


## CASE REPORT

### Treatment and repair of uterine scar dehiscence during cesarean section

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#### Introduction

The incidence of cesarean section (c-section) deliveries has steadily increased worldwide. For example, between 1970 and 2009, the proportion of c-sections recorded in the United States of America (USA) increased from 5.0% to 32.9% [1]. One notable complication of c-section is uterine scar dehiscence (USD), in which scar tissue remaining from a previous c-section is disrupted and separates. Although USD has not been precisely defined, the reported incidence of this condition ranges between 0.2% and 4.3% of all pregnancies associated with a previous c-section [1]. A previous c-section with USD is a well-known risk factor for uterine rupture during vaginal delivery. However, the clinical significance of USD in cases of repeated c-section remains unclear. Moreover, the relative importance of screening for this complication of c-section and the appropriate methodologies for such screening as well as the best surgical approach for repairing USD or the tearing of the anterior uterine wall during delivery have yet to be established.

Obstetricians often encounter USD during delivery by c-section. However, USD extending over one-third of the

#### Key Clinical Message

The incidence of cesarean section (c-section) has increased worldwide. Because the major risk factor for uterine scar dehiscence (USD) is a previous c-section, the rate of this complication has also increased. Its clinical significance and management strategies are unclear. Here, we discuss USD particularly pertaining to its surgical treatment.

#### Keywords

Cesarean section, repair of uterine scar dehiscence, surgical treatment, uterine scar dehiscence.

anterior uterine wall is rare. Furthermore, we have yet to establish the best surgical approach for repairing this rare complication of c-section or repairing a torn anterior uterine wall during delivery. Herein, we report two cases of USD with large defects of the anterior uterine wall and discuss the challenges associated with this complication. Although the anterior uterine wall was torn and extensively damaged in these patients, the repairs were successful in both.

#### Case History

##### Case 1

A 38-year-old woman, gravida 2, para 1, underwent c-section via transverse incision in the lower uterine segment (LUS) at gestational week 32 in her previous pregnancy because of concerns over fetal status. Intra-abdominal findings during this procedure included endometriosis, and abnormally strong adhesions were observed between the posterior uterine wall and the rectum. The current pregnancy was achieved via in vitro fertilization and embryo transfer. The patient had experienced a previous

premature delivery but did not suffer a recurrence during the current pregnancy despite cervical shortening. Ultrasonography reports showed that fetal growth was appropriate for gestational age, and transabdominal and transvaginal ultrasonography reports showed no indications of USD.

At 38 weeks and 1 day of gestation, a repeat c-section was performed. The myometrium of the anterior uterine wall had thinned over an extensive area, thus rendering the fetal membrane and fetus visible (Fig. 1A). Surgical records from the patient's previous c-section reported endometriosis and the existence of abnormal adhesions between the posterior uterine wall and the rectum. However, it was difficult to confirm the presence of adhesions before fetal delivery. We anticipated that abnormal adhesions would introduce challenges for the current c-section and had concerns that a transverse incision on LUS might damage the tissue lateral to the uterus, making it difficult to repair the uterine incision. Consequently, we prioritized safety and performed a vertical incision in the uterine body to deliver a healthy male infant weighing 3150 g with Apgar scores of 4 and 9 at 1 and 5 min after birth, respectively.

