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Vaginal birth after one previous Caesarean section - evaluation of predictive factors

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Summary

Vaginal birth (or trial of labour) after previous Caesarean delivery represents one of the most significant changes in obstetric practice. A five-year retrospective study was carried out at the Lagos University Teaching Hospital to determine the obstetric outcome after a previous Caesarean section and also to identify significant clinical factors that are predictive of successful subsequent vaginal delivery. Hospital records of 101 patients with previous Caesarean births and 105 patients without a previous Caesarean delivery were examined, the later group serving as control. Successful vaginal delivery occurred in 74 (73.3%) in the trial group and 90 (85.7%) in the control group. The Caesarean section rate was significantly higher in the trial group ($P < 0.01$). In the trial group, clinical factors found to predict successful vaginal delivery were a history of previous vaginal delivery (88.1%), infants birth weight less than 4kg (75%), gestational age less than 40 weeks (83.2%) and spontaneous onset of labour (82.1%). 63.6% of patients whose indications for previous Caesarean section were due to cephalo pelvic disproportion/arrest of labour were successfully delivered vaginally. This indicates that each patient should be selected for appropriate management based on individual merits independent of past indication for caesarean section. Clinical factors found not to favour successful vaginal delivery were fetal macrosomia, post dates and induced labour. Uterine rupture/dehiscence occurred in 3 (2.97%) patients. No maternal or perinatal death occurred. We conclude from this study that trial of labour in carefully selected patients with previous Caesarean delivery poses low level of risk for both the mother and the baby and that its use is an important component of efforts to lower the rate of repeat Caesarean birth.

Keywords: Vaginal birth after Caesarean section, trial of labour, low uterine caesarean section.

Résumé

L'accouchement par voie basse après un accouchement par caesarienne represente l'un des changements les plus significatifs dans la pratique obstetrique. Une etude retrospective avait été faite au Centre Hospitalier Universitaire de Lagos, afin de determiner l'aboutissement obstetrique après caesarienne et identifier les facteurs clinique qui ont predictifs des accouchement vginaux a success. Les dossiers medicaux de 101 patients avant eu des cesariennes ainsi que ceux de 105 patients n'avant pas eu de cesarienne avaient été survenu chez .+4 (+3,3%) dans se groupe ayant

fait un precedant accouchemt par caesarienne par rapport à 90(85,7%) dans le groupe oppose, Le taux de section caesarienne avaient été significativement eleve dans le groupe des patients ayant eu une precedante caesarienne ($P < 0,01$). Dans ce groupe, les facteus clinique pouvant predire un accouchement par voie basse duce success etaient: une histoire d'un precedant accouchement par voie basse (88,1%), poids de bebe à la naissance moins de 4kg (75%), Poggues gestation moins de 40 semaines (83,2%) et la un dehanchement spontane, du travail. 63,6% des patients qui avaient eu une cesarienne precedente avait presente avaient une disproportion cephalo peluique, et avaient eu un accouchement vaginal reussit. Ceci montre que chaque patient devrait être selectioner pour un survive approprie base sur les merites individual independent les precedante caesarienne. Les facteus clinique ne favorisant pas un accouchement par voie basse reussit etaient: la necrosomie fetal et le travail induit. La detuscence/rupture uterine etait survenue chez 3 (2,97%) des patients aucun cas de decés maternel ou perinatal n'était survenue. Nous concluons de cette etude que l'essai travail chez des patients selectioné et ayant un au paravant un accouchement par caesarienne represente un faible risque pour la mere et l'enfant. Ces observations devraient être considerées comme important. Afin d'éviter des accouchements repete par caesarienne.

Introduction

Vaginal birth or trial of labour after previous Caesarean delivery represents one of the most significant changes in obstetric practice over the last decade [1]. For a long time "once a caesarean, always a caesarean" was the rule in the United States" [2]. In the 1980's, vaginal birth after Caesarean grew in popularity and the pendulum began to swing from routine repeat Caesarean delivery [2].

