



Prior non-lower segment uterine scar: When to plan cesarean delivery

Ms. Smith is being seen for a routine prenatal care visit at 32 weeks' gestation. Her antenatal course has been uncomplicated to date. Her last pregnancy required a classical cesarean delivery due to preterm labor and malpresentation at 28 weeks' gestation.

When should a woman who has had a prior classical cesarean delivery have a scheduled repeat cesarean delivery?

A classical cesarean delivery is performed by making a vertical hysterotomy incision in the mid-portion of the uterus. Historically, a classical incision was considered to be above the round ligaments and to extend to the uterine fundus. True knowledge of the location of the hysterotomy, however, is challenging even if an operative report is available.

It is also often difficult to determine the extent of the involvement of the upper segment when a "T" or "J" incision has been performed in combination with a lower segment incision.

For the sake of this discussion, recommendations for the manage-

ment of women with prior T or J uterine incisions with involvement of the upper uterine segment will be the same as those for the management of women with a prior classical cesarean incision.

A classical cesarean delivery has longer operative time, increased blood loss, and higher rates of subsequent uterine rupture compared with a low transverse uterine incision.¹ It is performed only when a lower segment hysterotomy incision is not feasible or safe. In a review of almost 38,000 births at a single center just 157 patients (0.4%) had a classical cesarean delivery. The most common indication was preterm delivery with fetal malpresentation.²

The concern for uterine rupture in a subsequent pregnancy has guided recommendations for the timing of a repeat cesarean delivery. Recommen-

dations from the American College of Obstetricians and Gynecologists (ACOG) Practice Bulletin No. 115, *Vaginal Birth After Cesarean Delivery*, cite a risk for uterine rupture of 4% to 9% for women with a prior classical cesarean who labor, with the overall range in the literature reported as 0.9% to 12%.³⁻⁶

Outcome data must be interpreted with caution due to the relatively small sample size and risks for selection bias in these series.

Another concern for women with a prior classical cesarean delivery is the potential for uterine rupture at less than 37 weeks' gestation or rupture prior to the onset of labor. Therefore, regardless of the timing chosen for repeat cesarean at term, there is a risk of uterine rupture prior to scheduled cesarean delivery that may not be preventable. This information should be included in patient counseling.

Because of these concerns, optimal timing of repeat cesarean for women with a prior classical cesarean delivery should be prior to the onset of labor. There are limited clinical data to test this approach; however, it is supported by a decision analysis from the literature.⁷ The authors concluded

TABLE Recommendations for the timing of scheduled CD in women with prior uterine scar

Indication	Timing of planned delivery
Prior classical, T, or J incision (with involvement of upper uterine segment)	36 wks 0 days–37 wks 6 days
Prior myomectomy	37 wks 0 days–38 wks 6 days
≥2 prior lower segment cesareans	39 wks 0 days–39 wks 6 days*
Prior uterine rupture	36 wks 0 days–37 wks 6 days

Abbreviation: CD, cesarean delivery

Note: There is no requirement for amniocentesis to assess fetal lung maturity prior to delivery.

*Early term delivery is appropriate when prior CDs were complicated or in the presence of maternal or obstetric complications.

that for women with a prior classical cesarean delivery, delivery at 36 weeks' gestation without amniocentesis was the optimal strategy to avoid major maternal or neonatal complications.

The 2011 Eunice Kennedy Shriver National Institute of Child and Human Development (NICHD)/Society for Maternal-Fetal Medicine (SMFM) cosponsored workshop "Timing of Indicated Late Preterm and Early Term Births" reviewed available literature to make recommendations for timing of delivery for various indications commonly associated with late preterm and early term delivery.

The recommendation from the workshop suggests that 36 to 37 weeks' gestation (36 wks 0 days–37 wks 6 days) is the optimal timing for a scheduled repeat cesarean delivery for women with a history of a prior classical incision.⁸ This recommendation has since been reaffirmed by both SMFM and ACOG.⁹

What is the appropriate timing of delivery in women undergoing planned cesarean delivery due to a prior myomectomy?

The literature regarding uterine rupture rates after myomectomy is limited.

Given that a uterine myomectomy outside of pregnancy will usually involve the contractile portion of the uterus, risks of uterine rupture have been estimated from the literature for prior classical incisions.

A commonly held tenet (with minimal supportive data) has been that labor could be attempted if the endometrial cavity had not been entered at the time of myomectomy.³ When evaluating the risk of uterine rupture, the extent of the uterine incision(s) as well as the size and number of myomas removed should be considered.

Although there is most likely significant selection bias, reports of uterine rupture after prior myomectomy in women undergoing a trial of labor suggest a relatively low rate. Of 412 women with a pregnancy after myomectomy at a teaching institution in Nigeria, the incidence of uterine rupture was 0.2%.¹⁰ In a recent review of 176 singleton pregnancies delivering after a history of prior myomectomy, researchers noted that there were no cases of uterine rupture, including in the 35 women who underwent a trial of labor after cesarean (TOLAC).⁶ However, information regarding the extent of the uterine dissection during the preceding myomectomy was

not available.

Increasing rates of minimally invasive procedures add to the lack of clarity regarding the optimal timing and mode of delivery for women with a prior myomectomy. A retrospective analysis included the review of pregnancies following myomectomy at a single institution over 16 years.¹¹ Among 112 pregnancies with complete data one case of uterine rupture occurred at 36 weeks' gestation in a woman who had undergone a prior laparoscopic myomectomy.