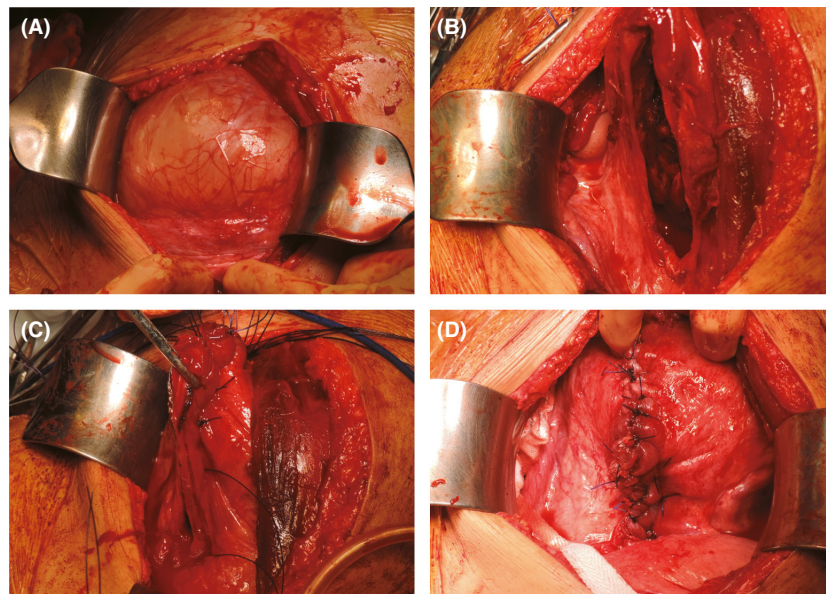
However, the LUS was torn and appeared to be very difficult to repair (Fig. 1B). We performed a single interrupted suturing technique with size 0 polydioxanone (PDS) thread to prevent bleeding from the transverse uterine layers. To repair the thinned and vertically torn

LUS, we performed extensive relaxation suturing on the first layer with square sutures (Fig. 1C). Subsequent minute Z-sutures were then used to repair and reinforce the second layer. These sutures allowed repair of the incision without any leakage of the lochia (Fig. 1D). Because the lower margin of the torn vertical uterine area was extremely close to the bladder, we filled the bladder with diluted indigo carmine dye to confirm that it had not been damaged.

## Case 2

A 30-year-old woman, gravida 3, para 2, had experienced two previous c-sections. During the second delivery, surgical findings showed that the fascia had thinned directly above the wound from the first c-section, and the fetus was visible. Therefore, the fetus was delivered via a transverse LUS incision approximately 1 cm cranially from the previous incision. The uterine incision was then repaired with continuous suturing of the two layers.

The patient became naturally pregnant for the third time. Ultrasonography reports showed that fetal growth was appropriate for gestational age and transabdominal and transvaginal ultrasonography reports showed no indications of USD. A repeat c-section was performed at 37 weeks and 3 days of gestation at the patient's request. Intraoperative findings revealed that extensive areas of the uterine anterior myometrium were missing at the



**Figure 1.** (A) Laparotomy revealed a large defect on the anterior uterine wall. (B) A vertical uterine incision was made, which extended to a tear in the lower segment of the uterine wall. (C) Square sutures were first inserted for relaxation suturing of the thinned and weakened myometrium. (D) Minute Z-suturing between the square sutures was performed to repair and reinforce the wound. The large tear in the uterus was successfully repaired.

previous uterine incision site, and the fetal membrane was visible. A transverse LUS incision had the potential to damage the uterine cervix and bladder if extended downward. We therefore made a transverse LUS incision in an upward direction from the thinning area of the uterine body to deliver a healthy female infant weighing 2872 g with Apgar scores of 8 and 9 at 1 and 5 min after birth, respectively. However, following delivery, the uterine incision longitudinally extended in a T-shape to a point directly above the internal ostium of the uterus (Fig. 2A and B). Therefore, to perform the initial extensive relaxation suturing, we used size 0 PDS thread to insert square sutures at four locations. We selected this technique because the myometrium was very thin and difficult to repair using traditional methods (Fig. 2C). Then, we used size 0 PDS thread to insert interrupted sutures to reinforce the wound site. The two layers of the transverse incision of the uterine segment were then closed with interrupted sutures (Fig. 2D), thereby repairing the incision without leakage of the lochia. Finally, the bladder was filled with diluted indigo carmine dye to confirm that it had not been damaged. These methods are summarized in Figure 3A.

