Trial of vaginal delivery following cesarean section: obstetric outcome

Mohammed H Soltan, PhD, FRCOG, Lulu Al-Nuaim, MRCOG, Tariq Khashoggi, Arab Board,Ob/Gyn, Noori Chowdhury, MSC, MPH, Mohammed Addar, Arab Board, Ob/Gyn, Babatunde Adelusi, MD, PhD, FRCOG

Abstract Objective: To evaluate study analyzing outcome of labor in 310 patients with one or 2 previous cesarean section (CS). This was conducted in the Department of Obstetrics and Gynecology, King Khalid University Hospital, Riyadh, Saudi Arabia. The results were subjected to statistical analysis using Chi-square tests.

Results: One hundred and ninety-four (62.6%) of the patients had successful vaginal delivery. A large number of the younger patients <30 years delivered vaginally. The indication for the previous CS, height of the patient as well as the fetal birthweight in the current pregnancy, significantly influenced the outcome of the pregnancy. However, there was no difference in the outcome of pregnancy in relation to the number of previous CS.

Conclusion: Provided that there is no cephalo-pelvic disproportion and other pregnancy complications, patients with one or two previous CS can be safely allowed trial of vaginal delivery.


Keywords: Trial, vaginal delivery, cesarean section, outcome

The increasing safety of cesarean sections (CS), particularly with regard to the perinatal morbidity and mortality, and the fear of litigation in the event of an adverse outcome of labor after a previous CS, has tended to encourage doctors to repeat CS. The outcome is therefore an ever increasing CS rate in many obstetric units. Nevertheless, CS itself is not without its risks. Indeed, maternal mortality rate following CS is said to be four times higher than after normal vaginal delivery.

Women in the Saudi society tend to favor large families, and since abdominal deliveries could invariably prejudice their obstetric career, it is often difficult for most of these women to accept repeat CS. It has been shown that about 67% of properly selected patients, when allowed to go into labor after a previous CS, will progress to successful vaginal delivery. Indeed, these women are more likely to achieve vaginal delivery if the CS was performed for the so-called "non-recurrent" than for the "recurrent" factors.

The present report attempts, therefore, to analyze the obstetric outcome in the patients who were allowed to undergo trial of vaginal delivery following previous CS in the obstetric unit of King Khalid University Hospital (KKUH), Riyadh, Saudi Arabia.

Material and methods Three hundred and ten women with one or two previous cesarean deliveries, who were managed at the obstetric unit KKUH between 1989 and 1993 were recruited into the study. The medical records of these patients were examined, and details of patient's age, height, previous pregnancies, including the first (and other subsequent) CS, the management of the current pregnancy, mode of delivery in the current pregnancy, maternal and perinatal complications and fetal weight were collated. Indication for CS was taken to be the main indication listed in the operation notes. All patients with one previous CS were assessed to ensure that there were no other factors to warrant elective repeat CS. Such assessment included pelvic examination both clinically and radiologically, and ultrasound

From the Department of Obstetrics and Gynecology, King Khalid University Hospital, Riyadh (SOLTAN, AL-NUAIM, KHASHOGGI, CHOWDHURY, ADDAR, ADELSUI)

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Address correspondence and reprint request to: Dr. Mohammed H. Soltan, Department of Obstetrics & Gynecology, King Khalid University Hospital, King Saud University Hospital, PO Box 2925 Riyadh 11461, Saudi Arabia
estimation of the fetal weight at 38 weeks. Any such patient with pelvic inlet >10.5 cm or fetal weight <3.5 kg, and without any major medical complication, was allowed to have trial of vaginal delivery. The trial was conducted strictly under standard procedures. However, ten patients with two previous CS in advanced labour and were allowed to progress. All the data were coded, and statistical analysis was performed, using Chi-square tests to investigate the association between the variables.

Results Of the 310 patients with previous CS who were allowed to undergo trial of vaginal delivery (trial of scar), 194 (62.6%) had vaginal delivery, 176 of these spontaneously and 18 by instrumental delivery. The remaining 116 (37.4%) required repeat CS for either an emergency obstetric indication or arrest of labour.

Table 1 shows the influence of maternal age on the outcome of labour in those patients who had trial of vaginal delivery. Seventy one (57.7%) of the 123 women aged 30 years and over were delivered vaginally, as compared with 52 (42.3%) of the same age group who had repeat CS. In contrast, 123 (65.8%) of the 187 women below 30 years of age delivered vaginally compared with 64 (34.2%) of the same age group who had repeat CS. The difference was not statistically significant; (P=0.28).

