Auditing of Performance of Vaginal delivery after One Caesarean Sectionat Alzahraa University Hospital

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Abstract: Background: VBAC (vaginal delivery after Caesarean Section) is a clinically safe choice for the majority of women with a single previous lower segment caesarean delivery assuming there are no other conditions that would normally require a cesarean delivery. Such a strategy is also supported by health economic modelling, and would also limit escalation of the caesarean delivery rate and maternal morbidity associated with multiple caesarean deliveries. VBAC avoids major abdominal surgery, lowers a woman's risk of haemorrhage and infection, and shortens postpartum recovery. A successful VBAC has fewer complications than an elective repeat cesarean while a failed TOLAC has more complications than an elective repeat cesarean. **Objectives:** Assessment of performance of vaginal delivery after one Caesarean Section at the department of Obstetrics and Gynecology at Alzahraa University Hospital. **Patients and methods:** This is a prospective study, carried out on all cases attempted to labour ward in obstetrics department of Al Zahraa University Hospital and selected to have vaginal delivery after one caesarean section from December 2015 to December 2016. Cases with inclusion criteria were subjected to history taking, general and local examination, initial laboratory investigations and abdominal and ultrasound in addition to assessment of the three stages of labour and maternal and neonatal outcome. **Results:** In the present study, out of 388 pregnant women with history of previous one LSCS (low CS scar), there were 52 cases eligible for trial of VBAC. Forty three cases had successful VBAC with success rate (65.38%) and 18(34.62%) underwent repeat emergency CS. There was a statistically significant difference between successful VBAC and gestational age at time of labour, neonatal birth weight, prior vaginal delivery and previous CS scar thickness. Maternal and neonatal complications were less common in successful VBAC, however it was more in failed VBAC. **Conclusion:** Either CS or vaginal birth for woman with previous CS have inherent benefits and risks. However, there is evidence of a more favourable benefit-risk ratio for planned vaginal birth after one caesarean section compared with repeat caesarean section. The current study may be utilised to aid the counselling of women faced with the choice of VBAC versus ERCS.

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Key words: VBAC – Cesarean delivery – health economic modeling – scar thickness.

1. Introduction

Several attempts have been made to reduce the dramatic increase in the rate of cesarean deliveries worldwide, including trial of labor after cesarean delivery (TOLAC). However, TOLAC has a minimal risk of uterine rupture, but such a risk can be prevented by close observation and adhering to the standard guideline. Overall, morbidity and mortality rates secondary to TOLAC are less than those of repeated cesarean sections **(Thapsamuthdechakorn et al., 2018)**.

Successful trial of labor after cesarean (TOLAC) and vaginal birth after cesarean (VBAC) are associated with long-term benefits, including up to a 90% chance of future successful VBACand avoidance of increasingly risky future cesareans **(Thornton, 2018)**.

VBAC is associated a lower morbidityand mortality rate than those having cesarean section, such as massive postpartum hemorrhage, need for blood transfusion, anesthesia-associated complications, surgical risks (intestinal obstruction, wound dehiscence, wound scars, infection, thrombo-embolic events, etc.), and obstetric complications in subsequent pregnancies **(Thapsamuthdechakorn et al., 2018)**.

Several studies have demonstrated significantly lower rates of successful initiation of breast feeding among women having ERCS compared to those who delivered vaginally or who have attempted vaginal birth **(Regan et al., 2013)**.

There has been a wide range of success rates (23 - 85%) reported for those achieving vaginal birth following a planned VBAC. Recently Published studies of the outcomes for women attempting VBAC report a likelihood of success of between 60 and 80% **(ACOG, 2017)**.

On the other hand, risks related to VBAC include increased perinatal loss compared with ERCS, hypoxic

ischemic encephalopathy (HIE) risk (0.7 per 1000) related both to labor and vaginal birth and to scar rupture, Increase morbidity of emergency Caesarean section compared to ERCS if unsuccessful in achieving VBAC, Pelvic floor trauma and uterine rupture **(Pallasmaa et al., 2010)**.

The presence of twins, fetal macrosomia (fetus greater than 4000-4500 grams in weight) and the presence of other medical conditions such as diabetes, maternal age (over 40), maternal BMI (greater than 30 Kg/m2), thin CS scar thickness, period between pregnancies less than 12 months, postdate pregnancy and if the baby is malpositioned are factors suggested to decrease the success rate of VBAC and favoring ERCS **(ACOG, 2017)**.

The risks and benefits should be discussed in the context of the woman's individual circumstances, including her personal motivation and preferences to achieve vaginal birth or ERCS, her attitudes towards the risk of rare but serious adverse outcomes, her plans for future pregnancies and her chance of a successful VBAC. In addition, where possible, there should be review of the operative notes of the previous caesarean to identify the indication, type of uterine incision and any perioperative complications **(RCOG, 2007)**.

Aim of Work

Assessment of performance of vaginal delivery after one Caesarean Section at the department of Obstetrics and Gynecology at Alzahraa University Hospital.

2. Patient and Methods

Methodology

This is a prospective study, carried out on all cases attempted to labor ward in obstetrics department of Al Zahraa University Hospital and selected to have vaginal delivery after one caesarean section from December 2015 to December 2016. The study included 388 cases with history of previous one cesarean section, 52 cases were selected to undergo trial of normal delivery according to inclusion criteria and have no indication for SC and 336 cases excluded from trial of normal vaginal delivery according to exclusion criteria and progressed to CS.

Background and Demographic Characteristics:

Inclusion criteria:

- Previous one caesarean section.
- Not grand multipara (more than four births).
- Placenta fundal.
- Intact membrane.
- Adequate pelvis.
- Fetus:
  - Single
  - Not distressed
  - Cephalic presentation
  - Occipito anterior
  - Average size
- Spontaneous onset of labor.
- Last child more than 2 years.
- Good scar quality (good scar shape, no tenderness and scar thickness ≥2.5 mm).
- No other obstetric or medical indication for repeated CS.

Exclusion criteria:

- Diabetes mellitus.
- Hypertension.
- Cardiac patient.
- Anemic patient.
- Abnormal placenta.
- Macrosomic baby.
- Postdate.
- IUGR.
- Oligohydramnios.
- Bad scare quality.
- Malpresentation or malposition (breach, face, occipito anterior).
- Fetal distress.
- More than one previous CS.
- Upper segment previous CS.

