Retrospective study of success rate of Trial of Labor after Cesarean Section (TOLAC) at Taiba hospital

Alsaeed Elsayed Ahmed A. Askar

Gynecology & Obstetric department, Faculty of Medicine Al-Azhar University, Egypt
sa_og2009@yahoo.com

Abstract: Objective: To assess the success rate of Trial of Labor after Cesarean Section (TOLAC) at Taiba Hospital-Kuwait. **Study design:** Retrospective study. **Settings:** Labor wards at Taiba Hospital in Kuwait. **Subjects:** Adult females aged beween19-45 years with mean 29.17±4.11, attendance of our Labor wards at Taiba Hospital in Kuwait for delivery. **Results:** The number of people included in the study was 138. After counseling 38 refused participating in the study and actual number included was 100, the remaining 100 patients are study group 78 of them delivered normal (vaginal) so success rate is 78% and 22 delivered by emergency CS so failure rate is 22%. The most common indication for repeat CS was lack of progress 8 patients among the 22 women in whom TOLAC failed (8/22). The rate of postpartum hemorrhage, drop in hemoglobin (Hb) and Neonatal intensive care unit (NICU) admission was high in TOLAC group 2 for each one (2/78). Age and time between admission and delivery were not significant in correlation with parity, in contrast to BMI which was highly significant. **Conclusion:** TOLAC in women with previous CS is associated with a relatively high success rate. This information and the risk factors for TOLAC failure can be used when counseling these women regarding mode of delivery of subsequent pregnancy.
[Alsaeed Elsayed Ahmed A. Askar. **Retrospective study of success rate of Trial of Labor after Cesarean Section (TOLAC) at Taibahospital.** *Nat Sci* 2015;13(2):65-70]. (ISSN: 1545-0740). http://www.sciencepub.net/nature. 10

Keywords: Cesarean section; vaginal delivery; trial of labor after cesarean and TOLAC

1. Introduction

A trial of labor after previous cesarean (TOLAC) delivery has garnered much interest in the last two decades. Initially hailed as an integral factor in reducing cesarean delivery (1).

After a first caesarean section (CS), a pregnant woman can opt for an elective repeat CS (ERCS) or an intended vaginal birth after caesarean (VBAC), which will result in an actual (successful) VBAC or an emergency CS (unsuccessful VBAC). Discussing the risks of both options is a substantial part of counseling on mode of delivery, and obviously the probability of having an actual VBAC is a key component.(2).

Approximately 60-80% of women opting for VBAC will successfully give birth vaginally, which is comparable to the overall vaginal delivery rate in the United States in 2010. (3).

Attempting (VBAC) is a safe and appropriate choice for most women who have had a prior cesarean delivery, including for some women who have had two previous cesareans.(4)

Maternal morbidity in women with previous cesarean is higher when TOLAC fails than when it leads to successful vaginal delivery.(5).

Repeat caesarean sections become increasingly complicated with each subsequent operation, as the probability of internal abdominal adhesions, bladder injuries, and abnormal placentation (placenta praevia or placenta accreta) increases dramatically, with placenta accreta reportedly affecting 50-67% of women having three or more caesarean sections. According to the United States Agency for Healthcare Research and Quality, "Abnormal placentation has been associated with both maternal and neonatal morbidity including need for antepartum hospitalization, preterm delivery, emergecy caesarean delivery, hysterectomy, blood transfusion, surgical injury, intensive care unit (ICU) stay, and fetal and maternal death and may be life-threatening for mother and baby.(5).

ACOG recommends that obstetricians offer most women with one prior cesarean section with a low-transverse incision a trial of labor (TOLAC) and that obstetricians should discuss the risks and benefits of VBAC with these patients.(2).

The study objective was to assess the success rate of Trial of Labor after Cesarean Section (TOLAC) at Taiba Hospital.

Research question

The research question for the purpose of this study is: 'What is the success rate of Trial of Labor after Cesarean Section (TOLAC)?'