A recent study of pregnancy outcomes after robotic myomectomy found one uterine rupture in 127 pregnancies.¹² Recommendations from the NICHD/SMFM 2011 workshop state that for women who are planning to have a repeat cesarean delivery due to a prior myomectomy, delivery should be planned between 37 and 38 weeks' gestation (37 wks 0 days–38 wks 6 days).⁸

When is the optimal timing of scheduled repeat cesarean delivery in women with multiple prior cesareans?

The decision for the timing of repeat cesarean delivery is a routine dilemma because current clinical guidelines do not support planned TOLAC if a woman has had fewer than 2 prior low transverse cesareans and because the number of women with multiple cesarean deliveries is increasing.⁴

Clinicians and patients must balance the risks and benefits of delivery at 39 weeks' gestation (to minimize neonatal morbidities) with the maternal risks of delaying delivery until 39 weeks' gestation. These include not only uterine rupture but also the risks of unscheduled surgery with potentially more complicated cesarean deliveries (eg, involving adhesions,

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I have never had a classical cesarean delivery, but have had fibroids removed. When should my cesarean delivery be performed?

A myomectomy (removal of a fibroid) can result in the disruption of the muscle wall of the uterus, depending on the type of surgery performed. There are many types of myomectomies, and each surgery is different, so risks for your current pregnancy depend on exactly what happened during your fibroid surgery. Important information that your obstetric provider will consider includes: the number and size of the fibroids removed, the surgical approach (laparoscopic or open), and whether or not your uterus was entered (if so, how big was the incision). Therefore, your provider will usually want the operative reports from your fibroid surgery.

Given the wide variability in techniques and surgeries, there are limited data to know the best way to manage future pregnancies. In general, if your provider has recommended you have a cesarean delivery because of a prior myomectomy it is usually done at 39 weeks' gestation.

Depending on the exact nature of your myomectomy, however, it may be best to deliver slightly earlier, between 37 and 38 weeks' gestation.

I have never had a classical cesarean delivery, but have had several cesarean deliveries. When should my next cesarean delivery be planned?

Women who have had more than 2 prior cesarean

deliveries are usually not candidates for a trial of labor after cesarean (TOLAC) because they are at increased risk for several types of complications. Rather than risk a fast surgery due to complications during labor, it is best to have a planned procedure so the provider can take his or her time. There is also a higher risk of bleeding during delivery, which sometimes requires a blood transfusion; it is often safest to be in the operating room if a blood transfusion is needed.

Further, multiple previous surgeries can increase the risk of the placenta trying to grow into the wall of the uterus. This may require the uterus to be removed immediately (cesarean hysterectomy); again, it is safest to be in the operating room if that is necessary.

Most of the time these complications do not occur. Nevertheless, to minimize the risks to you and your baby, repeat cesarean delivery is usually recommended at 39 weeks' gestation. Depending on complications in a prior cesarean delivery, your provider may also decide that it is safest for you to have the repeat cesarean delivery earlier, at 37 to 38 weeks' gestation.

My uterus ruptured in a prior pregnancy. I am pregnant again—when and how should this baby be delivered?

Women who have had a uterine rupture should not attempt a vaginal delivery because there is a 9% risk of repeat rupture. Your provider will likely recommend a scheduled repeat cesarean delivery between 36 and 38 weeks' gestation.



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hemorrhage, abnormal placentation).

Two analyses from the NICHD Maternal-Fetal Medicine Units Network cesarean registry have addressed this dilemma.^{13,14} In a 2011 analysis, investigators assessed maternal and neonatal

morbidity following cesarean delivery at term.¹³ This analysis excluded women with other medical or obstetric indications for scheduled deliveries prior to 39 weeks' gestation.

Outcomes specific for women with multiple prior cesarean deliv-

eries were not reported, although the repeat cesarean delivery number was included in the analysis and was not associated with increased maternal risks with delaying delivery until 39 weeks' gestation.

Utilizing a different analytic ap-

proach with the same study cohort, another investigation had similar conclusions.¹⁵ Thus, planned delivery at 39 weeks' gestation is appropriate for most women with multiple prior cesarean deliveries.

Delivery in the early term period (37–38 weeks' gestation), however, may be reasonable when information on the nature of the prior cesarean types is not available, when prior cesarean deliveries were complicated (eg. involving extensive adhesive disease or prior uterine window), or in the presence of maternal comorbidities or obstetric complications (see Table).

When should delivery occur in a patient with a prior uterine rupture?

A prior uterine rupture is a contraindication for TOLAC.⁴ The literature regarding pregnancies after uterine rupture is limited in addressing both recurrence risks and proper timing of the repeat cesarean. Multiple case series provide data; however, these are limited due to small sample size and selection bias.

In a literature review of 84 reported cases in women with uterine rupture who had TOLAC, researchers reported that repeat rupture was more common if the prior uterine incision was in the contractile, upper portion of the uterus.¹⁶ Older literature suggests a higher rupture rate of 9.1% in women with a prior rupture attempting vaginal delivery.¹⁷

Similar to repeat cesarean for women with a prior classical cesarean, delivery timing for women with a prior rupture should be prior to the onset of labor. Therefore, current recommendations include scheduled repeat cesarean at 36–37 weeks' gestation (36 wks 0 days–37 wks 6

days) without the need for an amniocentesis to document fetal lung maturity.⁹ **COG**

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