Methodology details

Cases were subjected to the following:

1- History taking:

1) Personal history:

a) Name
b) Age
c) Occupation
d) Residence
e) Marital status
f) Gravidity & Parity
g) Special habits

2) Complaint

3) Present and obstetric history:

a) Present pregnancy (1st, 2nd & 3rd trimester).
b) Previous pregnancies:
- Place of previous CS.
- Time of the previous CS.
- Indication of the previous CS.
- Maternal or fetal complications of the previous CS.
- History of vaginal delivery after or before CS and its complications.

4) Menstrual history

Date of last menstrual cycle.

5) Past history:

a) Diseases of medical importance.
b) Drug intake.
c) Surgeries.

6) Family history:

History of chronic diseases and consanguinity.

Written information about risks and benefits of vaginal birth and elective CS given to patients having a planned VBAC.

2- Examination:

(1) General examination, including:

- Level of consciousness, color of the patient, stature, vital signs (pulse, blood pressure and temperature).
- Examination of other systems (heart, chest and abdomen).
- Examination of lower limbs to exclude edema and varicose veins and skeletal abnormalities (kyphosis or scoliosis).

(2) Abdominal examination:

Inspection

- To identify any asymmetry.
- Fetal movements.
- Cutaneous signs of pregnancy as (lineanigra, striaegravidarum, striaealbicans and flattening/eversion of umbilicus).
- Superficial veins.
- Surgical scars.

Palpation

- Fundal level.
- Estimation of number of fetuses.
- Fetal lie (longitudinal, oblique or transverse).
- Presentation (cephalic, breech or shoulder).
- Amniotic fluid volume.

Auscultation of the fetal heart

Rate and rhythm of the fetal heart were determined by the ultrasound device.

(3) Local or vaginal examination:

- Exclude vaginal bleeding.
- Capacity of pelvis.
- Cervical dilatation and effacement.
- Station of head and state of membrane.

3- Ultrasound:

All cases were subjected to ultrasound examination at Alzahraa University outpatient clinic to assess fetal viability, gestational age, fetal weight, presentation, site and maturity of placenta, amount of liquor and assessment of the scar by using **(Medison Sonoace 6000C Digital Color MT)** ultrasound **(fig. 8)**.

Previous scar thickness was estimated at term or in early labour by transabdominal sonography with frequency of 3.5 mm. The patient was as kedtoremain with full urinary bladder. The previous CS scar thickness was measured after identifying the thinnest lower uterine segment and measurements were taken between the urinary bladder-myometrium interface. Patient with previous CS scar thickness more than 2.5 mm were eligible candidates for VBAC.

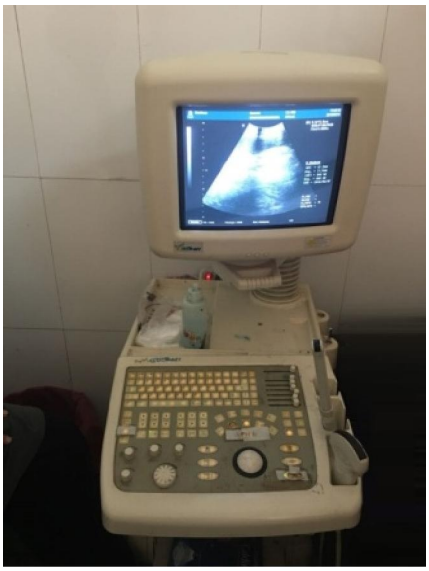

Figure (1): Medison Sonoace 6000C Digital Color MT Ultrasound System, Medison Co., Ltd. Seoul, Korea.

4- Investigations:

Venous blood sample was withdrawn from all recruited subjects using aseptic technique from the antecubital vein. Blood group and Rh in addition to routine labs like RBS, CBC, PT, PC, liver and kidney functions, HCV and HBV antibodies in blood were done to all cases.

The selected cases for trial of labor were subjected in the labor ward to the following:

During 1st stage:

(1) Maternal assessment:

Continuous careful monitoring of the progress of labor according to partogram form **(fig. 9)**.

(2) Fetal monitoring:

The FHR monitored continuously with a CTG.

During 2nd stage:

- Uterine contraction.
- Fetal monitoring.
- Mode of delivery (spontaneous or instrumental).
- Duration of 2nd stage.
- Episiotomy (yes or no).
- Any medication or anesthesia.
- Assessment of the 2nd stage of laboureg: vaginal bleeding, extension of episiotomy, perineal tear or conversion to caesarean section.

During 3rd stage:

- Way of placental separation (spontaneous or active methods).
- Any medication used.
- Post-partum hemorrhage.
- Duration of 3rd stage.
- Application of scoring system.

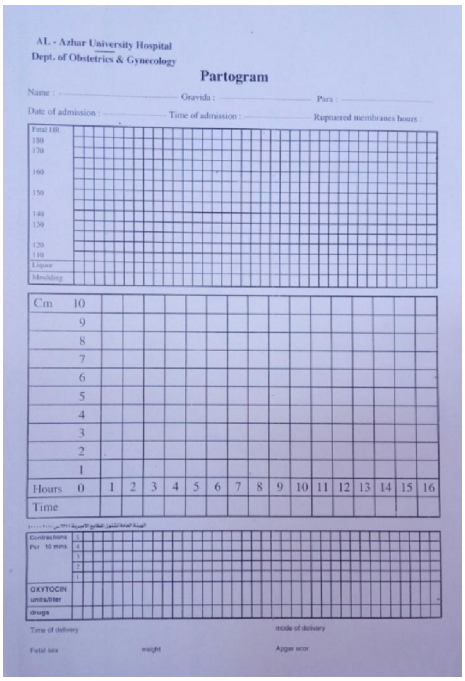

Figure (2): Partogram form in labor ward in obstetrics department of Al-Zahraa University Hospital.

Statistical Analysis

Data were statistically described in terms of range, mean ± standard deviation (± SD), frequencies (number of cases) and relative frequencies (percentages) when appropriate. Comparing categorical data was done using Chi square (χ^2) test was performed. Exact test was used instead when the expected frequency is less than 5. A probability value (p value) less than 0.05 was considered statistically significant. All statistical calculations were done using computer programs Microsoft Excel 2010 (Microsoft Corporation, NY, USA) and SPSS (Statistical Package for the Social Science; SPSS Inc., Chicago, IL, USA) version 15 for Microsoft Windows.

