DELIVERY AFTER A LOWER SEGMENT CAESAREAN SECTION

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ABSTRACT

A retrospective study on the outcome of 130 consecutive patients with a previous lower segment Caesarean section who delivered in Kandang Kerbau Hospital, Singapore from January to June 1989 was performed. Seventy-six percent of these patients were selected for a trial of labour and 24% of the patients had a repeat (elective) Caesarean section. Vaginal delivery was achieved in 65% of patients chosen to undergo a trial of labour. A trial of labour was found to be relatively safe with only a 0.7% incidence of uterine dehiscence and a perinatal mortality of 10.1 per 1,000 births with no maternal mortality. Cephalopelvic disproportion in the previous pregnancy and cervical dilatation during the previous Caesarean section were not important prognostic factor for the subsequent pregnancy outcome. A previous vaginal delivery in patients who had a previous Caesarean section was a good prognostic factor for a subsequent successful vaginal delivery ($p<0.05$) in the trial of labour. More vaginal deliveries ($p<0.05$) were achieved when oxytocic infusion was used in selected cases during the trial of labour. Maternal morbidities were higher in patients who had a failed trial of labour (57%) and repeat elective Caesarean section (20%) than those who had a successful trial of labout (10%). Management of patients with a previous lower segment Caesarean section may present a dilemma, but if properly conducted, the outcome can be favourable.

Keywords: Previous Caesarean section, trial of labour, vaginal delivery.

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INTRODUCTION

Caesarean section rates have been increasing annually for more than two decades worldwide. In the United States, the Caesarean section rates have risen from 16.5 per 100 deliveries in 1980 to 24.1 per 100 deliveries in 1986[1]. In Kandang Kerbau Hospital, Singapore, the Caesarean rate was at 15.3% in 1989[2]. As a result of the increasing Caesarean section rate, obstetricians are now managing more patients with previous Caesarean scar in subsequent pregnancies.

Craigin in 1916 pronounced that "once a Caesarean section always a Caesarean section" when Classical Caesarean sections were performed through a midline incision up to the fundus of the uterus. Subsequent pregnancies following these Caesarean sections were exposed to the real hazards of uterine rupture, massive haemorrhage and high maternal and perinatal mortality. Today, almost all Caesarean sections are performed through a transverse lower segment incision in the uterus which is associated with lower risk of uterine rupture.

The management of patients with a previous Caesarean scar poses a dilemma. On one hand, there is a fear of uterine rupture during labour with its attendant maternal and foetal risks; and on the other hand, repeating the Caesarean section is not without anaesthetic and surgical hazards.

A review of the management of patients with a previous transverse lower segment Caesarean section was made. This paper aims to report on the safety of a trial of labour and the use of oxytocic infusion in these patients, to look at some factors that will influence the outcome of the trial of labour and lastly to study the maternal morbidities associated with delivering these patients.

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MATERIALS AND METHODS

The medical records of 130 consecutive patients with a previous transverse lower segment Caesarean section who delivered over a six-month period from January to June 1989 in Kandang Kerbau Hospital, B Unit (renamed the Department of Reproductive Medicine), Singapore were reviewed.

Elective Caesarean section was performed for those patients who had a uterine tear during the previous Caesarean section and those with two or more previous Caesarean sections. It was also performed for those patients whose pregnancy was complicated by multiple pregnancies, breech presentation, macrosomia, contracted pelvis (true conjugate diameter < 10.5cm), placenta praevia major, severe medical conditions and bad obstetric history.

Spontaneous onset of labour had occurred in most of the patients chosen to undergo a trial of labour. Oxytocic infusion had been used to induce labour and to augment labour in carefully selected cases. During labour, all the patients had continuous electronic foetal heart and external tocographic monitoring. Pain relief for these patients was with intramuscular Pethidine and Entonox (Nitrous Oxide and oxygen) inhalation. None of the patients had epidural anaesthesia for pain relief. The maternal vital signs, progress of labour, symptomatology and clinical signs had been recorded.

The decision in selecting patients for an elective Caesarean section or a trial of labour and abandoning the trial of labour for an emergency Caesarean section was made by experienced senior obstetricians.

Statistical analysis was performed with Chi-square test.

RESULTS

Ninety-nine (76%) of 130 patients with a previous Caesarean section were selected to undergo a trial of labour. The remaining 31 (24%) patients had an elective Caesarean section.

