



**REVIEW OF LOWER SEGMENT CAESAREAN SECTION SCAR DEHISCENCE (PARTIAL UTERINE RUPTURE) OCCURRING AMONG WOMEN UNDERGOING TRIAL OF LABOUR AFTER CAESAREAN AT SARAWAK GENERAL HOSPITAL, MALAYSIA IN 2010**

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**ABSTRACT**

**Objective:** To study the incidence of lower segment caesarean section scar dehiscence (partial rupture) among women who had trial of labour after one previous lower segment caesarean section and its associating factors at Sarawak General Hospital, Malaysia, 2010

**Design:** A hospital based retrospective study.

**Setting:** Maternity Unit, Sarawak General Hospital, Malaysia.

**Population:** Total of 525 pregnant women with one previous lower segment caesarean section scar for trial of vaginal delivery at Sarawak General Hospital in 2010.

**Methods:** This study was carried out in Sarawak General Hospital through the antenatal, intrapartum and postnatal records.

**Results:** A total of 525 pregnant women with one previous lower segment caesarean section scar had a trial of vaginal birth. Among the 525 women, 390 did not have a prior history of successful VBAC and the remaining 135 women had at least one successful VBAC. Among 390 pregnant women, 208 (53.3%) had successful vaginal deliveries and 182 (46.7%) women underwent emergency lower segment caesarean section as failed VBAC. Among the 182 women, there were two cases of scar dehiscence and both had emergency LSCS performed for abnormal foetal heart tracing. Both had good foetal outcome.

**Conclusion:** Incidence of lower segment caesarean section scar dehiscence is more common than uterine scar rupture in TOLAC and abnormal changes in foetal heart tracing is an early indicator of impending rupture.

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**INTRODUCTION**

Previous lower segment caesarean section scar is a risk factor for uterine rupture during trial of labour. The overall incidence is low but it is associated with disastrous maternal and foetal outcome. LSCS scar rupture occurs when a full-thickness disruption of the uterine wall that also involves the overlying visceral peritoneum. It is notified by significant uterine bleeding, foetal distress, protrusion or expulsion of the fetus and/or placenta into the abdominal cavity, haematuria and abdominal pain. But contrast to LSCS scar rupture, LSCS scar dehiscence (partial uterine rupture in scar area) is a more common and because of the defect in the uterine wall is limited to a scar dehiscence, there is not much obvious clinical symptoms and mostly it is silent.

There are literatures showing factors associating in previous lower segment caesarean scar rupture and dehiscence such as parity,maternal age, gestational age of pregnancy, type of previous lower segment caesarean section, previous vaginal delivery and previous successful VBAC,inter-delivery interval, spontaneous labour, induction of labour, augmentation of labour and foetal weight.[1]

This study analyzed the cases of previous caesarean section scar dehiscence among women who underwent trial of labour withone previous lower segment caesarean section scar at Sarawak General Hospital Malaysia in 2010.

**Objective**

To study the incidence of previous lower segment caesarean section scar rupture and dehiscence as well as its association factors among pregnant women with one previous lower segment caesarean section during trial of labour.

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**METHODS**

**Setting**

Hospital based retrospective study, reviewing patient's inpatient case notes in Sarawak General Hospital

**Sample size**

A total of 525 women with a previous lower segment caesarean section were included in this study. Out of 525 women, 135 women had history of previous successful VBAC and the remaining 390 had no prior history of vaginal deliveries following a caesarean section.

**Data collection**

In the state of Sarawak, all pregnant women with one previous caesarean section would be appropriately counseled on the mode of delivery in the antenatal period. Unless there are clinical contraindications, all these women would be encouraged to go through a TOLAC. The patient would then make an informed choice of either ERCS or TOLAC. The target population for the study was women who had one previous caesarean section and were admitted to the hospital for a trial of labour. Data were collected retrospectively by reviewing the case notes in hospital record system.

**Inclusion criteria**

1. Pregnant women with history of one previous lower segment caesarean section who chose trial of labour
2. Singleton pregnancy with no contraindication for vaginal delivery

**Exclusion criteria**

1. Multiple gestation in current pregnancy.
2. Obstetric cases more than one caesarean section.
3. Women who chose ERCS

**Data Entry and Analysis**

This was a retrospective study among women on trial of labour with a previous lower segment caesarean section at Sarawak General Hospital within the period from 1st January 2010 to 31st December 2010 Data entry was done using SPSS version 22.

