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Full Length Research Paper

Outcome of Trial of Labour after Caesarean Section at King Khalid University Hospital

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The aims of this study were to detect the prevalence of vaginal birth after caesarean section (CS) and to investigate the risk factors and the complications associated with failure of trial of labour after CS, (TOLAC). A prospective cohort of women who had one lower segment CS in any previous delivery and who were admitted for TOLAC, during 12 months period, was included in this study. Women who had successful vaginal delivery following TOLAC were compared to those who had repeat CS due to failure of VBAC, with respect to maternal age, parity, previous vaginal delivery, gestational age and birth weight. In addition to the following adverse outcomes; rate of APGAR score, low cord blood pH, rate of uterine rupture, need for blood transfusion and admission to intensive care unit. Two hundred and eighty two women were included. Of those 204 women (72.3 %) had vaginal birth while 78 (27.8 %) were delivered by emergency CS. Three factors were predictive of failed TOLAC; older maternal age, odds ratio (OR) 1.1, 95% confidence intervals (CI) (1.01-1.16), p=0.03, smaller gestational age, OR 0.7, 95% CL (0.6-0.9), p <0.01, and lack of previous vaginal delivery, OR 0.17, 95% CI (0.08-0.34), p<0.001. Both groups did not have adverse maternal or neonatal outcomes. In conclusion, TOLAC has a success rate comparable to other centers in the worlds. It contributes significantly to reducing the rate of CS without increasing the maternal or perinatal morbidities. Previous normal vaginal delivery is a strong predictor of successful VBAC.

Keywords: Trial of labour after caesarean section-vaginal, birth after caesarean section-risk, factors for failed trial of labour

INTRODUCTION

Caesarean section (CS) delivery rate has increased worldwide. Previous CS delivery is one of the main contributors to the rising rate (Bondok et al., 2011; Patel et al., 2005). In Saudi Arabia the rate of CS is 19-25% (Al Rowaily, Alsalem, and Abolfotouh 2014; Wahabi et al. 2016); however, more than 50% of the elective CS were done for women with previous CS. Multiple CS are associated with increased risk of maternal morbidity and mortality. Abnormal placental adherence (acreta/ previa), a known problem associated with repeat CS, constitutes surgical challenge and high risk of caesarean hysterectomy, blood transfusion and bladder injury (Silver et al., 2006). In addition, with each repeat CS the operative time and risk of bowl and bladder injuries increases due to the increase in adhesions (Clark and Silver, 2011; Silver et al., 2006). To avoid many of the complications associated with repeat CS, trial of labour after previous caesarean delivery (TOLAC) is accepted as a safe option to reduce the overall CS rate (Landon et al., 2006). If the TOLAC is conducted in a well-equipped

center the risk of uterine rupture is small amounting to 0.3 to 0.7% (Landon et al., 2006).

Many studies have supported the effectiveness of vaginal birth after one caesarean section (VBAC) with comparable risks to repeat CS and with wide range of success rate of 50-85%, which indicates the importance of careful selection of women eligible for TOLAC (Bangal et al., 2013; Ugwu et al., 2014).

The objectives of this study were to detect the prevalence of VBAC in one of the main teaching hospitals in Riyadh, and to investigate the risk factors and the complications associated with failure of TOLAC among the Saudi women.

METHODS

This was a prospective cohort study of all women who had one lower segment caesarean section (LSCS) in any previous delivery and were admitted for TOLAC at a King Khalid University Hospital (KKUH) during 12 months period.

KKUH is tertiary referral hospital with 800 beds. It has all the essential departments including 20 operating theaters, an assisted reproduction unit and a cardiac center. The hospital provides free medical care to Saudi Nationals and the staff of King Saud University. The obstetrics department provides care for 3000-4000 deliveries per year.

Women are offered TOLAC if they fulfill the following criteria:

1. One previous lower segment CS (LSCS).
2. Cephalic presentation
3. In spontaneous labour
4. No obstetric or medical contraindication for vaginal delivery (e.g. placenta previa, placental abruption, sever preeclampsia, cephalo-pelvic disproportion ...)
5. Consent to undergo TOLAC.

Most of the women for TOLAC are admitted to the labour ward in spontaneous labour. Women who pass their expected date of delivery by 14 days are admitted to the antenatal ward for clinical re-assessment and induction of labour. In this study we included only women who were admitted in spontaneous labour.