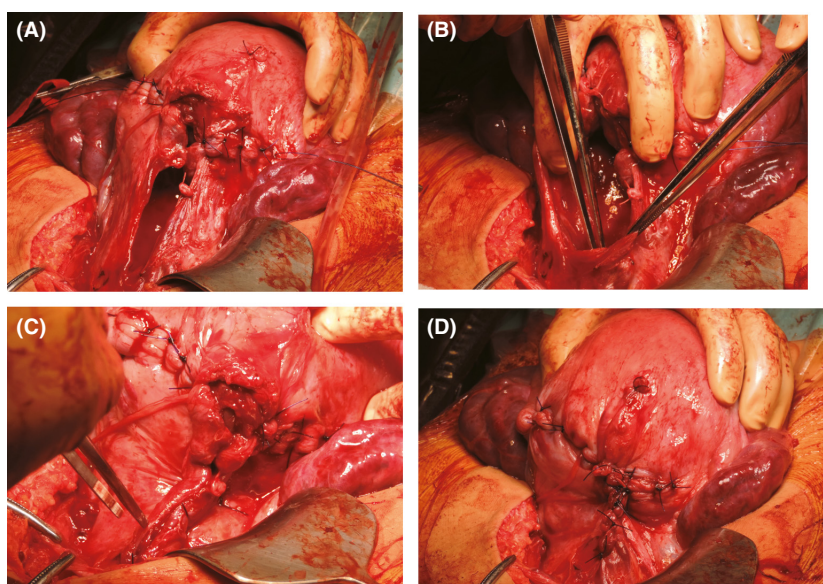
## Discussion

A variety of complications have been associated with c-sections. Early complications include hematoma, infection, wound dehiscence, and thrombus formation. Long-

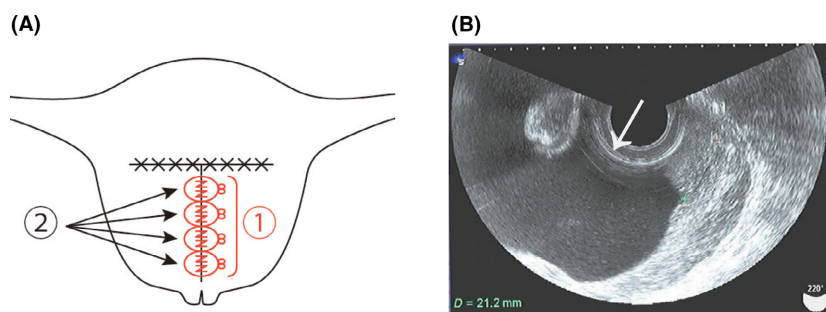
term complications include placenta accreta, peritoneal adhesions, infertility, and myometrial thinning with uterine rupture [2–4]. Literature shows that there are numerous definitions of myometrial thinning; however, there is no consistent definition of this condition with respect to uterine incision [5–7]. Myometrial thinning is observed in 0.2%–4.3% of postcesarean pregnancies [1] and is thought to occur as a result of USD. However, no clear consensus has been reached regarding the precise underlying mechanism of this condition after c-section.

The major complication of USD is uterine rupture, which is reported in approximately 1 in 16,000–19,000 women without a history of previous uterine surgery [8]. The incidence of uterine rupture is markedly increased among women with previous c-section and is observed in approximately 0.3% of trials of labor (TOL) in such women [9]. If these patients request TOL, it may be crucial to screen for USD. Recent studies have demonstrated the efficacy of predicting uterine tears using sonographic LUS measurements before TOL in women with previous c-section [10, 11]. A recent meta-analysis provides support for the use of antenatal LUS measurements to predict uterine ruptures during TOL [10].

Although screening for USD during TOL has been reported previously, the efficacy of this technique remains unknown for patients with planned repeat c-section. In addition, there is no consensus about diagnosing USD by measuring the LUS, and little is known about the ideal treatment for USD or the optimal timing of delivery in a



**Figure 2.** (A, B) A transverse incision was made in an upward direction from the thinned area of the uterine body to deliver the fetus. However, after delivery, the uterine wound extended to a point directly above the internal ostium of the uterus. (C, D) As in case 1, square sutures were inserted with minute Z-suturing in between.