When the outcome of pregnancy was analyzed in relation to the height of the patient, 31 (77.5%) of the tall women (>160cm) delivered vaginally as compared with 9 (22.5%) of those who had repeat CS. On the other hand, 31 (54.4%) of the short women (<150cm) had vaginal delivery as compared to 26 (45.6%) of them who had repeat CS. A comparison of the outcome of pregnancy in the tall and short women showed a statistically significant difference (P=.03), (Table 2). When the odds ratio was calculated for the height, the short women had an odds ratio of 2.9 (95% confidence interval = 1.1 - 7.9), for having CS as compared with the tall women.

Table 3 shows the outcome of labor in relation to the number of previous CS the patient had prior to the trial of vaginal delivery. The mode of delivery showed that 189 (63.0%) of those with one previous CS had vaginal delivery. On the other hand, 5 (50.0%) of the patients with two previous CS, had vaginal delivery. There was no statistically significant difference between those with one previous CS and those with 2 previous CS (P=0.532).

The outcome of labour was greatly influenced by the indications in the previous CS (Table 4). Whereas only 75 (48.1%) of the women who had previous CS for failure to progress in labour or for fetal distress had vaginal delivery, 81 (51.9%) of them had repeat CS. In contrast, 74 (78.7%) of those who had CS for malposition or breech, 19 (73.1%) of those who had CS for antepartum hemorrhage, and 26 (76.5%) of those who had CS...
Table 4 - Influence of indication for the previous cesarean section on the outcome of labour

<table>
<thead>
<tr>
<th>Patient height (cm)</th>
<th>Outcome of labour</th>
<th>Failure to Progress</th>
<th>Malposition</th>
<th>APH</th>
<th>IUGR + PE</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Vaginal delivery</td>
<td>75</td>
<td>48.1</td>
<td>74</td>
<td>78.7</td>
<td>19</td>
<td>73.1</td>
</tr>
<tr>
<td>Repeat cesarean</td>
<td>81</td>
<td>51.9</td>
<td>20</td>
<td>21.3</td>
<td>7</td>
<td>26.9</td>
</tr>
<tr>
<td>Section</td>
<td>156</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>94</td>
<td>100</td>
<td>26</td>
<td>100</td>
<td>34</td>
<td>100</td>
</tr>
<tr>
<td>Chi square</td>
<td>28.498</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>df</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>0.000003</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5 - Outcome of labour in relation to birth weight in women undergoing trial of vaginal delivery

<table>
<thead>
<tr>
<th>Weight (in grams)</th>
<th>&lt; 3500</th>
<th>&gt; 3500</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcome of Labour</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>Spontaneous delivery</td>
<td>128</td>
<td>62.7</td>
<td>48</td>
</tr>
<tr>
<td>Instrumental delivery</td>
<td>12</td>
<td>5.9</td>
<td>6</td>
</tr>
<tr>
<td>Repeat Cesarean Section</td>
<td>64</td>
<td>31.4</td>
<td>52</td>
</tr>
<tr>
<td>Total</td>
<td>204</td>
<td>100</td>
<td>106</td>
</tr>
<tr>
<td>Pearson Chi Square</td>
<td>9.382</td>
<td></td>
<td></td>
</tr>
<tr>
<td>df</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>0.0083</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

for intraterine growth retardation or pre-eclampsia delivered vaginally, compared with 21.3%, 26.9% and 23.5% respectively who had repeat CS. The difference was statistically significant (P<0.001). Failure to progress was the most significant contributor to the potential of the patient having CS in this study. When the odds ratio was calculated this finding was also reflected, with an odds ratio of 3.7 (95% CI = 2.19-6.19).

The fetal birth weight also significantly influenced the outcome of labor among the women (Table 5). One hundred and forty (68.6%) of the babies with birth weights less than 3500 gm were delivered vaginally as compared with 64 (31.4%) who were delivered by repeat CS. On the other hand, 54 (50.5%) of the babies weighing 3500 grams or more were delivered vaginally, as compared with 52 (49.1%) who were delivered by repeat CS. This difference was statistically significant (P<0.01).

Maternal morbidity was minimal among the patients. No case of uterine rupture was recorded in the series, although two patients had wound dehiscence observable during CS, performed for failure to progress and associated with tender scar. One patient who had vaginal delivery had postpartum hemorrhage which responded to conservative management after exploration of the uterus had revealed no wound dehiscence. Perinatal mortality in the series was 12/1000 which did not vary from the overall incidence for the hospital over the same period. The length of hospital stay was shorter among those who delivered vaginally as compared with those who had repeat CS.

Discussion Successful vaginal delivery in 62.6% of the 310 patients who underwent trial of vaginal delivery compares favorably with recent reports from other centers, even if others, however, have recorded higher success rates. It has been suggested that these higher success rates may have been influenced by the fact that a great proportion of their patients had a prior vaginal delivery before their CS, which could facilitate their subsequent vaginal delivery. Factors which may influence successful vaginal delivery following a previous CS include length of labor prior to the preceding CS, the indication for the CS, the age and height of the patient, and the fetal weight in the current pregnancy, among many others. In this study, there was a significant association between short and tall women and their labour outcome (P = 0.03). The height of the patient, especially when less than 150 cm, may have an adverse outcome on attempts to deliver her vaginally. This has been confirmed in this study where shorter women (<150cm) were found to have a three-fold risk of having CS as compared with taller women (>160cm).