Objective

The objective of the study is to assess the success rate of Trial of Labor after Cesarean Section (TOLAC) at Taiba Hospital.

2. Material and Method

Research method and design

This is a retrospective study conducted from September 2012 to July 2014 at Taiba hospital in Kuwait.

Study sample:

The study participants included one hundred thirty eight healthy women with term viable normal

singleton pregnancies, vertex presentation, and history of previous one CS. The sampling method was convenient and the sample size was one hundred thirty eight (n=138) participants consented to participate in the study.

The eligibility criteria are as follow: 1, singleton pregnancy, 2, vertex presentation, 3, history of one cesarean section, 4, presentation for scheduled induction of labor, 5, intact membranes and 6, gestational age more than 34 weeks.

Exclusion criteria

1. Antepartum intrauterine fetal demise.
2. Contraindication for vaginal delivery (placenta previa or uterine scar extended to fundus).

Sample size:

In order to correct any losses and provide a better breakdown of the independent variables, the sample size was adjusted by a proportional factor of 1.25. Thus, the sample size for this study was established at 138 patients. The number of patients needed to assess the internal consistency was considerably lower, being obtained by Non-Parametric Approach to Calculate Sample Size Based on Assessment Questionnaires or Scales in Healthcare Area, which estimates the sample size by the number of items and categories of the data collection instrument.

Data-collection methods:

All patients who presented to labor and delivery at Taiba hospital in Kuwait between September 2012 and July 2014 for labor with a history of one cesarean delivery were identified from the perinatal data base. The medical records of these women were reviewed, and were included in the final analysis if they met inclusion criteria**.**

Once the study group was selected, demographic and intrapartum data were abstracted from the medical records. These data included maternal age,parity, BMI, indication of CS, previous vaginal delivery, delivery interval (time from last CS), admission to delivery time, labor (induced, spontaneous or augmented), mode of delivery,causes of emergency CS and maternal and neonatal complications. Among those hundred women induction of labor by prostaglandins conducted in forty seven women, augmentation by syntocinon in eleven women and artificial rupture of membrane (AROM) in forty two women.

Statistical Analysis

The SPSS statistical package (SPSS, Chicago, IL) was used for statistical analysis. The association of variables under study with trail of labor outcome (vaginal or cesarean delivery) was the first assessed with univariable analysis; the $\times^2$ test was used to analyze categorical variables and the t test was used for continuous variables. All tests were 2-tailed. Descriptive statistics for the maternal and neonatal morbidity associated with trial of labor are also presented.Chi square analysis was used to test for statistical significance. A p-value of≤0.01 was considered statistically significant.

Ethical Aspects

The protocol for the study was approved by the Ethical and Research Committee of the Hospital.

3. Results:

The number of people included in the study was 138. After counseling 38 refused participating in the study and actual number included was 100, the remaining 100 patients are study group 78 of them delivered normal so success rate is 78% and 22 delivered by emergency CS so failure rate is 22%. Studied subjects ages ranged from 19-45years divided into three categories; 1.age <25, 2.age 25-35 and 3.age 35-45 years. Majority of the participants were within the age group25- 35years. Age and BMI were non significant where p value is > 0.05 (Table 1).

Based on women with previous vaginal delivery (VD) slightly above half of the study population had VD after CS 65/138 (Table 3).Most of the participants60/100had Last CS > 2 years (Table 4), also admission to delivery time was < 6 hours in nearly half of the study population 46/100 (Tables 4,5). Parity and previous VD were no significant where p value is > 0.05 (Tables 2, 3). As regards of those who had spontaneous delivery above half of the study population had spontaneous delivery 51/100 versus 16/100(20.50%) had induced labor via prostaglandin and 11/100(14.10%) augmented or via syntocinon (Table 6).