**Figure 3.** (A) Method for the surgical repair of a torn uterus. ① The myometrium had thinned to a film-like state that could have torn easily. Square sutures were used for relaxation suturing of the thinned and weakened myometrium because normal suturing alone would have been insufficient for adequate repair. However, square suturing could not sufficiently prevent leakage of the lochia into the peritoneum. ② Minute Z-suturing was performed between the square sutures to repair and reinforce the wound. (B) Transvaginal ultrasonography at 28 weeks of gestation. Retrospective analysis identified a large anterior uterine wall defect (white arrow).

patient with this complication. We suspect that excessive diagnosis of USD might unnecessarily increase the incidence of preterm birth. Therefore, we conclude that screening for USD is not required for patients requesting repeat c-section. Although USD may be diagnosed intra-operatively for the first time, it is not harmful for the patient. However, in case 1, a retrospective analysis of the vaginal sonography reports identified a large defect on the anterior uterine wall (Fig. 3B). When measuring cervical length, clinicians should examine the uterine anterior wall in patients who have undergone a previous c-section. If clinicians identify large defects in the anterior uterine wall, they will necessarily perform the c-section more cautiously.

We have treated patients with extensive thinning of the uterus. In these patients, it is difficult to make a safe incision. In case 1, we had concerns that there would be insufficient myometrial tissue for the closure of the uterine incision following delivery if we performed a transverse incision in the uterine body. Therefore, the fetus was delivered via a vertical incision. However, this uterine incision was extended, and the lower margin of the wound was close to the bladder.

In case 2, myometrial thinning was evident, and although the fetus was carefully delivered via transverse uterine incision, the incision extended too close to the internal ostium of the uterus. These two cases show that careful delivery of a fetus cannot avoid the extension of a uterine incision in severe cases of USD. Obstetricians should therefore take great care to avoid such deleterious complications in these cases. Notably, we found no evidence of severe complications, such as injury to the bladder or uterine cervix due to the extension of the incision or massive hemorrhage as a result of damage to the uterine parametrium.

In the present study, we failed to demonstrate the benefits of a surgical approach involving uterine incision

because both patients experienced major complications with extension to the bladder and cervix. However, a lower transverse uterine incision in patients with severe USD might have induced severe complications, as mentioned above. Therefore, it is important for clinicians to make the uterine incision in an upward direction from extensively thinned areas of the uterine body during delivery.

C-section always includes a risk of encountering unexpected and extensive myometrial thinning. As observed in the cases herein, the repair of this condition can be extremely difficult. Although the fetus can be delivered carefully, wounds to the LUS can extend downward or transversely. Consequently, there is high risk of damage to the bladder and other structures in its vicinity. Therefore, when extensive thinning of the myometrium is encountered in the LUS, two extremely important questions must be considered in decisions regarding its clinical management. First, clinicians should ask which uterine incision should be made. Second, they should determine how to repair the myometrium safely. The use of a vertical uterine incision may be considered a protective measure to prevent damage to the uterine parametrium. However, the risk of increased bleeding associated with a longitudinal uterine incision and its potential effects on subsequent pregnancies must also be considered [12].

If an area of thinned myometrium tears unavoidably, it can be very difficult to repair. However, we believe that the aforementioned method could be extremely useful to clinicians. Further large-scale studies with long-term follow-up are now required to investigate the standardization of these strategies for safely maintaining fertility, performing uterine incisions for delivery, and completing appropriate repairs in cases of extensive myometrial thinning. To date, no previous reports or case studies have addressed the efficacy of various methods of surgical repair for a thinning or torn anterior uterine wall.

Therefore, we believe that the discussion of the various repair techniques described herein will be of significant clinical value.

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## Conflict of Interest

The authors declare no conflict of interests.

## Authorship

MS, SM, RN, and ME: made substantial contributions to conception and design, collected the clinical data, and drafted as well as revised the manuscript. TI, AK, KK, and YU: helped in drafting the manuscript and responded to the submission work. TK: conceived and generally supervised of this study, and gave final approval of the version to be published. All authors read and approved the final manuscript.

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