

Determinants of successful outcome in trial of labour after a previous caesarean section

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ABSTRACT

Background: *Obstetrician and policy makers are worried about the rising incidence of caesarean delivery worldwide. Elective caesarean section for previous caesarean section have been identified as a major contributor. Attempts at reducing the high caesarean section rate must address the issue of repeat caesarean section.*

Objective: *To prospectively study the predictors of successful trial of vaginal delivery after one previous caesarean section.*

Patient and Methods: *Cohort of 123 women undergoing trial of labour after one previous labour were studied to determine obstetric factors significantly associated with successful trial of labour using Multiple logistic regression model.*

Results: *The vaginal birth after cesarean (VBAC) rate during the period was 69.1%. Univariate analysis revealed 5 potential predictors however after multiple logistic regression only previous successful trial of labour (OR; 2.1; C.I.: 1.7-3.3), birth weight < 3.5kg (OR: 1.8; 1.6-2.5) and station at -1 or below (OD: 1.5; C.I.: 1.3-2.1) retained significance as a predictive factor. Conclusion: Previous successful trial of labour, birth weight less or equal to 3.5kg and station at or below - 1 were the predictors of successful labour outcome in patients undergoing trial of labour in our centre*

INTRODUCTION

Caesarean delivery is a common obstetric operation and with increasing incidence worldwide^{1,2}. Concerns have arisen that the rate of caesarean sections has been increasing steadily over the past two decades. The National Sentinel Caesarean Section Audit Report in 2001 (www.rcog.org.uk)

indicated that in the United Kingdom, 21.3% of women now delivery by caesarean section, a rate which is similar to the United States. Research has therefore recently focused on the safety of a vaginal delivery after a previous caesarean section and in what circumstances it should be encouraged.

Nigerian patients have a general aversion for caesarean section because of the belief that delivering abdominally is a reproductive failure and thus majority of the women will insist on vaginal delivery even at the cost of their lives¹.

A major cause of the rising caesarean section rate is elective caesarean section for a previous caesarean section due to cephalopelvic disproportion^{1,3,4,5}. Thus attempts at reducing the high caesarean section

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rate must address the issue of routine elective caesarean for previous caesarean section.

Labour in patients with previous scar has been shown by several studies to be safe and reports over the past several years has provided evidence that 60-80% of trials of labour after a previous caesarean delivery resulted in successful vaginal births^{4,6,7,8,9,10}. However great care and caution must be exercised as serious complications may arise, especially in ill equipped and poorly staffed centres^{4,5}.

Most women who undertake a trial of labor after a previous cesarean delivery will achieve a successful vaginal birth, but those who fail are at higher risk of maternal morbidity than those who choose elective repeat cesarean⁵. Many researchers have tried to find predictive factors of successful vaginal birth cesarean (VBAC),^{15,16} the indication of the previous cesarean being one of these factors. When the indication for the previous cesarean is failure to progress secondary to cephalopelvic disproportion, the rate of successful VBAC is lower than when the indication is a nonrecurrent cause.^{17,18} It has been proposed by Hoskins and Gomez that a previous cesarean for dystocia in the second stage of labor is associated with a very high rate of failed trial of labor for the subsequent pregnancy.¹⁹ Contrary to this study, three studies with small numbers of patients showed a good success rate.²⁰⁻²² An increased incidence of operative vaginal delivery has also been reported in these patients.²³

We prospectively studied the different variables which may predict the outcome of trial of labour in a previous caesarean section, aimed at utilizing such information to select patients that will benefit from trial in order to avoid adverse outcome.

PATIENTS AND METHODS

All women undergoing trial of vaginal delivery at the Havana Specialist Hospital (HSH), Lagos, Nigeria between July 2000 and June 2003 were prospectively studied. HSH is a multidisciplinary proprietary hospital located in the cosmopolitan city of Lagos, Nigeria. Four consultant Obstetrician and two paediatricians supervise its obstetric and neonatology units. The obstetricians conduct all high-risk deliveries and over 95% of all other deliveries.

PROTOCOL FOR TRIAL LABOUR.

A. QUALIFICATION

1. Single transverse lower segment caesarean section for a non recurrent cause performed in our hospital or by an obstetrician and confirmed

by a medical report from him showing the indication for surgery, type of surgery and postoperative condition.

2. Singleton fetus in cephalic presentation with estimated fetal weight by ultrasound after 36 weeks less than 4 kg.
3. Pelvis adjudged as clinically adequate by the attending obstetrician. Radiological pelvimetry is not mandatory.
4. No contraindication to vaginal delivery.
5. Reactive fetus on non stress test.
6. Informed consent by the patient,
7. Spontaneous labour.