In our study, 22/100 had emergency CS due to variable causes, commonest were; failure to progress 08/22, tender scar 05/22 and having pathological CTG 06/22 Commonest complications were PPH 02/100**,** drop in Hb% 02/100 and NICU admission02/100**).** Relation of parity with previous VD was highly significant where p value is ≤.0.01(Table 2,3).Relation of parity with BMI was highly significant where p value is ≤.0.01(Table 3).Relation of Vaginal or emergency CS with delivery interval were non significant where p value is > 0.05, whereas, time between admission and delivery was highly significant where p value is ≤.0.01(Table 4).Relation of previous vaginal delivery with delivery interval was highly significant where p value is≤.0.01.Relation of age group with Time between admission and delivery in study population with delivery interval was highly significant where p value is ≤.0.01 (Table 5).

Table (1) Age and BMI of study population (n=100).

Item	Vaginal (n=78)		Emergency CS (n=22)		Test of sig. *p*-value
	No	%	No	%	
Age					
<25y	7	9.0	4	18.2	X^2=4.81 *P*= 0.09
25<35	68	87.2	15	68.2	
>35	3	3.8	3	13.6	
Mean ± SD	29.17±4.11		27.59±4.67		t=1.84 *p* =.069
Min-Max	19-39		20-37		
BMI					
Normal(<25)	9	11.5	2	9.1	X^2= 1.94 *p* =.378
Overweight(25-30	17	21.8	8	36.4	
Obese(>30)	52	66.7	12	54.5	
Mean ± SD	30.34±4.53		29.59±4.40		t=1.08 *p* =.283
Min-Max	18-42		23-36		

Table (2) Parity and previous VD ofstudy population (n=100).

Item	Vaginal		Emergency CS		Test of sig. *p* -value
	No	%	No	%	
Parity					
1	16	20.5	5	22.7	X^2= .936 *p* =.626
2-4	53	67.9	16	72.7	
>4	9	11.5	1	4.5	
pre.VD					
Non	16	20.5	5	22.7	X^2=.190 *p* =.909
Before	25	32.1	6	27.3	
After	37	47.4	11	50.0	

Table(3) Parity, previous VD and BMI in All population(n=138).

Item	Parity						Test of sig. *p* -value
	1		2-4		>4		
	No	%	No	%	No	%	
Previous VD							
Non	32	100	0	0	0	0	X^2=138.2 P=≤.0.01*
Before	0	0	37	39.4	4	33.3	
After	0	0	57	60.6	8	66.7	
Item	**Parity**						**Test of sig. p-value**
	1(n=32)		2-4(n=94)		>4 (n=12)		
	No	**%**	**No**	**%**	**No**	**%**	
BMI							
Normal	10	31.2	1	1.1	0	0	X^2=37.61 P=≤.001*
Overweight	9	28.1	31	33.0	0	0	
Obese	13	40.6	62	66.0	12	100	

Table (4) Relation of outcome with delivery interval, time between admission and delivery

Item	Vaginal		Emergency CS		Test of sig. p-value
	No	%	No	%	
Delivery interval					
<2y	30	40	10	10	X^2= .233 P= .629
>2y	48	48	12	12	
Time between admission and delivery					
<6h	44	56.4	2	9.1	X^2= 25.45 P=≤.001*
6-12	13	16.7	15	68.2	
12-24h	13	16.7	2	9.1	
>24h	8	10.3	3	13.6	

Table (5) Relation of previous VD and age with time between admission and delivery

Item	Previous VD						Test of sig. p-value
	Non(n=21)		Before(n=31)		After(n=48)		
	No	%	No	%	No	%	
Time between admission and delivery							
<6h	13	61.9	11	35.5	22	45.8	X^2= 19.23 P=.004*
6-12	2	9.5	17	54.8	9	18.8	
12-24h	4	19.0	2	6.5	9	18.8	
>24h	2	9.5	1	3.2	8	16.7	
Item	**Age**						**Test of sig. p-value**
	<25y(n=11)		25-<35(n=83)		≥35y(n=6)		
	No	**%**	**No**	**%**	**No**	**%**	
Time between admission and delivery							
<6h	7	63.6	38	45.8	1	16.7	X^2= 13.92 P=.031*
6-12	4	36.4	23	27.7	1	16.7	
12-24h	0	0	14	16.9	1	16.7	
>24h	0	0	8	9.6	3	50.0	

Table (6) Labor characteristics of study population (n=100).