The caesarean section rate has been noted to be increasing in the developed countries, the rate of Caesarean delivery in the United States has increased from a level of 1 in 20 births in 1970 to nearly 1 in 4 births today [3]. The reasons are multi-factorial but a recent analysis of the Caesarean birth epidemic concluded that the practice of elective repeat Caesarean section for patients with a previous caesarean delivery has been the major contributor to the escalation in the total Caesarean section rate [3]. Therefore, a policy of allowing selected women with previous Caesarean section to attempt a vaginal delivery is now widely accepted in developed countries as the standard of care and the high success rate and relative safety has been well established [4]. Reports of meta-analyses published from developed countries and sub-Saharan Africa reported successful vaginal deliveries occurring in 63-85% of patients depending on the indications for the Caesarean section in previous pregnancies, uterine rupture occurred in 2-2.1% of patients with a maternal

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mortality in 2.8-19/10,000 deliveries [5,6].

Recently, in our Institution which is a tertiary centre located in an urban setting, the Caesarean section rate has been also reported to have increased from 9.2% in 1976 to 32% in 1998 and previous Caesarean birth was one of the three leading indications for the repeat caesarean delivery [7]. The high Caesarean birth delivery rate is a cause for great concern especially as efforts are being made in most developed countries to lower the Caesarean birth delivery rate. Furthermore, it is important to avoid repeat sections in communities like ours where continued fertility is socially important and where vaginal delivery is said to be almost a cultural compulsion [8].

Despite the greater encouragement of vaginal birth after caesarean nationwide there remain conflicting opinions as to its safety to mother and fetus [9]. The main concern in this group of patients is the fear of scar rupture [10].

This retrospective study was therefore undertaken to determine the outcome of trial of labour after one previous caesarean section in our institution. The study also tried to identify which significant clinical factors independently or in combination will help to predict the success of the trial of labour after Caesarean section so as to be able to decide the safety of this procedure. This becomes necessary in our environment where patients bluntly refused caesarean section even at first attempt for the fear of repeat operation in future thereby endangering the life of the mother and the fetus.

Materials and methods

This retrospective study was carried out at Lagos University Teaching Hospital, Lagos a tertiary centre serving Lagos and its environs from April 1992, to March 31, 1997. This centre provides medical services to predominantly high-risk patients. The medical records of all patients with previous caesarean delivery were reviewed. Data were collected through detailed examination of both maternal and neonatal records from labour ward record and Nurses record books and also from the case notes. All the patients were registered with the hospital and they all had clinical and/or X-ray Pelvimetry at 36 weeks gestation. All patients with lower segment scars were considered candidates for trial of labour in the absence of the following exclusion criteria

1. 2 previous Caesarean Section Scar
2. Malpresentations
3. Multiple pregnancies
4. Severe concomitant medical disorders
5. Cephalo pelvic disproportion

All patients who underwent a trial of labour were closely monitored. Cervical ripening with foleys catheter was undertaken in patients with unripe cervixes before induction and trial of labour. Labour was usually closely monitored and cross-matched blood made available.

The maternal vital signs, progress in labour and symptoms were closely observed. Clinical signs of uterine scar disruption such as sudden severe uterine pain, vaginal bleeding, a sudden change in fetal or maternal vital signs, or an abrupt change in the labour pattern were considered indications for repeat abdominal delivery. Uterine dehiscence was defined as incomplete separation of the uterine scar without bleeding or extrusion of the fetus into the wound. Uterine rupture was defined as complete scar separations with bleeding, haematoma formation, or extrusion of the fetus.

Fetal distress was diagnosed based on rate and

irregularity of fetal heart beat with Pinnard's stethoscope and passage of fresh meconium. There was no facility for electronic fetal monitoring available during the period of study. Pain relief in labour was usually by intramuscular pethidine and promethazine.

For the control group data were from the labour ward register of registered patients without previous scar that were in labour on the same day as for each case of patient undergoing trial of labour. Analysis of the data was carried out by X² and the Student t test. Statistical significance was accepted at P < 0.05.

Results

During the study period there were 4262 births at Lagos University Teaching Hospital. These consisted of 3235 vaginal births and 1027 Caesarean sections (24.09%). We analysed 101 of these cases who had trial of labour after one previous Caesarean section. The control group were 105 patients scheduled for vaginal delivery. Of the 101 patients with prior Caesarean section 74 (73.26%) had successful vaginal delivery whilst 27 (26.74%) had intrapartum emergency Caesarean section. Of the 105 patients without previous scar (control group) 90 (85.71%) delivered vaginally and 15 (14.29%) had emergency Caesarean section. This results showed that the incidence of emergency Caesarean section was significantly higher (P < 0.01) in the trial of labour group than the control.

