ORIGINAL ARTICLE: REPRODUCTIVE SURGERY

Gynecological and obstetrical outcomes after laparoscopic repair of a cesarean scar defect in a series of 38 women

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Objective: To evaluate gynecological and obstetrical outcomes, as well as remaining myometrial thickness, after laparoscopic repair of a cesarean scar.
Design: Observational study and prospective evaluation of the remaining myometrium before and after repair.
Setting: Academic department in a university hospital.
Patient(s): A series of 38 symptomatic women with cesarean scar defects and remaining myometrial thickness of less than 3 mm, according to magnetic resonance imaging.
Intervention(s): Laparoscopic repair of the defect.
Main Outcomes Measure(s): Increase in myometrial thickness at the site of cesarean section, gynecological and obstetrical outcomes, and histological analysis of the defect after excision.
Result(s): The mean thickness of the myometrium increased significantly from 1.43 ± 0.7 mm before surgery to 9.62 ± 1.8 mm after surgery. All but three patients were free of symptoms. Among the 18 women with infertility, eight (44%) became pregnant and delivered healthy babies by cesarean section at 38–39 weeks of gestation. Histological analysis, performed in all 38 cases, revealed the presence of endometriosis in eight women (21.1%). Muscle fiber density was significantly lower compared with adjacent myometrium.
Conclusion(s): In symptomatic women with residual myometrial thickness of less than 3 mm who wish to conceive, laparoscopic repair could be considered an appropriate approach. (Fertil Steril® 2016;■:■–■. ©2016 by American Society for Reproductive Medicine.)
Key Words: Cesarean scar defect, niche, laparoscopic repair, hysteroscopy, myometrial thickness

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Over recent decades, the number of cesarean sections (CSs) has continued to rise worldwide.

In the United States, the proportion of CSs performed in 2007 was over 30% (1–4), while rates in China climbed as high as 35%–58% in 2010 and up to 80% in the private sector in Brazil.

This growing CS rate has stimulated interest in a frequently encountered morbidity described as a cesarean scar defect, also termed "niche" by some authors (5, 6).

Anomalies in a cesarean scar can be visualized by hysterosalpingography, transvaginal sonography (TVS), saline infusion sonohysterography (SIS), hysteroscopy, and magnetic resonance imaging (MRI) and are characterized by a defect within the myometrium, reflecting a breach at the site of a previous CS (7, 8) (Fig. 1).

CS scar defects are increasingly described, and the reported incidence is as high as 61% after one CS, reaching 100% in women undergoing at least three (9).

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O.D. has nothing to disclose. J.D. has been a member of the Scientific Advisory Board (SAB) of PregLem S.A. since 2007; held PregLem stocks related to SAB activities that were sold in October 2010 upon PregLem's full acquisition by the Gedeon Richter Group; there is no relationship between the stock payment value and future commercial performance of the studied drug. R.O. has nothing to disclose. M.-M.D. has nothing to disclose.
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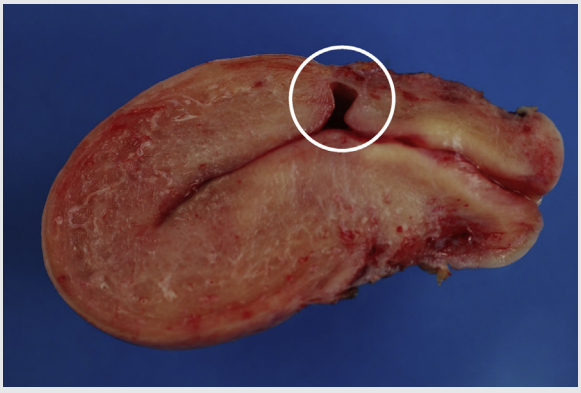
FIGURE 1



Sagittal view of a frozen section from a hysterectomy specimen. A deep anterior defect covered with a thin layer of myometrium (*white circle*) can be observed at the level of the supposed site of CS.

Donnez. Laparoscopic repair of cesarean scar defects. Fertil Steril 2016.