Labor	**Number**	**%**
Spontaneous	**51**	**51%**
Induced (prostaglandin)	**16**	**16%**
1.5 mg 3 mg	**6** **10**	
Augmented (syntocinon)	**11**	**11%**
5 units 10 units	**08** **03**	
Delivery		
Vaginal	**78**	**78%**
Emergency CS	**22**	**22 %**
Causes of emergency CS (22)		
Tender scar	**05**	**22.7**
Pathological CTG	**04**	**18.1**
Failure to progress	**08**	**36.3**
1st stage 2nd stage	**06** **02**	
Patient request	**02**	**9.09**
PET	**01**	**4.5**
Big baby	**01**	**4.5**
IUGR	**01**	**4.5**
Complications (8) 8		
PPH	**02**	**2**
Drop HB %	**02**	**2**
NICU admission	**02**	**2**
Low A/S	**01**	**1**
Low birth weight	**01**	**1**

4. Discussion:

In this study, we aimed to assess the outcome of TOLAC in women with previous vaginal delivery and to identify complications of TOLAC in these cases. This small study showed a very encouraging high successful VBAC. Previous vaginal delivery and, particularly, prior VBAC were associated with a higher rate of successful trial of labor. Moreover, as secondary outcomes, we found that a prior vaginal delivery also was associated with a lower rate of maternal mortality after augmentation and induction of labor and a lower rate of operative vaginal delivery. The higher rate of successful trial of labor was explained by lower rates of cesarean delivery for both

fetal distress and labor dystocia in the first or second stage of labor. Our study has several key findings including the following: (1)the overall success rate of TOLAC in women who underwent a previous CS because of previous VD 65 (65%) is relatively high; (2) when VD was performed in the subsequent pregnancy of these women, it was successful in all cases; (3) overall, maternal and short-term neonatal outcomes were similar between women who underwent TOLAC, elective repeat CS or emergency CS due to failed VD; and (4) lack of progress due to prolonged second stage was the commonest indication for emergency CS. Maternal age and time between admission and delivery were not associated with failed TOLAC, whereas increased BMI is independently associated with failed TOLAC in these women.

Our results correlate well with the study of Caughey *et al.*,[6]who reported the rate of successful trial of labor in800 patients with a prior cesarean and a single prior vaginal delivery. They found a 92.8% success rate for trial of labor in patients with a prior VBAC compared with 84.3% in patients with a single vaginal delivery before the index cesarean delivery(*P* = .002).

High BMI and inter delivery intervals of less than 2 years were associated with a decreased rate of VBAC success in patients who underwent induction, a difference not found in those with spontaneous labor.

Only 1 previous study, conducted by Jongen *et al.* (7) almost 15 years ago, investigated the outcome of TOLAC in this specific population of women who had a previous CS because of a failed operative vaginal delivery. The authors included in the study 132 women who underwent a previous CS during the second stage of labor, only 74 of these women; the CS followed a failed trial of VD. Of the 55 women in that study who underwent a TOLAC following a past failed operative VD, 41 (75%) experienced successful VBAC. In addition, a history of past failed VD was not associated with increased risk for fetal morbidity or rupture of uterine scar. The authors concluded that there is a high chance of success in a trial of labor, even if a trial of instrumental delivery at the previous delivery failed.

These relatively high VBAC success rates might appear to be contrasting with the results of previous studies reporting the rate of successful VBAC in women with past CS in the second stage of labor to be in the range of 13-65%.However, these latter studies did not specifically analyze women attempting TOLAC following past failed VD. (8, 9, 10)

The purpose of the prediction of VBAC success and the appropriate selection of patients for TOLAC is to optimize pregnancy outcome and to balance between maternal and fetal risks.