3. Results

This is a prospective study, carried out on all cases attempted to labor ward in obstetrics department of Al Zahraa University Hospital and selected to have vaginal delivery after one caesarean section. There were 388 cases enrolled in the study. Fifty two cases selected to have trial of normal vaginal delivery, 34 cases succeeded to have vaginal birth after one CS, while 18 cases had failed trial, while 336 cases had repeated CS.

Data analysis is presented in the following tables and figures:

Table (1): Basic demographic and clinical data of patients included in the present study

Characteristics of studied patients	Caesarian section delivery N=354 (91.2%)		Normal delivery N=34 (8.8%)		P value
	No	%	No	%	
Age group 18-27 year 28-37 38-47	 166 164 24	 46.9 46.3 6.8	 19 15 0	 55.9 44.1 0.0	X^2=2.9 P value=0.24
Maternal age mean±SD (YEAR)	28.5±5.49		27.09±3.99		t=1.46 P=0.145
Gestational age mean±SD (WEEK)	37.6±1.5		38.79+1.23		t=2.273 P=0.023*
Inter-pregnancy interval	2.4±0.97		3.2±1.01		t=4.57 P=0.0001*
Parity	1.6±0.8		1.8±0.7		t=1.62 P=0.11
Fetal birth weight	3.25±0.59		2.98±0.32		t=2.69 P=0.07*

Data presented by mean± SD, N (%) Significant p value ≤ 0.05

Table (2): Distribution the total studied sample according of type of delivery

Type of delivery	Number	Frequency
Trial of normal delivery	52	13.4%
Elective repeated CS (ERCS)	336	86.6%
Total	388	100%

Data presented by N (%)

Fifty two cases (13.4%) had trial of normal vaginal delivery, while 336 cases (86.6%) had elective CS (table 2).

Table (3): Incidence of successful VBAC among the studied group

Type of delivery	Number	Frequency
Successful VBAC	34	65.38%
Failed VBAC	18	34.62%
Total	52	100%

Data presented by N (%)

Out of 52 cases selected to have trial of normal vaginal delivery, 34 cases (65.38%) succeeded to have vaginal birth after one CS, while 18 cases (34.62%) had failed trial and turned to CS (table 3).

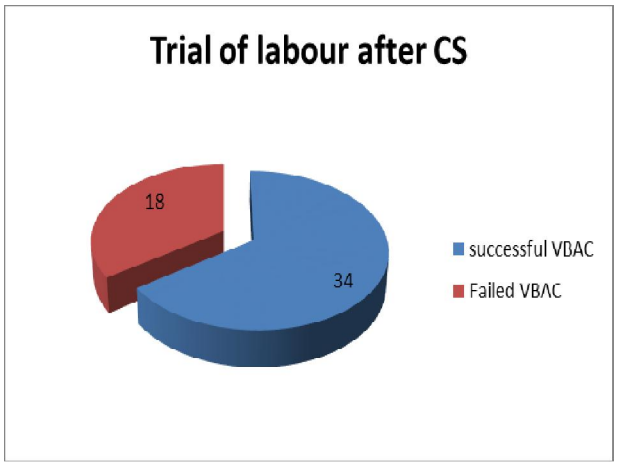

Figure (4): Incidence of successful VBAC among the studied group

Table (7): Comparison between CS and normal delivery regarding maternal age

		CS	Normal delivery	t. test	P. value
Maternal age year)	**Range**	18-47	20-35	1.46	.145
	Mean+SD	28.50+5.49	27.09+3.99		

Data presented by mean

There was no statisti ıg maternal age (table 4).

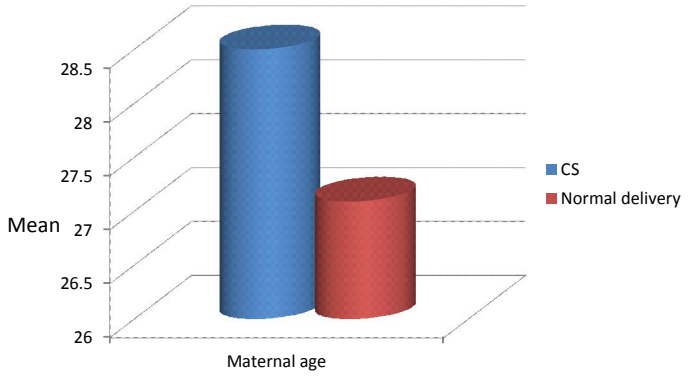

Figure (4): Comparison between CS and normal delivery regarding maternal age

Table (5): Comparison between CS and normal delivery regarding parity

			CS	Normal delivery	X^2	P. value
Parity	1	No.	215	16	3.14	.534
		%	60.7%	47.1%		
	2	No.	86	11		
		%	24.3%	32.4%		
	3	No.	49	7		
		%	13.8%	20.6%		
	4	No.	1	0		
		%	.3%	.0%		
	5	No.	3	0		
		%	.8%	.0%		

Data presented by N (%) Significant p value ≤ 0.05

There was no statistically significant difference between CS and normal delivery regarding parity (table 5).

Table (6): Comparison between CS and normal delivery regarding gestational age

		CS	Normal delivery	t. test	P. value
Gestational age (weeks)	Range	28-42	36-41	2.273	0.023*
	Mean+SD	37.62+1.51	38.79+1.23		

Data presented by mean±SD Significant p value ≤ 0.05

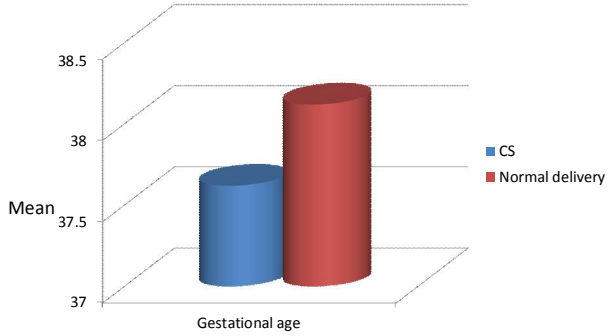

Figure (5): Comparison between CS and normal delivery regarding gestational age.

There was a statistically significant difference between CS and normal delivery regarding gestational age (table 6).