The most useful discriminating measurement is the thickness of the remaining myometrium (9, 10). Although the risk of cesarean scar defects remains unclear, there is obviously an association between large defects detected in nonpregnant women and dehiscence or uterine rupture in subsequent pregnancy (odds ratio [OR], 11.8; 95% confidence interval [CI], 0.7–746) (10). The risk of uterine rupture or dehiscence was reported to be even higher in another study in women with large defects (OR, 26.05; 95% CI, 2.36–287.61) (11).

In a review, Bij de Vaate et al. (12) defined niches as large when the remaining myometrial thickness was 2.5 mm based on SIS evaluation, while Bujold et al. (13) determined a lower uterine segment median value of 2.8 mm as the cutoff for risk of uterine rupture. A cutoff value of 3 mm was chosen by Donnez et al. (7) and Marotta et al. (14) on the basis of MRI evaluation.

Intermenstrual spotting, dysmenorrhea, dyspareunia, and chronic pelvic pain are the most commonly observed symptoms. According to the literature (15–17), subsequent fertility may be impaired, with the risk of infertility estimated to be between 4% and 19%. Accumulation of mucus or blood in the defect, leading to the presence of intrauterine fluid, could prevent penetration of sperm cells or embryo implantation (12,15–18).

The first laparoscopic repair of a uteroperitoneal fistula caused by CS was performed by the group of Nezhat (19). Laparoscopic repair of large defects was subsequently described by Donnez et al. in 2008 (7), showing an increased risk of uterine rupture, and the first series of 13 patients was reported several years later (14).

In the present paper, we report the largest series (n = 38) of symptomatic women who have undergone laparoscopic repair of large cesarean scar defects with a remaining myometrium of less than 3 mm. This series incorporate patients from prior small series of the same group. All of them were evaluated both pre- and postoperatively by MRI. This is also the first study reporting histological data on cesarean scar defects.

MATERIALS AND METHODS

No Institutional Review Board approval was required for this study. The surgical technique was first described by the authors (7) in 2008 and later recognized as an appropriate approach for correction of the CS defects in symptomatic patients (14). The present study is a prospective evaluation of a larger series.

The characteristics of the 38 patients are summarized in Table 1 (this number includes the previously reported series of 13 women). Twenty-five of them had undergone one CS, 12 had undergone two CSs, and one had undergone three. Only one patient had experienced a vaginal delivery, followed by two CSs.

Patients were selected according to their symptoms (bleeding, pain, or infertility) and the presence of a remaining myometrium measuring less than 3 mm at MRI evaluation (Fig. 2A–2C). All the women underwent TVS and MRI to preoperatively evaluate the defect and thickness of the remaining myometrium (Table 1). Correction of the defect was proposed to patients who were fully informed about the procedure and possible surgical outcomes, as reported in our previous papers (7, 14). All patients consented to participate after receiving clear information on the advantages and disadvantages of both hysteroscopic and laparoscopic approaches. As stated by Nezhat et al. (20), standard practice would have involved performing hysteroscopic resection of the defect in patients who no longer wished to conceive (20, 21). However, in our series, hysteroscopic resection was not offered due to the risk of bladder injury and uterine perforation in patients with myometrial thickness of less than 3 mm. This was clearly stated in one of our previous papers (14).

Surgical Technique

All surgical procedures reported in this series were performed by two of the authors (J.D., n = 4; and O.D., n = 34). The complete surgical technique is described in detail in one of our previous publications (8), but the most important steps of the procedure are summarized below.

Using CO_2 laser (Lumenis-Sharplan), we opened up the scar from one end to the other (Supplemental Fig. 1A). Fibrotic tissue was then excised from the edges of the defect (Supplemental Fig. 1B) to access healthy myometrium and facilitate further healing. Before closing the defect, a Hegar probe was inserted into the cervix to preserve the continuity of the cervical canal with the uterine cavity. For the first layer, three separate sutures were placed to close the scar using 2-0 Vicryl SH (Johnson & Johnson; Supplemental Fig. 1C). A second layer of separate stitches was applied to achieve double-layer closure. The peritoneum was then closed using Monocryl 0 MH+ (Johnson & Johnson) running suture (third layer; Supplemental Fig. 1D). Vervoort et al. (22) suggested that retroflexion of the uterus may impair wound healing after CS and encourage formation of cesarean scar defects. For this reason, the round ligaments were shortened bilaterally in case of a retroflexed uterus. At the end of surgery, hysteroscopy was performed to visualize the repair of the cervical