B. METHODOLOGY

When in spontaneous Labour

1. Review history and labour plan by the managing consultant.
2. Examination to confirm lie, fetal well-being and ability to withstand labour, approximate size of baby, adequacy of pelvic cavity and stage of labour.
3. Intravenous access is secured. Packed cell volume check. Group and cross match two pints of blood.
4. Inform theatre, anaesthetic and paediatrician.
Nil by mouth until delivered.
5. Augmentation of labour at the discretion of the attending obstetrician.
6. Labour managed using WHO partograph
7. Complication managed according to departmental protocol of managing such obstetric complication.

A trial is deemed successful if it ended in vaginal delivery. Information was collated on maternal age, parity, previous successful vaginal delivery after the primary caesarean section, birth weight, fetal sex, cervical score on admission and status on admission. The collected data were coded and entered into an IBM compatible PC using EPI inform Version 6. Univariate analysis was used to examine the association between each of the variables and successful outcome. Variable with significant

association at an α of 0.20 were subjected to logistic regression model using SPSS statistical software Version 10. A final logistic model was developed with the final predictive variable having a significant level of $p < 0.05$. The results are presented as odds ratios with 95% confidence interval.

RESULTS

During the period of study, one hundred and twenty three women had trial of labour after a previous caesarean section. Of the 123 women, 85(69.1%) had successful trial of labour while 41(30.9%) had emergency repeat caesarean section for failed trial of labour. The eighty-five women who had successful trial constitute the study subjects and the forty-one that had caesarean section as controls.

The univariate association between successful trial of vaginal delivery after a previous caesarean section and the selected maternal and fetal variables are shown in table I. In the univariate analysis, fetal birth weight of 3.5kg and below, cervical dilatation at presentation of 5cm and above, station of the presentation part at presentation of - 1 and below, gestation age of less than 40weeks, and successful vaginal delivery after a previous caesarean section had significant association with successful outcome.

Logistic regression analysis determined using odds ratios and 95% confidence intervals showed that only birth weight less than or equal to 3.5kg, station of -1 and below, and previous successful trial of vaginal delivery retained their significance as predictors of successful outcome in this patients that had trial of vaginal delivery.

DISCUSSION

In our social setting with great aversion for caesarean delivery, trial of labour after a previous caesarean section is not only desirable, but has been proven by this study and several other studies to be safe^{1,4,7,9,10}. The vaginal birth after caesarean section (VBAC) rate of 69.1% though within the reported range of 60-80% is slightly higher than 62.8% reported by Okpere et al in Benin Nigeria^{4,6,7,9,10}, but much higher than an earlier study in our center(1983-1987) with a VBAC rate of 48.9% among women allowed a trial of labour. The observed difference (69.1% Vs 48.9%) reflects the role of a number of factors. Firstly, the set of criteria used in the present study were tightly controlled under strict observation and close monitoring. Communication with the attending obstetrician who performed the primary caesarean section also influenced the patient approach of our obstetric team. The current study included all deliveries subsequent

to primary caesarean section at which time confidence in allowing a trial of labour have increased. It cannot be ruled out that the fact of an on-going study may have had a positive enhancing effect on the results. Finally in centres where all patients with a previous lower segment caesarean section are allowed trials are likely to record a lower success rate.

Though this study has indicated the feasibility of trial of vaginal delivery after a previous caesarean section, closing monitoring with provision of emergency obstetric service is necessary to avoid occasional mishaps like uterine rupture⁴.

It is noteworthy that the phrase, "once a cesarean, always a cesarean" dates back to an article by Edwin Cragin entitled "Conservatism in Obstetrics" published in 1916.¹³ Although caesarean delivery rarely was performed in that era, Cragin's purpose was to urge physicians to avoid unnecessary cesareans. He termed the caesarean operation "radical obstetric surgery" and urged his colleagues to practice sound obstetrics to avoid having to resort to it. The famous "once a cesarean, always a cesarean" phrase came in the final paragraph of the article and clearly was meant to emphasize that one of the risks of a primary cesarean is that repeat operations might be required. Interestingly, the author went on to point out that there are many exceptions to this rule and that one of his own patients had three vaginal births after caesarean without difficulty. This is remarkable given that vertical uterine incisions were standard at that time. The low transverse uterine incision would be championed by Kerr¹⁴ a decade later.

We embarked on this study to identify those factors that will increase our success rate and result in reduced maternal and fetal morbidity and mortality which could occasionally complicate trial of labour in patients with previous caesarean section.

Of the eight maternal and fetal variables thought to influence labour outcome in patients undergoing trial of labour, only previous successful trial of labour (OR= 2.1; CI= 1.7-3.3), birth weight of 3.5kg or less (OR=1.8; CI=1.6-2.5) and status of presentation at -1 or below (OR= 1.5; CI=1.3-2.1) remained significant predictors after multiple logistic regression. This finding is not unexpected in that the three parameters have to do with either the relationship between the fetus and the pelvic capacity or the adequacy of the pelvis itself.