Vaginal delivery was successful in 64 (64.6%) of 99 patients who underwent a trial of labour (Table I).

The outcome of the trial of labour in these patients is shown in Table I. Vaginal delivery was achieved in 18 (62.1%) of 29 patients with previous Caesarean section for cephalopelvic

disproportion, 14 (66.6%) of 21 patients with previous Caesarean section for breech presentation, 9 (47.4%) of 19 patients with previous Caesarean section for foetal distress and 5 (55.5%) of 9 patients with previous Caesarean section for medical diseases after a trial of labour.

Table I – Vaginal delivery following a previous Caesarean section. Figures are in number (%) of patients.

Previous Caesarean section	Trial of labour	Vaginal delivery
CPD/FTP	29	18 (62.1%)
Foetal distress	19	9 (47.4%)
Breech	21	14 (66.6%)
Placenta problems	10	9 (90.0%)
Medical problems	9	5 (55.5%)
Twins	0	0 (0%)
Malpresentation	4	3 (75.0%)
Cord prolapse	4	4 (100%)
Others	3	2 (66.6%)
Total	99	64 (64.6%)

CPD : Cephalopelvic disproportion.
FTP : Failure to progress.

A higher percentage of patient delivered vaginally when the previous Caesarean section was for placenta problems, cord prolapse and malpresentation other than breech. Vaginal delivery was achieved in 9 (90%) of 10 patients with previous Caesarean section for placenta problems, 4 (100%) of 4 patients with previous Caesarean section for cord prolapse and 3 (75%) of 4 patients with previous Caesarean section for malpresentation other than breech presentation (Table I).

The indications for emergency Caesarean section after a trial of labour are shown in Table II. Emergency Caesarean section was performed in the remaining 35 (35.4%) patients who underwent a trial of labour and was mainly performed for patients who developed cephalopelvic disproportion (16 patients) and foetal distress (10 patients) during labour.

One case of uterine scar dehiscence was found during an emergency Caesarean section for cephalopelvic disproportion. This patient had a previous Caesarean section for foetal distress and did not develop scar tenderness or increased abdominal pain during the trial of labour.

One patient had an emergency Caesarean section for scar tenderness during the trial of labour but no scar dehiscence or rupture was found during the Caesarean operation.

Table II – Emergency Caesarean section after a trial of labour. Figures are in number of patients.

Indications for Caesarean section	Emergency Caesarean section
CPD/FTP	16
Foetal distress	10
Breech	1
Placenta problems	1
Medical problems	2
Twins	1
Malpresentation	2
Others	2
Total	35

Table III shows the outcome of delivery in those patients who had spontaneous onset of labour and induced labour. Of those patients who were chosen to undergo a trial of labour, 88 patients had spontaneous onset of labour; 66 of whom were not augmented with oxytocin whereas 22 patients had oxytocin to augment the labour. Thirty-eight (58%) of 66 patients who had spontaneous labour but not augmented with oxytocin achieved vaginal delivery. However, 17 (77%) of 22 patients in spontaneous labour whose labour was augmented with oxytocin were delivered vaginally.

There were 11 patients who had surgical induction of labour and oxytocin was used to augment the labour. Nine (82%) of these patients achieved vaginal delivery (Table III).

More patients achieved vaginal delivery when oxytocin was used to augment labour in patients undergoing a trial of labour (X^2=3.856, df=1, $p<0.05$) than in those patients who were not given oxytocin.

Table IV shows the relation between previous vaginal delivery and the outcome of delivery after a trial of labour. Forty of the patients who underwent a trial of labour had a previous vaginal delivery either before or after the previous Caesarean section. Trial of labour was successful in 33 (83%) of these 40 patients. In contrast, 31 (53%) of 59 patients who had no previous vaginal delivery achieved successful trial of labour. This difference was statistically significant (X^2=6.558, df=1, $p<0.05$).

Table III – Trial of labour in patients with a previous Caesarean section. Figures are in number (%) of patients.

