How to Cite:
Al-Alwani, B. R. I., Al-Alwani, A. R. I., & Sarsam, S. D. (2022). Partogram in trial of labor after cesarean section. *International Journal of Health Sciences*, *6*(S5), 2555–2571.
https://doi.org/10.53730/ijhs.v6nS5.9205

Partogram in trial of labor after cesarean section

Ban Riyadh Ibrahim Al-Alwani
Senior Gynecologist, Al-Karama teaching hospital, Baghdad, Iraq

Abeer Riyadh Ibrahim Al-Alwani
Gynecologist, Department of Gynecology, Baghdad Teaching Hospital, Baghdad Medical City Complex, Ministry of health / Environment, Baghdad, Iraq
Corresponding author email: joym7131@gmail.com

Prof. Dr. Samar D. Sarsam
Consultant Obestetrician and Gynecologist, Al-Elwiyah Maternity Teaching Hospital, Baghdad, Iraq

***Abstract*---**Background: In recent decades, the proportion of caesarean sections to vaginal delivery has increased substantially for various reasons, and a trial of vaginal birth after a caesarean section may save many pregnant women from recurrent cesarean sections and their complications. Aim: Aim is to detect whether partogram is applicable in the monitoring of a trial of labor after cesarean section. Patients and methods: A cross sectional observational study was conducted at AL-ELWIYAH maternity teaching hospital. Partogram was studied for (200) term pregnancy patients with previous one cesarean section for a non-recurring cause. Both the advantages and disadvantages of vaginal birth after cesarean section and a repeat cesarean section were explained and an informed consent is obtained. Their partograms were studied and at any time during the trial if an indication of cesarean section appeared the trial would be abandoned and an emergency repeat cesarean section would be performed. Result: Among the (200) patients included in the trial the following results were obtained: (170) patients delivered vaginally hence success rate was (85%). It was noted that if the patient had a previous successful vaginal delivery she would have a better chance of a successful vaginal delivery again than a patient who have not had delivered vaginally before. The majority of patients who gave birth in zone (A) ended by successful vaginal delivery meanwhile the majority of those who gave birth in zone (D) ended by emergency repeat cesarean section. No significant association was found between interpregnancy interval, cause of previous cesarean section or maternal age with result of the

trial. Conclusion: Patients with a history of one previous cesarean section for a non-recurring cause, no risk factors and average size babies can be a good candidate for a trial of labor after cesarean section that is monitored by partogram to reduce the rate of future cesarean sections and their complications.

Keywords---Partogram, Labor, Cesarean section.

Introduction

Labor is the process that leads to childbirth, it begins with the onset of regular painful uterine contractions that bring about demonstrable effacement and dilatation of the cervix and ends with delivery of the newborn and expulsion of the placenta [1]. Many years ago, the progress of labor needed to be plotted on a standard graph to allowearly detection of any deviation from normal range [1].

Friedman unfolded the idea of the three practical labor divisions to describe the physiological intentions of each division [2]. First, during the *preparatory division,* although the cervix experience limited dilation, its connective tissue constituent change dramatically (effacement take place). Sedation and analgesiaare capable of halting this labor division. The *dilatational division,* during which the cervical dilatation progresses at its most rapid rate, it is unaltered by sedation. Last, the *pelvic division* begins with the deceleration phase of cervical dilatation. The classic labor mechanisms that involve the cardinal fetal movements of the cephalic presentation occur predominantly during this pelvic division. Actually, in real practice the beginningof the pelvic division is rarely definitely distinguishable [1, 2]. The pattern of cervical dilatation during both the preparatory and dilatational divisions of normal labor is a sigmoid curve. Two phases of cervical dilatation have been clarified. The *latent phase* represents the preparatory division, and the *active phase* is equivalent to the dilatational division. Friedman has subdivided the active phase into the *acceleration phase,* the *phase of maximum slope,* and the *deceleration phase* [2].