Table (7): Comparison between CS and normal delivery regarding inter-pregnancy interval

		CS	Normal delivery	t. test	P. value
Inter-pregnancy interval (years)	Range	1-5.2	1.5-5.1	4.57	.0001*
	Mean+SD	2.4±0.97	3.2±1.01		

Data presented by mean±SD Significant p value ≤ 0.05

There was a statistically significant difference regarding the mean value of inter-pregnancy interval between cases with normal vaginal delivery and those who had CS with P =.0001 (table 7).

Table (8): Comparison between CS and normal delivery regarding fetal birth weight

		CS	Normal delivery	t. test	P. value
Fetal Birth Weight / kg	Range	1.25-4.60	2-3.40	2.69	.007*
	Mean+SD	3.25+0.59	2.98+ 0.32		

Data presented by mean±SD Significant p value ≤ 0.05

Mean value of fetal weight was significantly higher among CS than normal delivery (3.25, 2.98 respectively) p =.007 (table 8).

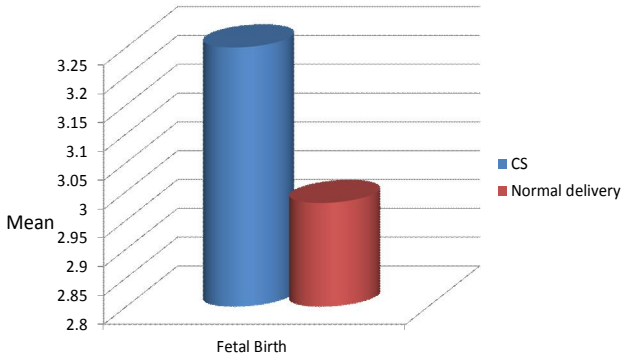

Figure (6): Comparison between CS and normal delivery regarding fetal birth weight.

Table (9): History of vaginal delivery

		Patients	
		NO.	%
History of vaginal delivery	Yes	21	61.8
	No	13	38.2
	Total	34	100.0

Data presented by N (%) Significant p value ≤ 0.05

Out of 34 cases with successful trial of normal labor, 21cases (61.8%) had a history previous vaginal delivery and 13 cases (38.2%) had no previous vaginal delivery (table 9).

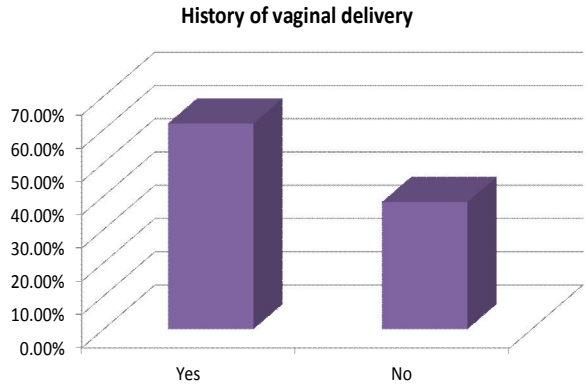

Figure (7): History of vaginal delivery.

Table (10): Comparison between CS and normal delivery regarding cause of previous CS

			CS	Normal delivery	X^2	P. value
Cause of previous CS	Progress failure	No.	59	4	25.69	.004*
		%	16.7%	11.8%		
	Fetal distress	No.	41	7		
		%	11.6%	20.6%		
	Malpresentation	No.	43	9		
		%	12.1%	26.5%		
	IUGR	No.	12	0		
		%	3.4%	.0%		
	PIH	No.	36	4		
		%	10.2%	11.8%		
	PROM	No.	22	3		
		%	6.2%	8.8%		

			CS	Normal delivery	X^2	P. value
	Oligohydramnios	No.	21	0		
		%	5.9%	.0%		
	Postdate	No.	18	0		
		%	5.1%	.0%		
	Multiple pregnancy	No.	27	7		
		%	7.6%	20.6%		
	Macrosomia	No.	21	0		
		%	5.9%	.0%		
	CPD	No.	54	0		
		%	15.3%	.0%		

Data presented by N (%) Significant p value ≤ 0.05

Progress failure, CPD, fetal distress and malpresentation were the most common causes of previous CS. There was statistically significant difference between CS and normal delivery regarding cause of previous CS with P=.004 (table 10).

Table (11): Causes of elective repeated CS (ERCS)

		patients	
		NO.	%
Cause of ERCS	Fetal distress	21	6.3 %
	Malpresentation	39	11.6 %
	Multiple pregnancy	17	5.0 %
	Abnormal placeta	23	6.8 %
	PROM	29	8.6 %
	Oligohydramnios	19	5.6 %
	DM	26	7.7 %
	PIH	36	%10.7
	Macrosomia	18	5.4 %
	CPD	27	8.0 %
	Bad scar quality	23	6.8 %
	**Others	16	4.7 %
	Patient refuse	15	4.4 %
	Postdate	27	8.0 %
	Total	336	100 %

Data presented by N (%)
(**) Other causes: 8 cases complained with anemia, 5 cases had cardiac problems and 3 cases complained with epilepsy.

Table (9) shows causes of elective repeated CS. The most imperative cause to have ERCS was malpresentation in 11 % of cases who had repeated CS, then PIH in 10.7% and PROM in 8.6%.

Table (12): Stage among normal group

		patients	
		NO.	%
Stage	Early 1st stage	13	38.2
	**Late 1st stage	21	61.8
	Total	34	100.0

Data presented by N (%)
** Late 1st stage of labour: cervical dilatation more than 7 cm

Regarding the group who had successful TOLAC (34 cases), 13cases (38.2%) presented in the labor ward in the early 1st stage of labor and 21cases (61.8%) presented in the late 1st stage of labor (table 12).

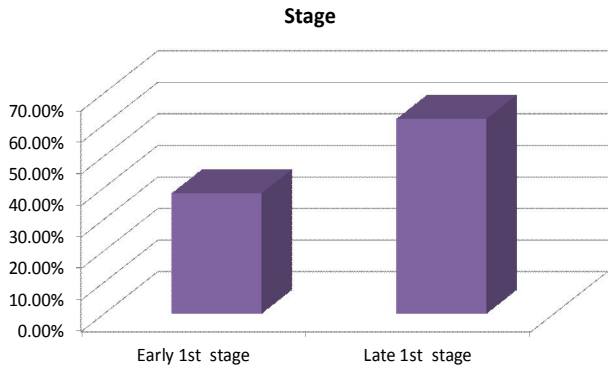

Figure (8): Stage among normal group.

