Reproductive Biology. 2011;154(2):218-22.
7. Heller DS. Pathologic basis for abnormal uterine bleeding with organic uterine pathologies. Menopause. 2011;18(4):412-5.
8. Donnez O, Jadoul P, Squifflet J, Donnez J. Laparoscopic repair of wide and deep uterine scar dehiscence after cesarean section. Fertility and sterility. 2008;89(4):974- 80.
9. SEN, S.; MALIK, S.; SALHAN, S. Ultrasonographic evaluation of lower uterine segment thickness in patients of previous cesarean section. *International Journal of Gynecology & Obstetrics*, 2004, 87.3:215-219.
10. NAJI, O., et al. Visibility and measurement of cesarean section scars in pregnancy: a reproducibility study. *Ultrasound in Obstetrics & Gynecology*, 2012, 40.5: 549-556.
11. Marotta M-L, Donnez J, Squifflet J, Jadoul P, Darii N, Donnez O. Laparoscopic repair of post-cesarean section uterine scar defects diagnosed in nonpregnant women. Journal of minimally invasive gynecology.2013;20(3):386-91.

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