The progress of labor in nulliparas has specific importance because the curves all disclose a quick change in the slope of cervical dilatation rates between 3 and 5 cm. *So, cervical dilatation of 3 to 5 cm or more, accompanied by uterine contractions, can be considered to dependably state the threshold for active labor.* Similarly, these curves represent useful guides for labor management [1]. According to Friedman (1955), the active-phase of labor mean duration in nulliparas was 4.9 hours, but the standard deviation of 3.4 hours is large, so, the active phase was reported to have a statistical maximum of 11.7 hours [3].

Thus, cervical dilatation rate ranged from a minimum of 1.2 up to 6.8 cm per hour. Friedman (1972) also discovered that multiparas progress rather more rapidly in active-phase of labor, with a *minimum* normal rate of 1.5 cm per hour. His analysis of active-phase of labor simultaneously gives description of rates of cervical dilation and fetal descent. Descent starts in the later stage of active dilatation, beginning at seven to height cm in nulliparas and becoming faster after eight cm [1, 4].

Protraction is defined as a *slow rate* of cervical dilatation or descent, which for nulliparas was < 1.2 cm dilatation per hour or < 1 cm descent /hr. For multiparas, protraction was defined as < 1.5 cm dilatation /hr. or < 2 cm descent /hr. Friedman also explained arrest as a *complete cessation* of dilatation and/ or descent. *Arrest of dilatation* was described as 2 hours with no change in cervical dilatation, and *arrest of descent* as 1 hour or more without change in fetal descent [1].

The prognosis for both protraction and arrest disorders differs considerably. Friedman found out that approximately 30 percent of women with protraction disorders had cephalopelvic disproportion (CPD). This is compared with a 45-percent CPD rate for women in whom an arrest disorder has developed [1, 4]. Partogram is a graphic record that enables a quick visualization of labor progress and to register maternal and fetal wellbeing [5].

The Partogram as recommended by WHO, contains three main labor components: fetal conditions, maternal conditions and the progress of labor. Fetal conditions take into consideration heart rate of the fetus amniotic fluid condition (clear, bloody or meconium stained) and moulding of the fetal head. Maternal conditions consider vital signs, urine, bleeding and body temperature. The progress of labor relates to the dilation of cervix, descend of the presenting part, and conditions of uterine contractions (frequency, intensity and duration) [5, 6]. it also shows records of the volume, type of intravenous infusions (including oxytocin drips) and any medications given intrapartum [5-7]

The World Health Organization (WHO) recommends partograms with a 4-hour action line from alert line, denoting the timing of intervention for prolonged labor; others recommend earlier intervention to allow for referral [8, 9]. Appropriate use of a partogram requires adequate number of skilled health workers with a positive attitude towards its use especially midwives at various levels of health care facilities and actual availability of the partogram tools at all times [9, 10]. During the 1970's, research reaffirmed the effectiveness of the partogram in reducing long labors, caesarian section rates and perinatal death during deliveries [5].

Cesarean section (CS) is a surgical intervention which is being used in emergencies to save the lives of mother and child when natural delivery is impossible or is dangerous for mother or/and child [11, 12]. The percentage of cesarean section to the total births in a certain period of time is judged as an important measure of prenatal care. A rate below five percent indicates that remarkable proportion of women have substandard access to pregnancy-related surgeries, while, the rates above 15 percent imply that cesarean section is being performed for reasons apart from its essential purpose which is rescuing lives [13]. In recent years, the rate of CS has increased around the world, both in developed and developing countries [14]. This increase is not likely due to an extreme change in obstetrical risk but rather an expansion of the range of the indications of CS [15]. In most countries, and precisely in the developing countries, it has been rising constantly and has gone beyond the WHO recommendations, without being accompanied by a decrease in maternal mortality or morbidity rates [16, 17]. The World Health Organization (WHO) has proposed that the rate of C-section deliveries should not surpass 15% of the rate

of all deliveries [18]. According to World Health Organization, Brazil had the highest rate of cesarean section (45.9%) and Chad had the lowest rate (4%) in 2008 [13].

