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Incomplete healing of the uterine incision after caesarean section: Is it preventable?

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Abstract

Objective: To find out whether a change in suturing technique might affect the healing of the uterine scar after caesarean section (CS).
Study design: In this randomised prospective study, 78 term pregnant patients delivered by CS were allocated to two different suturing techniques either including or excluding the endometrial layer. The integrity of the uterine incision was checked by ultrasound 40–42 days after the operation. Any deviation from the full thickness apposition of the anterior uterine wall (with the ratio: [anterior wall thickness/(anterior wall thickness + height of the wedge shaped defect)] < 1) was considered to represent incomplete healing. Both groups were then compared in terms of the frequency of incomplete healing. Chi square and Student's *t*-test were used where appropriate. A logistic regression model was used to adjust for confounding factors.
Results: The frequency of incomplete healing was significantly lower in the group treated by full thickness suturing (44.7% versus 68.8%); (OR: 2.718; CI: 1.016–7.268). Similarly the mean values for the incomplete healing ratio were 0.77 ± 0.17 and 0.86 ± 0.17 ($p = 0.03$) in split and full thickness groups, respectively. After adjusting for other confounding factors the suture technique still remained as a significant determinant of the incisional healing ($p = 0.04$).
Conclusion: By selecting full thickness suturing technique one may significantly lower the incidence of incomplete healing of the uterine incision after CS.

Keywords: Caesarean section; Incomplete healing; Uterine incision scar; Full thickness suturing

1. Introduction

Caesarean section is currently the most frequent abdominal surgical procedure throughout the world. A wedge-shaped distortion in the integrity of the uterine incision scar is a well-known phenomenon delineated by radiologic, ultrasonographic, endoscopic and histologic methods by various authors [1–11]. Although this anomaly has been implicated as an aetiologic factor in many clinical problems such as the rupture of the uterus during a subsequent pregnancy [12,13], ectopic pregnancy at the caesarean section scar [14,15], abnormal uterine bleeding [16] and dysmenorrhea [7] during the non-pregnant state, we were not able to find an in-depth analysis concerning the aetiology and the prevention of the defective healing of the caesarean section scar in the human. Since the suturing technique and mechanical forces affecting the wound area are major determinants of the surgical outcome in terms of incisional integrity in almost any surgical wound, we designed this prospective randomised study to analyse the effects of two different suturing techniques [full thickness including the endometrial (decidual) layer versus split thickness excluding the endometrial layer] on the incidence of postoperative defective healing of the uterine incision.

2. Materials and methods

A total of 78 nullipar patients with an indication for caesarean section participated in this prospective

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randomised study conducted between 1 February 2000 and 31 March 2001 at Süleymaniye Maternity Hospital for Research and Training, 45 of them were already in labour, whereas 33 underwent elective caesarean section after completed 37 weeks of pregnancy. Cases with multiple pregnancy, severe antepartum hemorrhagy, fever and prior trauma to uterus (hysterotomy, myomectomy, perforation, etc.) were excluded. The study was permitted by the local ethics committee and written informed consent was obtained in all cases. All caesarean sections were done under endotracheal general anesthesia, using Pfannenstiel and Kerr techniques for abdominal and uterine incisions, respectively. After one holding stitch at each corner, the uterine incision was closed with a single layer continuous locking No.: 1-chromic cat gut suture. Randomisation was done by using a computer program (Randomisation Generator Version1.0). Forty patients were randomised for full thickness suturing encompassing all layers including the endometrium and 38 patients for split thickness technique including all but the endometrial layer. Rarely, additional single sutures for hemostasis were added when deemed necessary. Exteriorisation of the uterus and visceral and parietal peritonisation and apposition of the rectus musculature and the subdermal space were done according to the preference of the actual surgeon. Every patient received a prophylactic dose of antibiotics (cephazoline sodium Flac. 1 g 3 × 1 IM). All patients were discharged within 3 days after the operation and scheduled for detailed transvaginal ultrasound examination (GE Logiq 400 MD, 7 MHz vaginal probe) 40–42 days after the operation. The ultrasound examiner was blinded to the closure technique. The patients were asked to empty their bladders only if the examiner considered it to be necessary to obtain satisfactory transvaginal access. Uterine dimensions were recorded as well as the presence of intracavitary, parametrial and subvesical hematoma formation. Anterior and posterior wall thickness at the uterine incision site were measured. The integrity of the incision was checked in transverse and longitudnal sections. Any deviation from the full apposition of the cranial and caudal edges of the uterine incison causing a tenting (ballooning out) towards the anterior abdominal wall was considered to be representative of incomplete healing. The width, height and the length of the defect was recorded. Continuous variables with normal distribution were compared by Student's *t*-test. All cathegorical variables were compared by chi-square method. A logistic regression model was used to adjust for various cofactors. Since this is a pilot study, a sample size evaluation was only possible after the conclusion of the study. According to this, to show a 24.1% reduction in defective healing with 90% power, confidence limit of 95% and alpha set at 0.05, one would require a total of 190 patients, 103 and 87 at the full thickness and split thickness arms, respectively. The statistical analysis was done with the SPSS 10.0.7 software for Windows.