Table (13): Comparison between cases who had successful trial of labor and those with failed trial, regarding scar thickness

		Successful TOLAC N (34)	Failed TOLAC N (18)	t. test	P. value
Scar thickness / kg	Min-Max	2.5-4.1	2.4-4.0	2.01	.050*
	Mean+SD	3.37+0.40	3.13+0.43		

Data presented by mean±SD significant p value ≤ 0.05

There was a statistically significant difference between the thickness of the of previous CS scar of cases who had successful trial of labor and those with failed trial (table 13).

Table (14): Causes of failed TOLAC

		patients	
		NO.	%
cause of faliure	Fetal distress	5	27.8
	Tender scar	4	22.2
	Failure to progress	7	38.9
	Severe maternal tachycardia	2	11.1
	Total	18	100

Data presented by N (%)

According to causes of failed TOLAC in cases of our study, failure to progress was found in 7 cases (38.9%), fetal distress was found in 5 cases (27.8%), tender scare in 4 cases (22.2%) and severe maternal tachycardia was found in 2 cases (11.1%) (table 14).

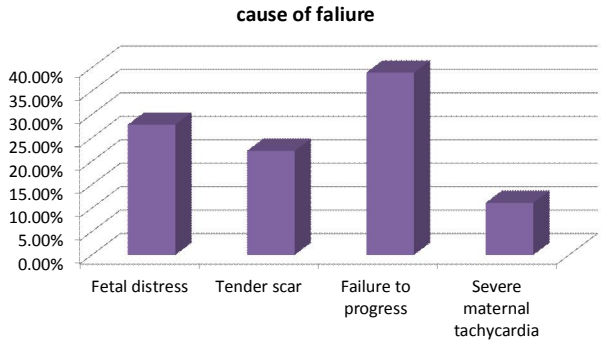

Figure (9): Causes of failure.

Table (15): Comparison between CS and normal delivery regarding maternal complication

			ERCS	Emergency CS	Normal delivery	X^2	P. value
Maternal complication	NO complications	No.	215	8	28	7.94	.018**
		%	63.9%	44.4%	82.4%		
	Bladder injuries	No.	20	1	0		
		%	5.9%	5.6%	0%		
	Postpartum hemorrhage	No.	42	4	3		
		%	12.5%	22.2%	8.8%		
	Infection	No.	34	2	2		
		%	10.1%	11.1%	5.9%		
	Extension of the scar	No.	12	3	0		
		%	3.6%	16.7%	0%		
	**Others	No.	13	0	1		
		%	3.9%	0%	2.9%		
	Total	No.	336	18	34		
		%	100%	100%	100%		

Data presented by N (%) Significant p value ≤ 0.05

****Others:** vaginal hematoma, placental abruption, ICU admission and blood transfusion. ERCS: Elective repeated CS.

There was statistically significant difference between elective CS, emergency CS due to failed TOLAC and normal delivery regarding maternal complications (table 15).

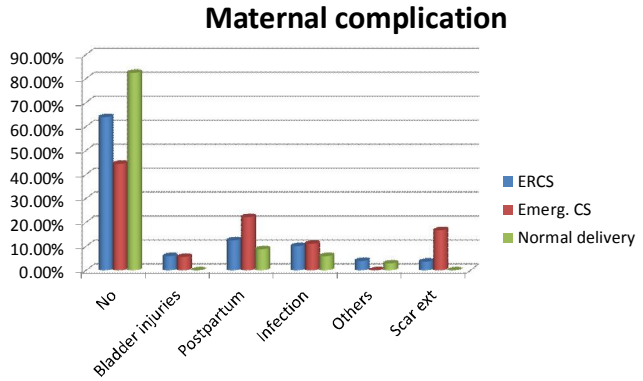

Figure (10): Comparison between CS and normal delivery regarding maternal complication.

Table (16): Comparison between CS and normal delivery regarding fetal complications

			ERCS	Emergency CS	Normal delivery	X^2	P. value
**Fetal complications	Yes	No.	146	12	7	11.10	.004*
		%	43.5%	66.6%	20.6%		
	No	No.	190	6	27		
		%	56.5%	33.3%	79.4%		
	Total	No.	336	18	34		
		%	100%	100%	100%		

Data presented by N (%) Significant p value ≤ 0.05

** Fetal complications as: NICU admission due to respiratory distress, meconium aspiration, hypoxia, hypoglycemia, sepsis and Erb's palsy and cephalhematoma. ERCS: Elective repeated CS.

There was statistically significant difference between elective CS, emergency CS due to failed TOLAC and normal delivery regarding maternal complications (table 16).

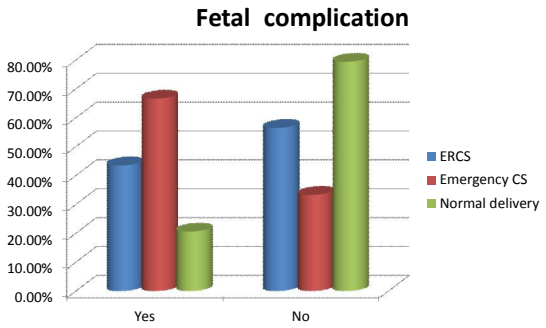

Figure (11): Comparison between CS and normal delivery regarding fetal complication.

Some pictures from the collected data of our study:

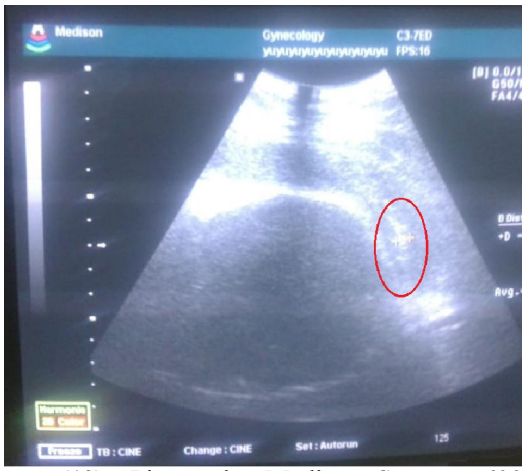

Figure (12): Picture by Medison Sonoace 6000C Digital Color MT Ultrasound showing a good scar thickness of previous CS with 5.1mm to a case of successful VBAC.