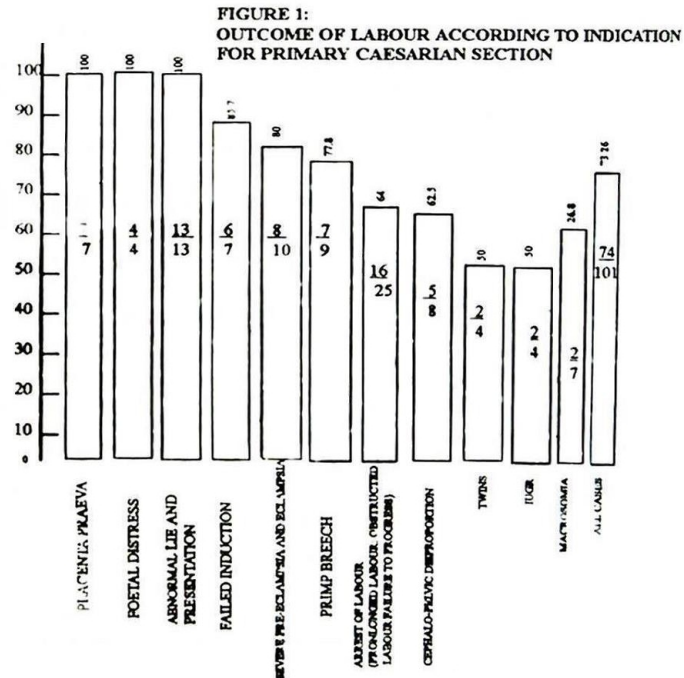


Fig. 1 shows the outcome of labour according to indication for primary Caesarean section. The percentage of patients that had successful trial was significantly lower among cases who had arrest of labour, cephalopelvic disproportion, and macrosomia as indications for primary Caesarean section. Successful outcome (85.7%) was noted among patients whose indication was for failed induction. Fetal distress, placenta praevia and breech presentation as an indication for primary Caesarean section were not found to be a recurrent cause for a repeat Caesarean birth.

Table 1: Outcome of labour with respect to previous vaginal deliveries.

Intercurrent vaginal delivery	No.	Successful vaginal delivery	%	Cesarean delivery
Present	42	37	(88.09)	5
Absent	59	37	(62.71)	22
Total	101	74	(73.46)	27

History of previous vaginal delivery in the past improved the prospect of successful vaginal delivery significantly in 88.1% of the patients with previous uterine scar. (Table 1)

Table 2: Outcome of trial with respect to nature of onset of labour

Type of labour	No.	Vaginal delivery	%	C/S delivery	%
1. Spontaneous +/- augmentation	70	58	82.9	12	17.1
2A. Induction - following cervical ripening with foley's and Catheter and amniotomy	14	7	50	7	50
2B. Induction-following premature rupture of membrane	17	9	52.9	8	47.1
Total	101	74	73.46	27	26.74

Table 2 highlights the importance of the nature of onset of labour vis-avis outcome of trial of labour. About 82.1% of cases that went unto labour spontaneously with or without further augmentation had vaginal delivery while women that had cervical ripening with foley's catheter followed by amniotomy had a significantly lower vaginal delivery rate (50%). Premature rupture of membranes followed by medical induction was equally associated with a lower vaginal delivery rate (47.1%).

Table 3: Outcome of trial of labour according to birth weight.

Birth weight (g)	No.	Vaginal delivery	%	C/S delivery	%
1000	-	-	-	-	-
1001-1500	2	2	100	0	0
1501-2000	2	2	100	0	0
2000-2500	5	4	80	1	20
2501-3000	18	14	77.8	1	20
3001-3500	42	32	74.4	10	25.6
3501-4000	23	16	69.9	7	30.4
4001-45000	09	4	44.4	5	55.6
Total	100	73	73	27	27

Table 4: Outcome of trial according to gestational age.