Table 1
Comparison of the full thickness versus split thickness group in terms of demographic, laboratory and ultrasonographic parameters

	Split thickness	Full thickness	*p*-Value
Parity	0.68 ± 0.96	1.13 ± 2.01	0.12
Gestational age (days)	275.15 ± 11.61	275.84 ± 16.89	0.42
Cervical dilatation (cm)	2.12 ± 1.60	2.02 ± 1.85	0.40
Preoperative hematocrit (%)	34.66 ± 3.04	34.12 ± 3.38	0.24
Hematocrit difference (%)	2.72 ± 1.55	3.40 ± 2.59	0.09
Fetal weight (g)	3556.25 ± 589.52	3465.18 ± 800.26	0.29
Uterus length (mm)	80.78 ± 11.28	83.65 ± 13.77	0.17
Anterior wall (mm)	9.34 ± 2.25	9.91 ± 3.21	0.39
Posterior wall (mm)	13.07 ± 3.66	12.73 ± 2.53	0.65
Healing ratio[a]	0.77 ± 0.17	0.86 ± 0.17	0.03

Values given as mean ± S.D.
[a] Healing ratio = anterior wall thickness (mm)/anterior wall thickness (mm) + wedge defect height (mm).

3. Results

Only 38 and 32 patients from the full and split thickness groups, respectively, returned for late puerperal ultrasound examination. Thus, in the final analysis a total of 70 patients were evaluated. There was no significant difference between the two groups in terms of gestational age, parity, preoperative cervical dilatation, preoperative hematocrit values, difference between the preoperative and post-operative hematocrit values, fetal weight, the length of the uterus and anterior and posterior wall thickness on the 40th day after the caesarean section (Table 1). Four of the

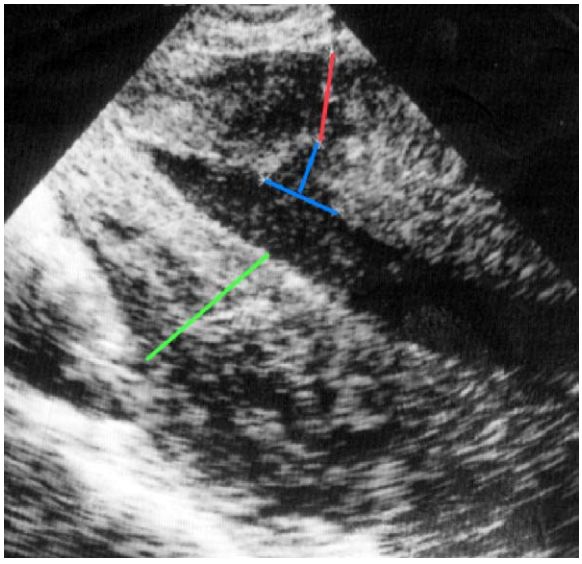

Fig. 1. Wedge-shaped healing defect of the uterine incision on the 40th day after the caesarean section. Blue line: base and height of the defect; red line: reapposed anterior wall thickness; green line: posterior wall thickness.