4. Discussion

Management of a woman who has undergone a previous cesarean section, has been a controversial topic for a long time. The old dictum "once a cesarean, always a cesarean" (CRAGIN, 1916) has changed now because of the awareness among obstetricians about the safety of vaginal birth in scarred uterus as well as awareness of greater maternal morbidity and increased risk of maternal mortality in cesarean birth **(Jha et al., 2018)**.

Vaginal birth after cesarean section (VBAC) is one of the strategies developed to control the rising rate of cesarean sections (CSs). It is a trial of vaginal delivery in selected cases of a previous CS in a well-equipped hospital **(Bangal et al., 2013)**.

The advantages of vaginal delivery include decreased maternal and neonatal morbidity and mortality, and also decreased hospital stay and cost **(Jha et al., 2018)**.

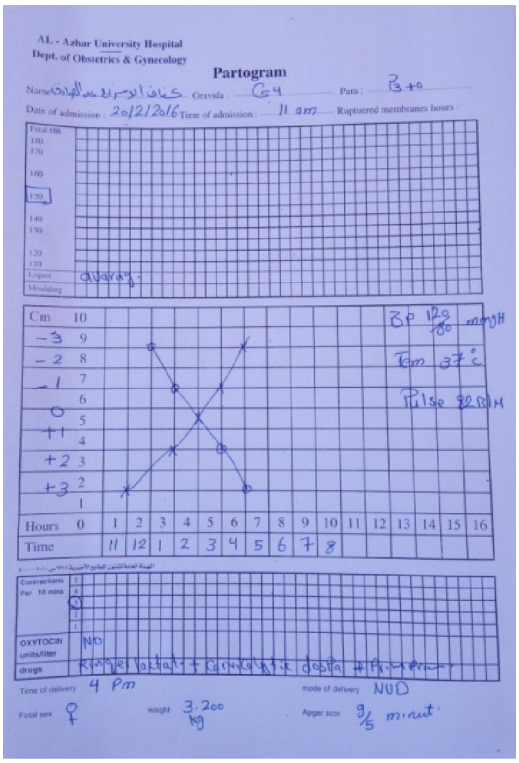

Figure (13): Partogram of a case with successful VBAC

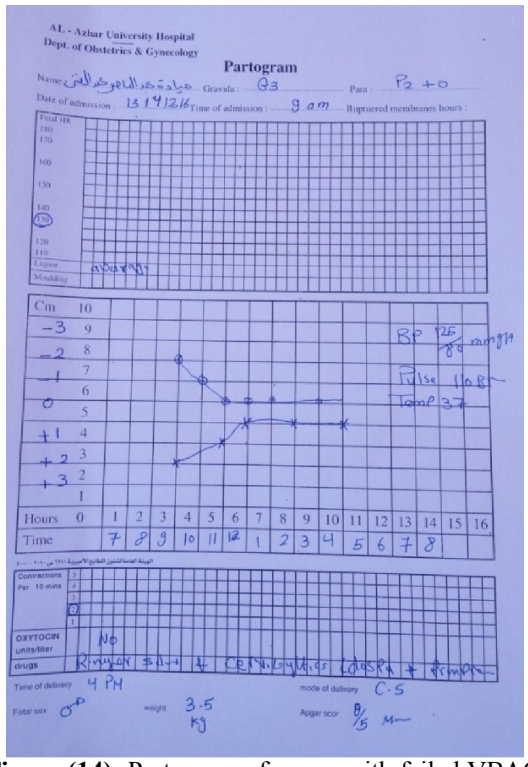

Figure (14): Partogram of a case with failed VBAC

Planned vaginal birth is appropriate for and may be offered to the majority of women with one previous

lower segment caesarean section. It has benefits to the woman but the possible associated risks must be clearly explained and backed with an information leaflet **(Harlow, 2016)**.

Studies suggest an overall success rate for planned VBAC of about 70-75% following onecaesarean section. Success rates are highest for those who have had a previous vaginal delivery or a caesarean section for non-reassuring fetal heart rate or breech presentation. Those having had a caesarean section for failure to progress or "cephalopelvic disproportion" are less likely to deliver vaginally but still have a success rate of approximately 66% **(Harlow, 2016)**.

Previous vaginal birth, advance cervical dilatation and proper interval after Cesarean increase the success rate of VBAC. Factors which negatively affect the vaginal birth after Cesarean are the history of recurrent cause for previous cesarean, maternal diabetes, short interval, IVF pregnancies and Induced labor **(Alani et al., 2017)**.

Because of the stretching of themuscle during pregnancy or the strong contractions of labor, the old cesarean scar might not stand the strain of labor and it becomes thin or begins to separate. When it does, it is called 'scar dehiscence'. Rarely, the scar opens and extends into other parts of uterus. This is called as' uterine rupture' and is a serious risk to both mother and baby. Because of this risk, repeat elective cesarean sections are being performed on women with previous cesarean section **(Jha et al., 2018)**.

The rupture of caesarean scar is potentially devastating complication of trial of vaginal delivery which increase smaternal and perinatal morbidity and mortality. There is a need to assess the integrity of uterine scar and risk factors before planning for trial of vaginal delivery **(Jha et al., 2018)**.

Audit is a valuable tool for addressing the quality of care and an important source of data on maternal and newborn health and can improve the quality of practice as it allows comparisons between health services and can therefore lead to the equalization of health performances **(Kongnyuy & Broek, 2009)**.

The audit system, even the simple approach used in this study (just orientation on adhering to the guideline and reporting the outcomes), is a factor with a very strong impact on TOLAC acceptance and its success rate **(Thapsamuthdechakorn et al., 2018)**.

This study aimed to assess the performance of vaginal delivery after one Caesarean Section at department of Obstetrics and Gynecology at Alzahraa University Hospital.

This was a prospective study, carried out on all cases attempted to labor ward in obstetrics department of Al Zahraa University Hospital and selected to have vaginal delivery after one caesarean section. There were 388 cases enrolled in the study.

In the present study, out of 388 pregnant women with history of previous one LSCS, 336(87%) underwent elective LSCS and 52 cases (13%) underwent trial of labour after cesarean section. Out of 52 cases,34(65.38%) had successful VBAC and18(34.62%) underwent repeat emergency LSCS.