Labour	Trial of Labour n = 99	Vaginal delivery n = 64	Caesarean delivery n = 35
Spontaneous labour, non-augmented	66	38 (58%)	28 (42%)
Spontaneous labour, augmented	22	17 (77%)	5 (23%)
Induced labour, augmented	11	9 (82%)	2 (18%)

Table V shows the relation between cervical dilatation at time of previous Caesarean section and outcome of trial of labour. Of those patients chosen to undergo a trial of labour, there were 66 patients with cervical dilatation of less than 4 cm and 33 patients with cervical dilatation of more than 4 cm at the time of the previous Caesarean section. Forty-two (64%) of 66 patients who had not attained a cervical dilatation of 4 cm during the previous Caesarean section and 22 (67%) of 33 patients with cervical dilatation of 4 cm or more at the time of

Table IV – Relation between previous vaginal delivery and outcome of delivery after previous Caesarean section. Figures are in number (%) of patients.

Vaginal delivery	Trial of Labour n = 99	Vaginal delivery n = 64	Caesarean delivery n = 35
None	59	31 (53%)	28 (47%)
Previous vaginal delivery	40	33 (83%)	7 (17%)

the previous Caesarean section achieved vaginal delivery. This difference was not statistically significant (X^2=0.055, df=1, p>0.05).

One perinatal death was recorded. This patient had polyhydramnios and premature rupture of membranes without cord prolapse at 29 weeks of gestation. There was no gross foetal abnormality. The cardiotocogram showed late decelerations just before normal vaginal delivery. Apgar scores was 2 at 1 minute and 2 at 5 minutes. The baby died a few hours after birth. Post-mortem revealed acute asphyxia as the cause of death.

The perinatal mortality in this study was calculated to be 7.7 per 1,000 births for all patients who delivered after a previous Caesarean section. However, the perinatal mortality was 10.1 per 1,000 births for those patients who were chosen to undergo a trial of labour.

Table V – Relation between cervical dilatation at time of previous Caesarean section and outcome of trial of labour. Figures are in number (%) of patients.

Cervical dilatation at time of previous Caesarean section	Trial of Labour n = 99	Vaginal delivery n = 64	Caesarean delivery n = 35
< 4 cm	66	42 (64%)	24 (36%)
4 – 10 cm delivering	33	22 (67%)	11 (33%)

There was no maternal death.

Table VI shows the incidence of maternal morbidities associated with the different modes of delivery in patients with a previous Caesarean section. Maternal morbidity was found in 7 patients (20%) with repeat elective Caesarean section, 20 patients (57%) with emergency Caesarean section and 7 patients (10%) who had vaginal delivery after a trial of labour.

Patients who had repeat Caesarean section had a higher incidence of febrile morbidity, urinary tract infection and blood transfusion. Blood transfusions were given to 6% (2 patients) of those who had elective Caesarean section, 6% (4 patients) of those who delivered vaginally and 23% (8 patients) of those who had emergency Caesarean section after a trial of labour.

Table VI – Maternal morbidity. Figures are in number of patients.

Morbidity	Vaginal delivery	Emergency Caesarean Section	Elective Caesarean Section
Scar dehiscence	–	1	–
Febrile morbidity	1	6	3
Endometritis	2	1	1
Urinary tract infection	–	3	1
Blood transfusion	4	8	2
Post-operative ileus	–	1	–
Deep vein thrombosis	–	–	–
Bladder/neck trauma	–	–	–
Wound breakdown	–	–	–

The incidence of Caesarean scar dehiscence was found to be 0.7% (one case) in this series.

Patient who delivered vaginally had a significantly shorter hospital stay (2.7 days) than patients with emergency Caesarean section (6.9 days) and elective Caesarean section (6.7 days).

DISCUSSION

Many safe vaginal deliveries have been conducted in patients with a previous lower segment Caesarean section scar. In this series, 65% of the patients who underwent a trial of labour achieved vaginal delivery. This result is comparable to a few larger studies[3-6] which reported a similar success. However, a higher rate of vaginal delivery in which 80-90% of patients who had a trial of labour and delivered vaginally had also been reported[7-10]. Xavier[10] in the Provincial Hospital, Gweru, Zimbabwe which was without any facilities of electronic foetal heart rate monitoring, X-ray pelvimetry and even with no information about the previous Caesarean section had managed a 82% success of vaginal delivery in patients undergoing the trial of labour. This indicates that carefully selected patients with a previous lower segment Caesarean section can have a good prognosis for vaginal delivery in their further pregnancies.