Women who had successful vaginal delivery following TOLAC were compared to those who had repeat emergency CS due to failure of VBAC. VBAC was considered to be successful in women who delivered vaginally (spontaneous or instrumental) as opposed to those delivered by emergency CS.The trial was terminated by emergency repeat CS, when there was evidence of unsatisfactory progress, scar tenderness, or fetal distress.

The two groups were compared with respect to maternal age, parity, previous vaginal delivery, gestational age at the time of delivery and birth weight. In addition to the following adverse outcomes; rate of APGAR score of <7 at 1 and 5 min, rate of cord PH less than 7.1, rate of uterine rupture/dehiscence, need for blood transfusion and maternal admission to intensive care unit or admission to neonatal intensive care unit.The risk factors for failure of VBAC including maternal age, gestation age, birth weight and previous vaginal delivery were examined.

Ethical approval from the institutional ethics review board of King Khalid University Hospital was sought and granted before commencing the study.

Statistical analysis

Continuous variables were compared using students *t* test and categorical variables using X^2 test. The risk factors for the failed TOLAC including maternal age, gestational age, birth weight and history of previous vaginal delivery, were assessed using regression model. p value of < 0.05 considered significant.

RESULTS

The total number of deliveries during the study period was 3,522 of those 407 had one previous CS. Eighty-seven (21.4 %) women were excluded because they either refused TOLAC or had contraindication for vaginal birth. In addition 38 women had induction of labour before they undergone TOLAC and were excluded. The remaining 282 women were included in this study. Two hundred and four women of this group (72.3 %) had vaginal birth while 78 (27.8 %) were delivered by emergency repeat CS after failed TOLAC. Univariate analysis showed that women who had VBAC were younger, with more advanced gestational age and were more likely to have had previous vaginal delivery (table 1). In addition, infants of women with VBAC were heavier. Over 60% of women who had VBAC delivered spontaneously while the rest had assisted vaginal delivery. The outcomes of the women who had VBAC and those who were delivered by CS were comparable except for the proportion of infant with low APGAR scores at one minute, which was significantly more in the CS group. No cases were reported for any other complication (table 2).

Multiple regression analysis showed three factors to be predictive of failed VBAC and delivery by emergency CS including older maternal age, odds ratio (OR) 1.1, 95% confidence intervals (CI) (1.01-1.16), p value 0.03, smaller gestational age, OR 0.7, 95% CL (0.6-0.9), p <0.01, and lack of previous vaginal delivery, OR 0.17, 95% CI (0.08-0.34), p<0.01 (table 3).

Table 1. Characteristics of women with previous caesarean section who had vaginal birth compared to women who had caesarean section after trial of labour

Variable	VBAC 204	C/S 78	*P* value
Maternal age (years)	30.91 ± 5.265	31.14 ± 4.266	0.12
Gestational age (weeks)	38.88 ± 1.8	37.90 ± 2.7	0.001
Birth weight (kg)	3.21 ± 0.52	3.14± 0.75	0.001
Pervious vaginal delivery	144 (70.5%)	34(43%)	0.000

Values are presented as mean ± SD or n (%).

Table 2. Outcomes of pregnancy for women with previous caesarean section who had vaginal birth compared to women who had caesarean section after trial of labour

Variable	VBAC 204	C/S 78	*P* value
APGAR scores <7 at 5 minutes	7 (3.7%)	4 (5.1%)	0.504
APGAR scores <7 at1 minutes	26 (12.7%)	24 (30.7%)	0.001
Cord PH < 7.1	7 (3.7%)	4 (5.1%)	0.514
Ruptured uterus/wound dehiscence	0.0	0.0	
Blood transfusion	0.0	0.0	
Admission to ICU or NICU	0.0	0.0	
Stillbirth	0.0	0.0	

VBAC=Vaginal birth after caesarean section, C/S= Caesarean section, ICU= intensive care unit, NICU= Neonatal intensive care unit

Table 3. Risk factors for failed TOLAC

Risk factor	VBAC(204) Adjusted OR (95% CI)	C/S(78) Adjusted OR (95% CI)	P value
Maternal age	0.9 (0.8-0.9)	1.1(1.01-1.16)	0.03
Gestational age	1.4 (1.2-1.6)	0.7(0.6-0.9)	<0.01
Fetal weight	1(0.9-1.0)	1.0 (1.0-1.1)	0.07
Previous vaginal delivery	5.8 (2.8-12.0)	0.17(0.08-0.34)	<0.01

TOLAC= Trial of labour after C/S, VBAC=Vaginal birth after caesarean section, C/S= Caesarean section

DISCUSSION

The results of this study showed that TOLAC at KKUH has a success rate of over 72%, and that previous vaginal delivery is a determinant of the success of TOLAC. Furthermore, the results confirm that VBAC was not associated with major complications to mothers or infants.