**Financial Disclosure**

The authors declared that this study was not funded.

**RESULTS**

During study period, 525 pregnant women with a previous one lower segment caesarean section had undergone trial of labour. Among 525 pregnant women, 390 had no previous successful vaginal delivery but 135 had at least one previous successful VBAC. Among 390 pregnant women, 208 (53.3%) had successful vaginal deliveries and 182 (46.7%) women underwent emergency lower segment caesarean section as failed VBAC. Two cases of LSCS scar dehiscence were found in group of 182 women. (Table I)

**Table I** Frequency distribution of outcomes of trial of scars among study population

Outcomes	Frequency	Percentage
Vaginal deliveries	208	53.3
Emergency LSCS	182*	46.7
Total	390	100.0

\* Group of women in which LSCS scar dehiscence were found

Among the 182 women, 75 (41.2 %), 55 (30.2%), 16 (8.8%), 6 (3.3%) and the remaining 30 (16.5%) had emergency caesarean section for foetal distress, poor progress of labour, lower segment caesarean section scar tenderness, failed induction of labour and other indications respectively. There were 2 cases of LSCS scar dehiscence among the 75 women who had emergency LSCS for foetal distress (abnormal foetal heart changes). (Table II)

**Table II** Frequency distribution of indication for current LSCS among study population

Indication	Frequency	Percentage
Poor progress	55	30.2
Scar tenderness	16	8.8
Foetal distress*	75*	41.2
Failed induction	6	3.3
Other indications	30	16.5
Total	182	100.0

\* Group of women in which LSCS scar dehiscence were found

The scar dehiscence rate was 0.38% among women who had TOLAC. The 2 incidents of scar dehiscence were among the 390 pregnant mother who have not had any successful vaginal delivery. The scar dehiscence rate among this group was higher at 0.51%. Among the remaining 135 women who have had successful vaginal delivery before, there was no scar dehiscence or uterine rupture (Table III)

**Table III** LSCS Scar dehiscence rate among population

Type of Population	Number of pregnant women	No of LSCS scar dehiscence	LSCS scar dehiscence rate	No of LSCS scar rupture
pregnant women without previous successful vaginal delivery	390*	2	0.51%	0
pregnant women with previous successful vaginal delivery	135	0	0	0
Total pregnant women on trial of labour	525	2	0.38%	0

Among 390 women, 321 women were under age of 35 and remaining 69 were over age of 35. Both women who had scar dehiscence were under age of 35. (Table IV)

**Table IV** Frequency distribution of age group of study population

Age group (Yrs)	Frequency	Percentage
< 35	321*	82.3
≥ 35	69	17.7
Total	390	100.0

Minimum age = 16 Years Maximum age = 42 Years

Out of 390 women who underwent trial of labour, 372 women had spontaneous labour, while the remaining 18 had induction of labour. The scar dehiscence occurred among women who had spontaneous labour (Table V)

**Table V** Distribution population between spontaneous and induction of labour

Onset of labour	Outcome group		Total
	Vaginal delivery	LSCS	
Spontaneous	205 (55.1%)	167 (44.9%) *	372 (100.0%)
Induction	3 (16.7%)	15 (83.3%)	18 (100.0%)
Total	208 (53.3%)	182 (46.7%)	390 (100.0%)

\* Group of women which LSCS scar dehiscence were found

### Case 1

A 34 years old, Gravida 2 parity 1 lady at 41 week period of pregnancy was admitted to the hospital with spontaneous onset of labour. She had a previous emergency lower segment caesarean section 6 years earlier for cord prolapsed. During the trial of labour, variable decelerations was noted in the cardiotocograph tracing and decision for emergency lower segment caesarean section was made. Intra-operatively scar dehiscence was noted. A baby girl weighing 3.91 Kg was delivered with Apgar score of 8 in 1 minute, 9 at 2 minutes and 10 at 5 minutes. Umbilical cord pH was 7.26. The estimated blood loss was 400 ml.