Gestation in weeks	No.	Vaginal deliveries	%	Caesarian deliveries	%
28 - 33	1	1	100	0	0
33* - 37	07	05	71.4	02	28.6
37* - 40	69	54	78.3	15	21.7
> 40	24	14	58.3	10	41.7
Total	101	74	73.20	27	26.72

The fetal weight significantly influenced the outcome of labour in the trial group. Over half the number of patients with macrosomic babies (> 4kg) had emergency Caesarean section (55.6%) (Table 3). Gestational age, less than 40 weeks was also associated with a higher percentage (83.2%) of successful vaginal delivery (Table 4).

Twenty seven patients had a repeat Caesarean section performed due to the causes listed in Table 5. Failure to progress and fetal distress accounted for the majority (77.8%) for discontinuation of trial of labour. One case (0.7%) had symptoms suggestive of uterine rupture. Also in the control group failure to progress and fetal distress was found to account for 63.3% and pre-eclampsia 13.3% as indications for emergency Caesarean section.

Table 5: Indications for intrapartum repeat Caesarian deliveries

Indications	No.	Percentage
Failure to progress	16	59.26
Fetal distress	05	18.52
Malposition	03	11.1
Failed induction	02	07.41
Suspected rupture	01	0.70
Total	27	100

Three (2.97%) of the patients who attempted vaginal birth after Caesarean had a scar dehiscence/rupture. Two of these were asymptomatic and were discovered and repaired at the time of emergency section for failure to progress in labour. One resulted in maternal haemorrhage (1.9 litres of blood loss) and had a lateral angle tear, this was repaired and she was transfused with 2 litres of blood. These three patients were post date, two presented with spontaneous rupture of membranes and had augmentation of labour with oxytocin, while one had intracervical foley's catheter followed by amniotomy and induction of labour for being postdate.

No maternal or perinatal deaths occurred in both groups.

Discussion

It is difficult to discuss this subject without referring to Cragin's rule "Once a Caesarean section, always a caesarean section" published in his original communication on conservation in obstetrics in the New York Medical Journal in 1916 [11]. Things have since changed due to improvement in the type of uterine incision combined with advances in technology which allow continuous and accurate monitoring of the mother and fetus in utero during labour. Attempted vaginal birth after Caesarean delivery has been advocated as a safe and practical means of reducing the overall Caesarean delivery rate. Safety and cost effectiveness had been well documented [12]. This study showed that 73.26% of our patients achieved successful vaginal birth. This success compares favourably with the range between 63% and 84% reported by other workers in Sub-Saharan African [6]. However it is significantly higher than earlier reports from this institution [13] and some other parts of the world. The reasons for this difference as later explained in this article is in the use of oxytocin for induction of labour and the strictness with which patients were selected for trial of labour.

The finding in this study support the view that trial of labour is associated with a higher Caesarean rate than in the patients without previous section as we found this to be 26.73% in the former and 14.3% in the latter. It has been reported that women with a previous caesarean delivery have a Caesarean rate of between 18% and 44% when undergoing a subsequent trial of labour [14].

Martins [15], had suggested that there are no clinical factors that predict a successful vaginal birth after Caesarean section. However, our finding in this study has shown that the single most important factor in determining whether a patient with one previous Caesarean section will achieve

vaginal delivery is whether she had a history of previous vaginal delivery as we found that 88.1% of such patients successfully delivered vaginally. Also the Caesarean section rate in this group was lower, 11.9% as compared to 37.3% in patients that never had vaginal delivery. It has been reported that multiparous women with a previous Caesarean delivery have lower Caesarean rates when undergoing a trial of labour [5,9]. Other significant clinical factors found to predict achievement of a successful vaginal delivery in not less than 75% of the patients included the infant birth weight less than 4kg, the gestational age less than 40 weeks and when the onset of labour is spontaneous.

Similar to finding of other workers [16], we found that successful trial of labour occurred less in the macrosomic group as the Caesarean section rate rose to over 55% in babies weighing more than 4kg. Whereas this indicates that estimate of fetal weight could help predict which women were likely to be successful in a vaginal birth after Caesarean sections attempt, the weight demarcation should not be an overriding consideration. A review of the four macrosomies that successfully delivered per vagina (44%) in this study showed that all but one had both intercurrent vaginal delivery and labour was of spontaneous onset. In all these four babies the Apgar vs APGAR score at five minutes was greater than 7. This finding further supports the prime contribution of these known indicators toward attaining successful vaginal deliveries in cases of trial of labour. However, it must be stressed that if this were a prospective study, such patients would not have been allowed a trial of labour. This is because of the association of lower success rate and increased maternal and fetal risks when trial of labour is attempted in large babies [9].