Previous successful trial of labour not only confirms the adequacy of the pelvic capacity but also imparts confidence to the obstetrician and midwife thus increasing their threshold for intervention while lowering that for assistance in labour like augmentation.

Table 1: Univariate association between successful trial of labour and some maternal and fetal variables.

Variables	Study Group=85	Control Group N=38	P Value	T or χ^2	OR	95% C.I.
Mean age (years)	27.4 \pm 5.1	29.4 \pm 5.3	0.64	.308	-	-
Mean parity	1.9 \pm 1.2	1.8 \pm 1.2	0.45	.508	-	-
Laboured before primary caesarean	59(69.4%)	18(47.4%)	0.03	4.55	2.52	1.02-5.98
Gestation age (weeks)						
<37	26(30.6%)	10(26.3%)				
37-40	48(56.5%)	16(42.1%)				
>40	11(12.9%)	12(31.6%)	0.05	6.08	3.46	1.05-11.54
Previous successful trial	23(27.1%)	3(7.9%)	0.03	04.69	4.33	1.12-19.56
Station of presenting part						
Above -1	47(55.3%)	30(78.9%)				
-land below	38(44.7%)	8(21.1%)	0.02	5.31	0.33	0.12-0.86
Birth weight (kg)						
\leq 3.5kg	52(61.2%)	14(36.8%)	0.02	5.31	2.70	1.14-6.44
>3.5kg	33(38.8%)	24(63.2%)				

Table 2: Predictors of successful outcome

Predictor	P Value	Odds Ratio	95% Confidence Interval
Previous successful trial of labour	0.03	2.1	1.7-33
Birth weight of 3.5kg or less	0.04	1.8	1.6-2.5
Station at -1 or below	0.03	1.5	1.3-2.1

The average birth weight in our centre is 3.5kg and values higher than 3.5kg were associated with higher caesarean rate¹. Thus we chose this value as a cut off point and were not surprised that lower weights were associated with successful outcome. Obviously, the smaller the fetal size the more the ease with which the fetus negotiates through a normal sized pelvis. Values above 3.5kg are more likely to lead to cephalopelvic disproportion, which is the leading indication for caesarean section in our centre¹.

The fetal presentation which relates to the relationship between the fetus and the pelvic capacity and it depends not only on fetal size but also on the capacity of the pelvis. The advancement of fetal head to -1 or below at presentation is a reflection of the adequacy of pelvic inlet and mid cavity and since outlet contraction is not common in our environment¹²; it was not surprising that majority of the patients with fetal head at level of -1 or below progressed to vaginal delivery.

A surprising finding in this study is failure of the state of the cervix at presentation to retain its significance as a predictor after multiple logistic regression. This may be related to the fact that in cephalopelvic disproportion, cervical dilatation may reach up to 7-8cm before progress is stalled. So cervical dilatation to any degree alone may not guarantee success. As indicated, uterine rupture is one of the most dreaded complications of a trial of labour after prior caesarean delivery. Most studies report a rate of symptomatic uterine rupture of approximately 1%, however there are also a substantial number that report rates of uterine rupture that are well below 1%²⁴.

A uterine rupture is a complete disruption of the uterine wall that results in associated symptoms affecting the mother or neonate. Common sequelae associated with uterine rupture include excessive hemorrhage

requiring surgical exploration, need for hysterectomy, injury to the bladder extrusion of any part of the fetus, cord, or placenta through the disruption. caesarean delivery for fetal distress²⁵.

In the present study, with proper obstetric care and acumen this complication was avoided.

Vaginal birth after caesarean delivery is reported to be successful in 60-80% of attempts²⁶. However, the rates reflect a selected population and the exact number of women undergoing trial of labor is unknown. Successful VBAC is associated with lower morbidity than repeat caesarean delivery (i.e. fewer blood transfusions, fewer postpartum infections, fewer cases of hysterectomy).²⁷

Many women who have had one or two previous low-transverse caesarean deliveries without contraindications to vaginal birth are candidates for a trial of labour, but the risk of uterine rupture increases with the number of previous uterine incisions.²⁸ Although patients with a previous history of failure to progress do deliver vaginally, the caesarean section rate is lower than for patients with nonrecurring indications (i.e. fetal distress, breech presentation).²⁹ Patient with a history of classic uterine incision are not candidates for VBAC.

In conclusion, the identified predictors of trial of labour outcome in this study are previous successful trial of labour, birth weight of 3.5kg or less and station of the presenting part of -1 or below; however additional studies are required to study the predictability of this identified factor before they could be used in other environments screen patients for trials. The most important aspect of this finding is that the identified predictors are factors that are measurable at presentation in labour and it does not matter whether a patient is booked or not.

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