### Case 2

A 26 years old, Gravida 2 parity 1 lady at 38 weeks period of pregnancy, was admitted to the hospital with spontaneous onset of labour. She had a previous emergency lower segment caesarean section 5 years earlier for breech presentation in labour. During trial of labour, variable decelerations was noted in the cardiotocograph tracing and an emergency lower segment caesarean section was performed. Scar dehiscence over the previous scar was noted intra-operatively. A baby girl weighing 3.03 Kg was delivered with an Apgar score of 8 in 1 minute, 9 at 2 minutes and 10 at 5 minutes. Umbilical cord pH of artery and vein were 7.2. The total blood loss of operation was 700 ml.

## DISCUSSION

### LSCS Scar rupture and dehiscence

There were no incidents of uterine rupture during the period of the study, but LSCS scar dehiscence rate was 0.38 % among 525 women overall and 0.51% among 390 women who did not have history of previous successful delivery. That rate is lesser comparing with other studies. In a meta-analysis from 1089 to 1999 by Mozurkewich and Hutton showed uterine rupture rate for women undergoing a TOLAC was 0.39%. [2] In a study by Ravasia *et al* of 1,544 patients with a previous cesarean delivery who later laboured spontaneously, the uterine rupture rate was 0.45%. [3] Zelop *et al* found that, among 2,214 women with 1 previous cesarean delivery who labored spontaneously, the uterine rupture rate was 0.72%. [4] A meta-analysis of 29,263 pregnancies from 9 studies by Gerard from 1987 to 2004 showed that the overall risk of uterine rupture was 0.44% for women who labour spontaneously after a previous cesarean delivery. [1]

In contrast to uterine scar rupture, uterine scar dehiscence was more common. Bangal *et al* found that LSCS scar dehiscence was 2% in their study. [5] A systematic review of 10 observational studies by Guise also showed that uterine rupture ranged from 0% to 0.78% of trials of but uterine asymptomatic uterine scar dehiscence ranged from 0.5% to 2 %. [6] In a study by Gaikwad H S *et al* also found out the LSCS scar rupture rate was 3.8% and scar dehiscence rate was 11.5%. [7]

### Signs and symptoms of previous lower segment caesarean section scar dehiscence

The classic signs and symptoms of uterine rupture are foetal distress, diminished baseline uterine pressure, loss of uterine contractility, abdominal pain, recession of the presenting

foetal part, hemorrhage, and shock. But signs and symptoms of lower segment caesarean section scar dehiscence are less obvious and may be silent compared to uterine rupture. Many studies showed that abnormal foetal heart rate patterns are warning signs for uterine rupture. Bujold *et al* showed that abnormal patterns in foetal heart rate were the first manifestations of uterine rupture in 87% of patients. [8] In a study by Leung *et al*, prolonged decelerations in foetal heart rate occurred in 79% of cases and were the most common finding associated with uterine rupture. [9] Rodriguez *et al* found that foetal distress was the most common finding associated with uterine rupture, occurring in 78%. [10] Overall, in 4 studies from 1983 to 2000, prolonged decelerations of foetal heart rate or bradycardias occurred in 114 (80%) of 143 cases of uterine rupture. In cases that involved the extrusion of the placenta and fetus into the abdominal cavity, prolonged decelerations in foetal heart rate invariably occurred. [8,11-13]

Similarly, in this study, both who had scar dehiscence had abnormal fetal heart changes during the continuous electronic fetal heart recording.

Sudden or atypical maternal abdominal pain occurs more rarely than abnormal foetal heart rate changes. In 9 studies from 1980 to 2002, abdominal pain occurred in 13-60% of cases of uterine rupture. In a review of 10,967 patients undergoing a TOLAC, only 22% of complete uterine ruptures presented with abdominal pain and 76% presented with signs of fetal distress diagnosed by continuous electronic foetal monitoring. [14]

In the study, there were 16 women who underwent emergency caesarean section when they developed scar tenderness and impending scar dehiscence or rupture was suspected but no scar dehiscence was noted.