The issue of induction of labour in management of patients with a previous Caesarean section is controversial. Some obstetricians are fearful of the catastrophic complication of uterine rupture and as a policy do not induce [17,18], while some concluded that there are no contra indications to either oxytocin or prostaglandin induced labour after one previous Caesarean delivery [19]. We have observed in this study that careful use of oxytocin for induction of labour or augmentation of labour is relatively safe in gravid uterus with a transverse lower segment scar. More than half of the patients in this study received oxytocin for labour induction or augmentation with little or no associated complications. It is worthy of note from this study that the use of oxytocin contributed significantly to the high success rate (73.2%) when compared with earlier reports from the same institution where only 4% of their patients had oxytocin induction resulting in successful vaginal delivery in only 37.5% of their patients [12]. We suggest that decisions to induce should be with extra cautions under close observation to ensure the safety of mother and fetus and such decisions should be taken by a very experienced Senior Obstetrician after an assessment including abdominal and vaginal examinations. This becomes more necessary when the indication for induction is for post datism as we found that uterine dehiscence/or rupture/occurred only among patients that had induction/cervical ripening with oxytocin for post dates. We also agree with the suggestion by Turner et al 1997 [20] based on their findings that the risks and benefits of induction after a previous caesarean delivery needs to be analyzed according to whether a patient has been previously delivered vaginally and whether labour starts spontaneously. Induction of labour was found to be associated with a significantly higher incidence of repeat Caesarean section in

women who have not had previous vaginal delivery and if the cervix is not effaced at induction.

The uterine rupture and scar dehiscence rate of 2.97% in this study is within the published range of (1-3.2%) for sub Saharan Africa [6]. However, this is higher than the incidence of 5.01 per 1000 deliveries in the general population in our Hospital [21].

The significant risk factors for intrapartum repeat Caesarean section in this study were previous Caesarean section for arrest of labour, cephalopelvic disproportion (CPD) and macrosomia. None of these factors are generally accepted as absolute contraindications for trial of scars [6]. It is noteworthy that among cases of arrest of labour or CPD 63.6% of them achieved successful vaginal delivery. This suggests that a diagnosis of "CPD" in a previous pregnancy should not be regarded as a contra indication for trial. This is in support of the earlier suggestion of Thubuisi *et al.* (1993) [22] who recommended that women with one previous section should be allowed to undergo a trial of labour if no clear indication for elective Caesarean section exists. This was based on their findings that 60% of patients that had inadequate post partum x-ray Pelvimetry successfully delivered vaginally and these women would have been delivered by elective section if antepartum x-ray pelvimetry had been performed. Rates of failed trial of labour between 32% and 45% have been reported for a previous indication of failure to progress which is not very different from the 36% reported in this study [9].

It is pertinent to mention that we did not record any maternal or perinatal mortality in our review. Review from developed and developing nations had put the maternal mortality to be less than that reported in the general obstetric population and the perinatal mortality rate not to be different from the general obstetric population [5,6]. One can deduce from these findings that trial of labour is not associated with increased maternal and perinatal mortality.

This study was a retrospective analysis of data, so there might be other fetal or maternal factors associated with successful vaginal delivery in trial of labour concerning which we had no or inadequate information about and therefore a prospective study would be necessary to score the strength of variable factors that are clearly related to vaginal delivery after a previous Caesarean sections.

In conclusion, this study indicate that patients with a previous lower uterine segment scars can undergo trial of labour with efficacy and safety, comparable to those of the general obstetric population. Therefore, a significant reduction in the Caesarean section rate may be achieved by allowing vaginal delivery after previous section. Closely monitored oxytocin augmentation or induction of labour appears to be a safe and effective means of increasing the vaginal delivery rate. Previous history of vaginal delivery, infant birth weight of less than 4kg, spontaneous onset of labour and gestational age of less than 40 weeks and non-recurrent indications for prior Caesarean delivery are good predicting clinical variables factors for a successful vaginal delivery in patients undergoing trial of labour for previous Caesarean scar while post-datism and induction of labour are unfavourable factors.

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