The study of **Thapsamuthdechakorn et al., 2018** showed that the success rate of TOLAC was 60%, while an Australian cohort trial reported a VBAC success rate of 59% (535/903 VBAC labours) **(Crowther et al., 2012)**.

In contrast to our study, **RCOG, 2015** reported that success rate of planned VBAC is 72–75%. Also, a meta-analysis by **lGuise et al., 2004** (n = 103 188 VBAC labours) reported a VBAC labour success rate of 74% (72–75%), while the National Institute of Child Health and Human Development (NICHD) study reported a 73% VBAC labour success rate (n =17 898 VBAC labours) **(RCOG, 2015)**.

Many factors may explain the decreased TOLAC success rate in our study as; the current study had too restricted inclusion criteria, the short duration of current study and the different quality of patients in our community which affects patient acceptance of TOLAC in addition to the unavailability of painless labor (several cases could not tolerate the severe pain in advanced labor), together with the fear of uterine rupture resulting in a higher rate of women changing their mind during labor, which was likely associated with the lack of audit system.

Bad quality of previous CS scar and non-reassuring CTG at time of admission also had an imperative effect on the success rate of TOLAC in our study.

A lower rate of successful VBAC reported by the study by **Fong et al., 2016** which was a retrospective cohort study, performed using California discharge data and reported that out of 663,700 women with prior cesarean delivery, 14.2% underwent VBAC. VBAC incidence decreased considerably during the time period, from a peak of 23.7% down to about 10.9%.

In the current study, there was no statistically significant difference between caesarian section delivery group and normal delivery group regarding to maternal age with a P value (P=.145).

These results agreed with **Nkwabong et al., 2016** and **Ugwu et al., 2014** who found that, there was non-significant difference between caesarian section delivery group and normal delivery group regarding to maternal agewith P value (P=.22, P=.13 respectively).

This was in contrast to **Seffah et al., 2014** who found a significant statistical difference between women who had successful VBAC and those with

repeated CS regarding maternal age due to different demographic data with P value (P<0.001).

Also, there was a study by **Melaemd et al., 2013**, stated that maternal age >30 years was associated with an increased risk of failed TOL with a significant statistical difference between the two groups (TOLAC and Elective repeat CS) with P value (P=.009).

In the current study, there was a statistically significant difference between CS and VBAC regarding the gestational age at time of delivery with P value (P=.023).

This was in agreement with **Thapsamuthdechakorn et al., 2018** who found a statistical significant difference between the group of successful TOLAC and the group of repeated CS regarding the gestational age at time of labour with P value (P<0.001).

Also, results of the current study were in agreement with the study of **Seffah et al., 2014** who found a statistically significant difference between women who had successful or failed VBAC regarding gestational age at delivery with P value (P<0.001).

The current study was in contrast to a study by **Nkwabong et al., 2016**who did not find any statistically significant difference between women who had successful TOLAC and those with repeated CS regarding gestational age at delivery with P value (P=0.12).

This study showed that, there was a statistically significant difference regarding the mean value of inter-pregnancy interval between cases with normal vaginal delivery and those who had CS. Mean value of inter-pregnancy interval was higher among normal delivery group than caesarian section delivery group with P value (P=.0001).

This results agrees with **Bangal et al., 2013** who revealed that, mean value of inter-pregnancy interval was higher among normal delivery group than caesarian section delivery group with P value (P<.05).

Results of our study were in contrast to the study by **Thapsamuthdechakorn et al., 2018** and the study by **Nkwabong et al., 2016** who found no statistically significant difference between women who had successful TOLAC and who had repeated CS regarding inter-pregnancy interval with P values (P=0.64, P=0.23 respectively).

In this study, we found that, mean value of fetal weight was significantly higher among CS than normal delivery (3.25, 2.98 respectively) with P value (P=.007).

This goes with **Froehlich et al., 2016** who study association of recorded estimated fetal weight and Cesarean delivery in attempted vaginal delivery at term. He recorded that, mean value of fetal weight was significantly higher among CS than normal delivery with (P<.001).

The current study showed that women who had vaginal delivery prior to (or after) the first CS had better chances of successful TOLAC, (61.8%) of women who had successful TOLAC, had history of vaginal delivery.

This was in concordance with **Thapsamuthdechakorn et al., 2018** who found in their study that (77.6%) of women who had successful TOLAC, had history of vaginal delivery whether before or after the CS. A percent which was higher in the study by **Nkwabong et al., 2016**as (94.1 %) of women with successful TOLAC, had history of vaginal delivery.

In the current study, the most common causes of previous CS were progress failure (16.7%), CPD (15.3%), fetal distress (11.6%) and malpresentation (12.1%). Causes of the previous CS found to have great impact on the current mode of delivery as there was statistically significant difference between CS and normal delivery regarding cause of previous CS with P value (P=.004).

These results were in agreement with **(Kennare et al., 2007)** who found that the indication of previous C.S. was failure of progress, fetal distress, malpresentation, hypertension, antepartum hemorrhage, intrauterine growth retardation and others.

The current study also agreed **Alani et al., 2017** who stated in their study that the previous cause of Cesarean had a great impact on VBAC success. He found a statistically significant difference between successful VBAC and repeated CS regarding the most common causes of previous CS with P value (P<0.0001).

Balachandran et al., 2014 concluded that previous vaginal delivery including previous VBAC is the greatest predictor for successful TOLAC.

According to causes of elective repeated CS, the current study showed that the most imperative cause to have ERCS was malpresentation in 11.6 % of cases who had repeated CS, then PIH in 10.7% and PROM in 8.6%.

This was in contrast to **Seffah et al., 2014** who found in their study that the most common indications for elective CS were; postdate pregnancy (17.2%), then macrosomia (16.4%), malpresentation (12.1%), hypertension (7.6%) and CPD (7.0%).

The study by **Balachandran et al., 2014** reported that the most common reason for ERCS was non-availability of their previous operative notes. The other common indication was malpresentations then patient request and suspected cephalopelvic disproportion (CPD).

IN another study **Lydon et al., 2006** found that the most common indications for elective repeated CS were; maternal request (18.3%), macrosomia (5.7),

malpresentatin (breech) (5.7%), no indication in (5.1%), scar condition (5.1%), fetal distress (4.1%), CPD (3.2%) then maternal medical conditions (3.0%).