Uterine scar rupture is a serious complication which is associated with high maternal and perinatal mortality. Uterine scar rupture is separation of the uterine scar with bleeding and can be accompanied by partial or complete extrusion of the foetus into the abdominal cavity whereas uterine scar dehiscence occurs when there is separation of the uterine scar without bleeding or extrusion of the foetus through the wound. The incidence of uterine scar dehiscence was 0.7% in our series. In comparison, the incidence of uterine rupture was 0.7% in larger series[3,10]. Dewhurst[11] reported that the risks of uterine rupture was 0.8% prior to labour and 1.2% during labour in those patients with a transverse lower segment Caesarean scar.

The risk of uterine scar rupture in patients undergoing a trial of labour is found to be increased when the indication for the primary Caesarean section is for a non-recurrent cause, for example, foetal distress, than when it is for a recurrent cause, for example, cephalopelvic disproportion[12]. This was an unusual finding because the risk is expected to be lower in the former group of patients. In this study, the only case of uterine scar dehiscence was found in a patient with a previous Caesarean section for foetal distress.

Dewhurst has emphasised the usefulness of lower abdominal pain and tenderness for early detection of uterine scar rupture. However, others have found this an unreliable feature. In this study, the patient who developed a uterine scar dehiscence during the trial of labour was found not to have increased abdominal pain and tenderness; and in another patient, no uterine scar dehiscence or rupture was found during the emergency Caesarean section for suspected uterine rupture because of increased abdominal pain and tenderness. This has proved the inadequacy of abdominal pain and tenderness in detecting uterine scar rupture.

The use of oxytocin for induction and augmentation of labour in the presence of a previous uterine scar is controversial. However, its use in this respect is gaining popularity[9]. Flamm et al[13] reported in his study of 230 patients given oxytocin infusion during a trial of scar, vaginal delivery was achieved in 65% of the patients with no increase in uterine rupture, maternal and foetal mortality. In this study, vaginal delivery was achieved in about 80% of patients given oxytocin for induction and augmentation of labour with no incidence of uterine scar dehiscence and rupture. The only patient who had a uterine scar dehiscence in this study did not receive oxytocin

during labour. We feel that in properly selected cases and with meticulous monitoring of the labour, a high rate of vaginal delivery can be achieved when oxytocin is used judiciously to augment the uterine contractions but bearing in mind that scar rupture can be more likely. Other studies however have found that the use of oxytocin in patients undergoing a trial of labour is associated with a decreased chance of vaginal delivery and a small increased chance of uterine rupture[3,5,7]. However, Chew[14] reported uterine scar rupture and dehiscence in 28 (0.12%) of 22,561 patients who had a previous lower segment Caesarean section and in only 3 patients with uterine scar rupture were oxytocic infusions given.

Continuous cardiotocography monitoring during labour has been shown to be effective in detecting uterine scar rupture. A cessation of uterine contractions and the occurrence of foetal distress during a trial of scar are described to be early signs of uterine scar rupture. We feel that continuous cardiotocography and in particular, intrauterine pressure monitoring should be mandatory for monitoring all patients with a previous Caesarean section in labour, especially when oxytocic infusions are also given.

Cephalopelvic disproportion in a previous pregnancy can be considered as a recurrent problem in subsequent pregnancies and hence, a repeat Caesarean delivery may be required. However, this was found not to be true. In this study, 62% of patients who had a previous Caesarean section for cephalopelvic disproportion were delivered vaginally after a trial of labour. We feel that the diagnosis of cephalopelvic disproportion during the primary Caesarean section may have little prognostic value from one pregnancy to the next and hence such patients should be selected for a trial of labour after assessing the size of the foetus and the adequacy of the pelvis and not to exclude such a patient from a trial of labour.

Elective Caesarean section was performed for those patients who were diagnosed antenatally to have cephalopelvic disproportion. Despite the exclusion of patients with an obvious cephalopelvic disproportion from undergoing a trial of labour, emergency Caesarean section was still being performed for cephalopelvic disproportion arising during the trial of labour in 46% of patients with a previous Caesarean section. This could be explained because most of these patients were found to have cephalopelvic disproportion arising from persistent occipital posterior position during labour.

Patients who have a previous vaginal delivery after a previous Caesarean section are found more likely to deliver vaginally again[15]. In this study, we found that patients who had delivered vaginally either before or after the previous Caesarean section were more likely to achieve vaginal delivery than those who had not delivered vaginally before ($p<0.05$). This finding may give more confidence to obstetricians to attempt vaginal delivery in patients who had a lower segment Caesarean scar and previous vaginal delivery.