### Previous Successful vaginal delivery after caesarean section (successful VBAC)

In Sarawak General Hospital's study, lower segment caesarean section scar dehiscence were found among 390 pregnant women who did not have previous successful VBAC. In contrast, among the group of 135 pregnant women who had previous successful vaginal delivery, there was no incidents of scar dehiscence. Various studies suggest a protective advantage with regard to the uterine rupture rate if a woman has had a prior successful VBAC attempt. This could be explained that a successful prior VBAC attempt assures that the maternal pelvis is tested and that the bony pelvis is adequate to permit passage of the fetus and the integrity of the uterine scar has been tested previously under the stress/strain conditions during labour and delivery that were adequate to result in vaginal delivery without prior uterine rupture. (1)

Mercer *et al* also found that the rate of uterine rupture decreased after the first successful VBAC, but that there was no additional protective effect demonstrated thereafter: the uterine rupture rate was 0.87% with no prior VBACs, 0.45% for those with one successful prior VBAC, and 0.43% for those with 2 or more successful prior VBACs ( $P = .01$ ). [11]

### Previous vaginal deliveries

Several studies have shown a protective association of previous vaginal birth on uterine rupture risk in subsequent attempts at vaginal birth after previous cesarean delivery. Zelop *et al* compared 1,021 women who underwent a TOLAC after a single previous cesarean delivery with 1 previous vaginal delivery with 2,762 women who underwent a TOLAC with no previous vaginal delivery. The uterine rupture rate was 0.2% versus 1.1% ( $P=0.01$ ) [15]

Caughey *et al* found that among women with a previous LSCS scar, those with at least 1 previous vaginal delivery had one fifth the risk for uterine rupture compared with women without a previous vaginal delivery (OR, 0.2; 95% CI, 0.04-0.8) [16] In a study of 205 patients who underwent a TOLAC after 1 previous cesarean delivery, Kayani and Alfirevic noted that all of 4 cases of uterine ruptures occurred in women with no previous vaginal delivery. [17] Similarly, in our study, both women who had scar dehiscence were in their second pregnancies without previous vaginal deliveries.

#### **Induction of labour and spontaneous onset of labour**

A study of 11,778 women by members of the Maternal-Fetal Medicine Units (MFMU) Network found that in women with no prior vaginal delivery who underwent a TOLAC, there was an increased risk of uterine rupture with induction versus spontaneous labour (1.5% vs 0.8%,  $P=0.02$ ). In contrast, Grobman *et al* found there was no statistically significant difference between women with a prior vaginal delivery who underwent spontaneous TOLAC compared with those who had induction of labour (0.6% vs 0.4%,  $P=0.42$ ). [18]

In this study, among the 390 pregnant women, 18 were induced for trial labour and 372 pregnant had spontaneous labour. Uterine scar dehiscence cases were found in the group of spontaneous labour.

#### **Failed trial of labour**

In Sarawak General Hospital study, LSCS scar dehiscence cases were found among the 182 women who had failed trial of labour. This results was supported by pooled data from 5 studies showing increased uterine rupture rate of 1.4% (1 per 73) in failed VBAC attempts. [19-23] Hibbard *et al* examined the risk of uterine rupture in 1,324 women who underwent a TOLAC. They reported a significant difference in the risk of uterine rupture between women who achieved successful vaginal birth compared with women in whom attempted vaginal delivery failed (0.22% vs 1.9%; OR, 8.9; 95% CI, 1.9-42). [24]

#### **Age**

Shipp *et al* showed that advancing maternal age is associated with an increased rate of uterine rupture. In a multiple logistic regression analysis designed to control for confounding factors, the overall rate of uterine rupture among 3,015 women with 1 previous cesarean delivery was 1.1%. The rate of uterine rupture in women older than 30 years (1.4%) versus younger women (0.5%) differed significantly (OR, 3.2; 95% CI, 1.2-8.4). [25] It was concluded that women aged 30 years or older have a greater risk of uterine rupture as compared with women younger than 30 years. But in the Sarawak general hospital study, one women of LSCS scar dehiscence was younger than 30 years and the other one is older than 30 years of age but both were younger than 35.