Regarding the group who had successful TOLAC (34 cases), we found that 13cases (38.2%) presented in the labor ward in the early 1st stage of labor and 21cases (61.8%) presented in late 1st stage of labor (cervical dilatation more than 7cm).

This was in agreement with **Maanongun et al., 2016** who noticed a statistically significant increase in number of women who admitted at 2nd stage of labour (95 cases 54%) than at 1st stage (79 cases 46%) with more spontaneous vaginal deliveries and more use of episiotomy.

In the current study, there was minor increase in the mean values of thickness of the previous CS scar in women who had successful TOLAC than those with failed trial, a difference which was statistically significant with P value (P=0.5).

This was in agreement with **Singh et al., 2015** who reported that the scar thickness was thinner in patients having cesarean delivery than those having vaginal delivery and this difference was statistically significant. Mean scar thickness in patients who delivered vaginally was 3.3±0.7 mm and in those who had repeatcesarean section was 2.9±0.9 mm with P value (P=0.003).

The current study showed that, according to causes of failed TOLAC, failure to progress was found in 7 cases (38.9%), fetal distresswas found in 5 cases (27.8%), tender scare in 4 cases (22.2%) and severe maternal tachycardia was found in 2 cases (11.1%).

This was in agreement with **Lydon et al., 2006** who found that the most common cause of failed TOLAC was failure to progress (60.1%), fetal distress (24.6%), CPD (8.0%), maternal intrapartum request (7.2%), fetal indication (5.8%), breech presentation (4.3%), failed vacuum (4.3%), no indication noted in chart (4.3%), possible uterine rupture (3.6%), abruptio placentae (2.2%) and maternal complication (2.2%).

Thapsamuthdechakorn et al., 2018 noted that a prevalence of failure to progress or cervical dystocia was relatively high in their study. This was probably caused by low threshold in the diagnosis of dystocia due to fear of uterine rupture especially in settings of unavailable painless labor.

In our study, we found that there were no maternal complications related to successful TOLAC except for postpartum hemorrhage in three patients (8.8%), infection which occurred in two patients after delivery (5.9%) and one patient developed vaginal hematoma (2.9%).

The most common maternal complications occurred after CS either elective or emergency were postpartum hemorrhage (12.5% - 22.2% respectively), infection (10.1%) in women who had elective Cs and (11.1%) in women with emergency CS, extension of the scar (3.6% - 16.7%) and bladder injury (5.9.8% - 5.6%).

The incidence of uterine rupture was 0% this may be due to small sample size (only 52 was subjected to trial of labour) that failed to show the small incidence of uterine rupture and early detection of maternal and fetal distress and signs of scar dehiscence.

This agreed the study by **Kok et al., 2014** who reported that postpartum hemorrhage was reported in 58 per 1000 deliveries in the planned caesarean section group and 50 per 1000 deliveries in the emergency caesarean section group. No significant difference in the number of blood transfusions between the groups (P=0.4) and maternal mortality did not occur.

Balachandran et al., 2014 reported in their study that minor postpartum hemorrhage was the most common complication occurred due to repeated CS which was more in emergency repeated CS than elective with no need for blood transfusion. Scar dehiscence was the second common complication without any reported cases of maternal mortality or rupture uterus. The study did not reveal any significant increased maternal or perinatal morbidity associated with TOLAC other than a 0.86% incidence of scar dehiscence in the trial group.

In contrast to our results, the study by **Senturk et al., 2015** showed maternal complication rates in the vaginal delivery group more than the CS group due to increased incidence of vaginal tears, which are a relatively minor complication.

This study showed that, fetal complications were common with emergency CS (66.6%) than elective CS (43.5%) and VBAC (20.6%). A difference which was statistically significant (P=.004). Fetal complications as: respiratory distress, meconium aspiration, hypoxia, hypoglycemia, sepsis and Erb's palsy and cephalhematoma.

This results agreed with **(Abdelazim et al., 2014)** who found that, fetal complication were present among unsuccessful TOLAC group more than elective CS group and successful group. The most common fetal complication in the study was neonatal intensive care admission due to birth asphyxia and 2 due to meconium aspiration and sepsis.

Senturk et al., 2015 showed in their study that there was no significant difference between the two groups regarding neonatal outcome.

Conclusion

Planned VBAC is appropriate for the majority of women with a singleton pregnancy of cephalic presentation at 37+0 weeks or beyond who have had a single previous lower segment caesarean delivery,

with or without a history of previous vaginal birth except for women with previous uterine rupture or classical caesarean scar and in women who have other contraindications to vaginal birth that apply irrespective of the presence or absence of a scar (e.g. major placentapraevia, presence of twins, macrosomicor malpositioned baby, postdate pregnancy and the presence of other medical conditions such as diabetes and).

In the current study, there were 388 cases with previous one CS participated in the study. Fifty two cases were eligible for TOLAC with success rate of VBAC was (65%), which was lower than the international success rates of VBAC reported by **RCOG, 2015** (72-75%). The different quality of patients in our community, lack of audit system and fear of uterine rupture affected patient acceptance of TOLAC resulting in the low success rate.

The most common cause of elective repeated CS in current study was malpresentation then PIH and PROM, while the most common cause of failed TOLAC was failure to progress in labour followed by fetal distress and tender scar.

In the current study, there was a statistically significant difference between successful VBAC and gestational age at time of labour, neonatal birth weight, prior vaginal delivery and previous CS scar thickness. Maternal and neonatal complications were less common in successful VBAC, however it was more in failed VBAC.

Recommendations

Most women with one previous cesarean delivery with a low transverse incision are candidates for and should be counseled about VBAC, and should be offered TOLAC.

Proper counseling should be offered to candidates with clarification of the advantages and risks of VBAC on a written consent to let them have the decision of their fate.

Proper selection, appropriate timing and close monitoring by competent staff are mandatory.

In the management of TOLAC cases, regular and intensive antenatal surveillance is required. There is no doubt that a Trial of labour is relatively safe procedure but it is not devoid of risks pertaining to it.

TOLAC in patients with one previous C-Section is almost always safe in centers which has quality care and is capable to provide comprehensive emergency obstetrical and pediatric care.

During labour, strict maternal and fetal monitoring to all mothers with previous CS scar to detect early signs of rupture uterus.

Clinical audit system should be applied in maternal and fetal health care through regular orientation and reporting the outcomes, which is a powerful factor associated with a successful TOLAC.

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