These results are consistent with previous reports about the effectiveness and the safety of TOLAC as compared to elective repeat CS (Bangal et al., 2013; Balachandran et al., 2014; Sepulveda-Mendoza et al., 2015).

According to the World Health Organization (WHO), the CS rate in any setting should be kept at 10-15% of the total deliveries to maintain favorable perinatal and maternal outcomes (WHO 2015). However, during the last three decades the rate of CS delivery has increased worldwide where in some areas 30-40% of the deliveries were by CS (Yazdizadeh et al., 2011; MacDorman et al., 2008). Many recent reports have analyzed the CS rate in different health setting based on Robson ten-group classification of women undergoing CS and all reports were consistent in their conclusion about repeat CS being the main contributor to the high rate of CS (Fatusic et al., 2016; Barcaite et al., 2015; Triunfo et al., 2015). Our results showed that by offering TOLAC to women with previous CS a reduction in repeat CS rate by more than 70% could be achieved without increasing the rate of ruptured uterus or perinatal morbidity or mortality. Repeat CS without labour is associated with serious maternal morbidity, which increases with each operative delivery (Silver et al., 2006). Epidemiological studies proved that CS is the main risk factor for morbidly adherent placenta

(accreta, increta, and percreta) (Fitzpatrick et al., 2012; Cheng and Lee, 2015), and that the risk increases with each repeat CS (Silver et al., 2006). Furthermore repeat CS is associated with long term morbidity for the baby and the mother including preterm birth and ectopic pregnancy and pelvic pain due to adhesions (Clark and Silver, 2011).

Decision analysis studies which included maternal and perinatal morbidities in the decision tree favored TOLAC over repeat elective CS especially in communities where family planning is extended to more than two children (Mankuta et al., 2003; Pare et al., 2006), which is applicable in Saudi community where the mean number of children is 2-4 per woman (Wahabi et al., 2016).

The strong association of successful TOLAC with history of previous normal delivery in this study (table 3), is consistent with the finding from studies conducted in other countries with similar fertility rate (Madaan et al., 2011; Birara and Gebrehiwot, 2013). Although advanced gestational age beyond 40 weeks was found to be predictor of failed TOLAC, mainly due to the increased size of the baby (Hammoud et al., 2004). The results of this study showed that advance gestational age below 40 weeks was a predictor of successful TOLAC (table 3) which is consistent with the findings of previous reports(Patel et al., 2005). Another risk factor for failed TOLAC examined in this study was the maternal age. The findings are consistent with previous reports, which concluded that advanced maternal age is associated with increased risk for failed TOLAC (Patel et al., 2005; Sepulveda-Mendoza et al., 2015; Bujold et al., 2004). However, the low odds for the last two risk factors may indicate low clinical significance. Although birth weight was significantly different between women who had VBAC and those who delivered by emergency CS, but it did not constitute a risk factor for this cohort when examined in the regression model (table 3). Patel et at found that extremes of birth weight were associated with increased risk for CS (Patel et al., 2005; Sepulveda-Mendoza et al., 2015), however others did find the birth weight a significant predictor for the success of TOLAC (Birara and Gebrehiwot, 2013).

This study has some limitation including that it did not investigate all the risk factors associated with failed TOLAC such as the indication for the primary CS, the intervals between the pregnancies and maternal diabetes and gestational diabetes. In addition, the study included small sample during one calendar year, which may affect the generalization of the results to other institutions.

CONCLUSION

TOLAC at KKUH has a success rate comparable to other centers in the worlds. It contributes significantly to reducing the rate of CS without increasing the rate of maternal or perinatal morbidities or mortalities. Previous normal vaginal delivery is a strong predictor of successful TOLAC in this cohort.

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