#### **Inter-delivery interval**

Shipp *et al* found that the risk of symptomatic uterine rupture was increased 3-fold in women with inter-delivery intervals less than 18 months when they underwent a TOLAC after 1 previous cesarean delivery (OR, 3.0; 95% CI, 1.2-7.2). [26] A study by Bujold *et al* also reported on 1,527 women who underwent a TOLAC with a previous lower segment cesarean section, showed that 2.8% of patients who had an inter-delivery interval of 24 months or lesser than had a uterine rupture compared with 0.9% for those with an inter-delivery interval of more than 24 months ( $P<0.01$ ). [27] In a follow-up study, the same authors examined the risk of uterine rupture between 18-24 months. After adjustment for confounding factors, they found that an inter-delivery interval shorter than 18 months was associated with a significant increase of uterine rupture (odds ratio [OR], 3; 95% confidence interval [CI], 1.3-7.2), whereas an inter-delivery interval of 18-24 months was not (OR, 1.1; 95% CI, 0.4-3.2). In agreement with the findings by Shipp *et al*, the study by Bujold *et al* concluded that an inter-delivery interval shorter than 18 months was considered as a risk factor for uterine rupture and authors speculated that a prolonged inter-pregnancy interval may allow time for the previous cesarean delivery scar to reach its maximal tensile strength before the scar undergoes the mechanical stress and strain with a subsequent intrauterine pregnancy. [28]

But in Sarawak General Hospital study, both LSCS scar dehiscence cases were inter-delivery interval of 60 months (5 years) and 72 months (6 years) inter-delivery interval.

#### **Foetal Weight**

Elkousy *et al* found that, in 9,960 women who underwent a TOLAC after 1 previous cesarean delivery, the risk of uterine rupture was significantly greater for foetus that weighed more than 4000 g (2.8%) than in those weighing less than 4000 g (1.2%; RR 2.3,  $P<0.001$ ). For women with 1 previous cesarean delivery and no previous vaginal deliveries, the uterine rupture rate was 3.6% for women with a fetal weight of more than 4000 g compared to women with a fetal weight of < 4000 g (RR 2.3,  $P<0.001$ ). [29] More recently, Jastrow *et al* showed that birth weight was directly correlated with the rate of uterine rupture, with uterine rupture rates of 0.9%, 1.8%, and 2.6% for birth weights of less than 3500 g, 3500-3999 g, and 4000 g or larger, respectively ( $P<0.05$ ). [30]

Zelop *et al* reported that the rate of uterine rupture for women delivering neonates weighing >4000 g was 1.6% versus 1% for newborns  $\leq$ 4000 g, but that the difference was not statistically significant ( $P=0.24$ ). [31] Flamm *et al* examined TOLAC risks in a cohort of 301 women and reported no difference between the rates of uterine rupture for women with neonates weighing  $\geq$ 4000 gm versus < 4000 gm. [32] The ACOG 2010 VBAC guidelines suggest that suspected fetal macrosomia alone should not preclude the possibility of TOLAC. [33]

In this study, the foetal weight of two LSCS scar dehiscence were 3.91 Kg and 3.03 Kg and both fetuses were not macrosomic.

### Gestation of pregnancy

Among 4,680 women undergoing a TOLAC at a gestational age of 40 weeks or longer, Coassolo *et al* reported a uterine rupture rate of 1.1% (52 of 4,680), which was not statistically different from the uterine rupture rate of 1.0% (68 of 6,907) found in women with a gestational age of less than 40 weeks.[34] When the investigational cohort was defined as those pregnancies of 41 weeks' gestation or longer, the risk of uterine rupture and overall morbidity was also not increased. Zelop *et al* reported similar findings of no significant difference in uterine rupture rate of 1.3% (17 of 1,271) in women undergoing TOLAC at more than 40 weeks of gestation versus 0.8% (12 of 1,504) in women at 37-40 weeks of gestation (P = 0.2).[35]

In Sarawak general hospital study, LSCS scar dehiscence patients were 41 week and 38 week pregnancy respectively during trial and couldn't conclude regarding gestation of pregnancy.

### CONCLUSION

In 2010, there were no incidents of uterine rupture among women undergoing TOLAC in Sarawak General Hospital. The incidence of scar dehiscence (partial rupture) was relatively low and occurred among women who have not had a successful vaginal delivery before and among those who had previous emergency caesarean section. Abnormal fetal heart tracing during continuous monitoring is the only early warning sign of impending uterine dehiscence or rupture in both cases.

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