Routine X-ray pelvimetry in patients with a previous Caesarean section has contributed in reducing the number of repeat Caesarean secrion, especially in patients who had a previous Caesarean section for cephalopelvic disproportion. However, in this respect, no benefit is found in those patients who had a previous normal vaginal delivery and Caesarean section[16]. We feel that a clinical and radiological pelvimetry should be performed for those patients with a Caesarean section scar who had not delivered vaginally before and the mode of delivery is decided after the size of the foetus is considered. It must also be emphasized that cephalopelvic disproportion often may be diagnosed with certainty only after an adequate trial of labour and not solely on the basis of the radiological pelvimetry.

Molloy et al[8] has shown that more patients have a repeat Caesarean delivery if the primary Caesarean section is performed for patients in labour before the cervix is 4 cm dilated because of recurrent cervical dystocia. Demianczuk et al[7] has also shown that if the cervical dilation on admission was less than 3 cm there is a significantly smaller chance of vaginal delivery. However, Whiteside et al[17] and ourselves were unable to confirm this finding.

The incidence of maternal morbidity was higher in patients who underwent a repeat (elective and emergency) Caesarean section when compared to patients who delivered vaginally after a trial of labour. It was disturbing to note that 23% of the patients who had emergency Caesarean section after a trial of labour required blood transfusion as compared to 6% in both the patients with elective Caesarean section and vaginal delivery. Maternal morbidity was encountered in 57%, 20% and 10% in this study as compared with only 18%, 10%, 1% in one study[18] in patients with emergency Caesarean section, elective Caesarean section and vaginal delivery respectively. The high maternal morbidity rate in this study can be explained by the lower social economic status of our patients. Some of these patients had low haemoglobin reserve and were more at risks to infection and bleeding requiring blood transfusion.

The incidence of perinatal mortality in this study was 7.7 per 1,000 births in patients who delivered with a previous Caesarean scar. However, the perinatal mortality rate was 10.1 per 1,000 births of patients with a previous Caesarean section undergoing a trial of labour. This was comparable to the overall perinatal mortality rate of 10.1 per 1,000 births for the hospital in the same year[2]. Several studies have reported a lower perinatal mortality rate in the patients with repeat elective Caesarean section and a higher rate among the patients who delivered vaginally after a trial of labour in the presence of lower segment Caesarean section scar. However, Lanvin et al[3] has shown that the rupture of a transverse lower segment uterine scar did not carry an increased foetal risk if the patients are appropriately managed.

No incidence of maternal mortality was seen in this series as our study number was small. Maternal mortality from Casearean section is shown to occur in 0.8 per 1,000 operations and 13% of these deaths are the result of anaesthetic complications[19].

We have repeated Caesarean section for all patients with two or more previous Caesarean sections and a previous Caesarean section complicated with a breech presentation. However, recent studies have shown that 65-77% of patients with two previous Caesarean sections or more [15,20] and 46-63% of breech presentation with a Caesarean section scar [3,9] have achieved vaginal delivery after a trial of labour. These aspects however remained poorly studied and one would wait for more reports before subjecting this group of patients to a trial of labour.

We agree with O'Driscoll that the way to reduce the number of repeat Caesarean sections is to reduce the number of primary Caesarean section performed[21]. There is also a need to reduce the number of repeat Caesarean sections because of its associated higher maternal mortality and morbidity, anaesthetic risks, post-operative discomfort, the risks of pulmonary embolism, longer hospital stay, increased need for blood transfusions and antibiotics and higher financial costs.

A standard protocol for selecting patients to undergo a trial of labour in the presence of a lower segment Caesarean section scar should be drawn up. With safe guidelines and meticulous surveillance in these patients, the obstetric outcome can be good.

In conclusion, our experience in this study have proved that a trial of labour for patients with a previous transverse

lower segment Caesarean scar is safe when conducted under close monitoring. Patients who have a previous vaginal delivery have been shown to have a higher success rate for another vaginal delivery during the trial of labour. The status of the cervical dilatation in the primary Caesarean section did not influence the outcome of the trial of labour. The use of oxytocin for induction and augmentation of labour in the presence of a lower segment Caesarean scar in selected cases is safe and is associated with more vaginal deliveries. The maternal morbidity for patients delivering after a previous Caesarean section in this series of patients is high, in particular those who had a repeat Caesarean section, but we feel that it can be reduced with the appropriate measures to improve the haemoglobin reserve of our patients.

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