Even though there was no significant association found in the outcome of labor with regards to age, there was a higher rate of cesarean deliveries in women older than 30 years (42.3%) as compared with those below this age (34.2%). This difference, though not significant, is probably a resolve of the younger women to ensure vaginal delivery in order to enhance their future obstetric career, especially the desire for a large family in the Saudi society.

Contrary to the findings in other studies, where patients with previous diagnosis of cephalo-pelvic disproportion, or those who had CS for failure to progress in labor or fetal distress did not significantly influence the likelihood of vaginal delivery after CS, 51.9% of our patients who had
previous CS for failure to progress in labor or fetal distress ended up having repeat CS, whereas, Stovall et al.\textsuperscript{4} was able to achieve a success rate of 77\% of vaginal delivery in patients who had primary CS for dystocia, we had only 48.1\% vaginal delivery after CS for failure to progress in the previous labour.

The indication for CS has been said not to be a reason to prevent patients from attempting vaginal delivery.\textsuperscript{2,10} In our view, the need to exclude cephalo-pelvic disproportion, both clinically and radiologically, cannot be over-emphasized. The findings in our study, where a significantly higher number of patients with CS for failure to progress in labor required repeat CS in the current pregnancy will tend to confirm this view point. This is because sub-optimal pelvimetry results have been shown to mitigate strongly against selection for planned labor after CS,\textsuperscript{10} even if others have found no significant difference in the rates of CS in planned labors, with (22\%) or without (21\%) satisfactory pelvimetry.\textsuperscript{19}

There was a very significant relationship between the fetal weight and the outcome of labor in the patients in this study (P<0.01). This is in agreement with the findings of Seitchik and Rao\textsuperscript{20} who found significantly higher CS delivery in the women with babies weighing over 3500 gm. Even though, Menticoglou et al.\textsuperscript{21} believe that fetal macrosomia is not a justified indication for routine repeat CS; it is recommended that CS should be preferable in those women where the fetal weight is greater than 3500 gm, once the uterus has been scarred.

In this study, ten (3.2\%) of the patients had 2 previous CS prior to the current pregnancy, and although these were not specifically selected for trial of vaginal delivery, the success rate of 50\% vaginal delivery in these cases calls for serious thought. Similarly, other studies\textsuperscript{22,23,24} have reported that women with more than one previous CS can be safely permitted to have trial of vaginal delivery. In a recent series, Phelan et al\textsuperscript{25} demonstrated that the likelihood of successful vaginal delivery according to the number of prior CS was 82\% for one CS, 72\% for two previous sections and 90\% for three previous CS. This may perhaps indicate that there is an increase in the scar strength with repeat CS. In the light of the findings in this study and the reports quoted, it would seem reasonable to allow planned labor more often in women with 2 previous CS, especially if vaginal delivery has been accomplished either before or after the CS, unless circumstances specific to the current pregnancy suggest otherwise. The paucity of complications associated with the unplanned labors in this study suggest that such a procedure will be feasible, providing the labors are carefully monitored, although further study may still be required to support this view point.

With good selection and careful monitoring of these patients, repeat cesarean section can be reduced further without any appreciable rise in maternal or fetal morbidity. The issue at stake here is not so much the integrity of the uterine scar alone, but the presenting head and the size of the pelvis. There is, therefore, the need to review the routine use of CS in patients with 2 previous cesarean deliveries, especially in well selected cases where cephalo-pelvic disproportion has been excluded.

There is no denying the fact that vaginal delivery after CS does not guarantee the integrity of the scar in a subsequent delivery. For example, it has been reported that patients who have delivered three times vaginally after CS, have had the scar give way during the 4th labour.\textsuperscript{19} This only goes to highlight the need for constant surveillance of each trial of scar, and to emphasize that all patients with a previous CS scar are exposed to the same risk at each trial. There is need for proper selection of cases, therefore, and careful monitoring required in labour. Furthermore, such labours should be conducted where adequate facilities are available.\textsuperscript{23}

The study did not find a higher incidence of maternal or perinatal complications following CS performed for failed trial of vaginal delivery as compared with other studies.\textsuperscript{2,22,23,24,26} Indeed, the duration of hospital stay in those who succeeded vaginally was significantly shorter than those following CS. The findings in this study, together with the findings of increased maternal morbidity and mortality associated with CS being 4 times higher than following vaginal delivery,\textsuperscript{4} would tend to provide a strong indication for trial of vaginal delivery in the majority of women with a previous lower segment CS. This might also reduce the cost of providing adequate obstetric care to these patients.

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References