In our study the overall neonatal morbidity was similar between women who underwent TOLAC and those who had an elective repeat CS. With regard to maternal outcome, the rate of postpartum hemorrhage, drop in HB and with regard to neonatal outcome NICU admission were commonest complication in the TOLAC group than in the repeat CS group. Nevertheless, it should be emphasized that our study was not powered to detect differences in the rate of adverse outcome such as uterine rupture, fetal asphyxia, and perinatal mortality.

The use of oxytocin or prostaglandins for induction or augmentation of labor in women with a previous cesarean section has remained controversial, because of speculation that there might be an increased risk of uterine rupture or dehiscence. This view is not universally held nor is it strongly supported by the available data.(11) A number of series have been reported in which oxytocin or prostaglandins were used for the usual indications with no suggestion of increased hazard. Review of the reported case series show that an increased risk of uterine rupture with the use of oxytocin or prostaglandins is likely to be extremely small. (12, 13). When dehiscence occur in women they are more likely to occur in women who have received more than one oxytocic agent, rather than a single agent used in an appropriate manner. Such comparisons, of course, are rendered invalid by the fact that the cohorts of women who received, or did not receive oxytocics, may have differed in many other respects in addition to the use of oxytocic agents. Nevertheless, the high vaginal birth rates and low dehiscence rates noted in these women suggest that oxytocics can be used for induction or augmentation of labor in women who have had a previous cesarean section, with the same precautions that should always attend the use of oxytocic agents. (11).

One limitation of our study is the relatively small sample size of those patients undergoing induction and those with maternal morbidity. This limits our power and raises the possibility of a type II error in our conclusion that induction did not influence the risk of uterine rupture.

Study limitations

Some of the limitations of our study is retrospective nature. The determination of women undergoing TOLAC was made by strict logic based on database entry by trained labor and delivery nurses in a standardized medical record. This may have underestimated the women with a failed TOLAC and relatively limited sample size, though, the prospective study addressing the topic of or study can be difficult to conduct, besides a selection bias could limit the generalizability of the findings of the study.

Conclusions

In conclusion, this study almost uniformly identifies previous vaginal delivery and previous VBAC as factors associated with successful VBAC trials. Induction of labor in previous analyses has not had as decisive an impact. However, an evaluation of the data provided by this population suggests that the two most important independent variables affecting VBAC success are the spontaneous onset of labor and a prior vaginal delivery. From the data presented, we recommend that induction of labor be reserved for those with a clear maternal or fetal indication, particularly in the absence of other favorable prognostic indicators. Induction of labor in women attempting VBAC was not associated with an increased risk of serious maternal morbidity. We urge the continuation of VBAC as an integral part of good obstetric care however more information regarding safety and prediction for success should be pursued. This study will be progressing to obtain more accurate prediction for safe, successful trial of labor.

Recommendations Based On Our Study

1. Most women with one previous cesarean delivery are candidates for and should be counseled about and offered TOLAC.
2. A trial of labor after previous cesarean delivery should be undertaken at facilities capable of emergency deliveries. Because of the risks associated with TOLAC and complications can be unpredictable,
3. When resources for immediate cesarean delivery are not available, it is recommended that health care providers and patients considering TOLAC discuss the hospital's resources and availability of obstetric, pediatric, anesthetic, and operating room staffs.
4. Respect for patient autonomy supports that patients should be allowed to accept increased levels of risk; however, patients should be clearly informed of such potential increase in risk and management alternatives.
5. After counseling, the ultimate decision to undergo TOLAC or a repeat cesarean delivery should be made by the patient in consultation with her health care provider. The potential risks and benefits of both TOLAC and elective repeat cesarean delivery should be discussed. Documentation of counseling and the management plan should be included in the medical record.
6. TOLAC is not contraindicated for women with previous cesarean delivery unless there is a frank contraindication.

Acknowledgements

I wish to express profound gratitude to Dr. Mahbooba Afghani Ullah specialist of obstetric and gynecology and Dr. Salma Kayani head of Obstetrics and gynecology department and for all labor room staff Taiba hospital Kuwait for their immense support during the data collection processes.

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2/8/2015