Patients and method
Introduction

This is a cross sectional observational study conducted at AL-ElWIYAH maternity teaching hospital from the 1st of May 2017 to the 30th of April 2018. Two hundred pregnant women with previous one CS for a non -recurring cause {placenta previa, malpresentation (breech, transverse) lies fetal distress} whounderwent a trial of vaginal birth after CS were included in the study.

Inclusion criteria

1. singleton pregnancy
2. GA ≥ 37weeks
3. vertex presentation
4. history of previous one lower uterine segment CS for a non-recurring cause
5. adequate pelvis
6. All patients are in active phase of labor.

Exclusion criteria

1. previous 2 CS, previous classical CS, previous T shaped incision
2. previous myomectomy
3. recurring cause of CS
4. poor integrity of previous CS (documented by US) [19].
5. short interpregnancy interval (less than One year)
6. Placenta previa

Counselling, Consent and Ethical consideration

All the patients included in the study were informed about the advantages and disadvantages of the trial of labor after cesarean section and a repeat cesarean section whether it was emergency or elective, and a consent to participate in a trial of laborafter cesarean section was obtained from all patients.
The conduction of This study was approved by both the committee of Arabicboard of Obstetrics and Gynaecology and the administration of AL-ELWIYAH maternity teaching hospital.

History

A thorough medical, surgical and obstetrical history was obtained from all patients in the study (obstetric history included the indication, place and time of the previousCS).

Examination

General and systemic examination including general appearance, blood pressure pulse rate and cardiovascular examination. Abdominal examination included fundal height, fetal lie, presentation, engagement of the presenting part, fetal heart rate, polyhydramnios, oligohydramnios, rough estimation of fetal weight, uterine contractions and scar tenderness. Speculum examination (when indicated) to determine presence or absence of leaking liquor and to note its color. PV (per

vaginum) examination to assess cervical length, effacement, position, dilatation, application of the presenting part to the cervix, presence or absence of amniotic membrane, caput and moulding. PV examination was done on admission and repeated every two hours (hospital protocol) or earlier according to labor progress.

Monitoring
The fetal, maternal wellbeing and progress of labor were plotted on partograph for monitoring:

- Fetal wellbeing was assessed by continuously monitoring the fetal heart using CTG (cardiotocography), moulding and color of liquor
- Maternal wellbeing was assessed by blood pressure, pulse rate, temperature and urine output.
- Progress of labor was assessed by cervical dilatation, descent of the presenting part (in relation to ischial spine) and uterine contractions which were estimated by abdominal palpation for duration, intensity and frequency and reassessed every half an hour.

For progress of labor area before the alert line was named zone (A) 2 hours after alert line was named zone (B) 2 hours earlier to the action line was named zone (C) the area after the action line was named zone (D). The zone division was to determine at which zone vaginal delivery, emergency repeat cesarean section or ruptured uterus is more likely to take place. For acceleration of labor, oxytocin was not used in our study only ARM was.

Signs of uterine rupture or scar dehiscence was constantly checked for (fetal bradycardia, maternal tachycardia, fresh vaginal bleeding other than the show, tender scar and blood in urine). Patient is continuously monitored until vaginal delivery take place or the trialis abandoned and a repeat cesarean section is done for failure to progress, fetal distress, signs of dehiscence or rupture

Statistical analysis
The collected data was subjected to statistical analysis using statistical package for social science (SPSS version 20).Results

Results

This chapter introduces the results of calculating the entire number of term patients with previous one cesarean section who were admitted to AL-ELWIYAH maternity teaching hospital from the 1st of May 2017 to the 30th of April 2018 and ended by giving birth regardless the mode of delivery.
We studied the partograph of (200) term pregnancy patients with previous one cesarean section for a non-recurring cause who were already in active phase of labor, (170) of them delivered vaginally (success rate was 85%) and only (30) had an emergency repeat cesarean section (failure rate was 15%).

One Year Admission of patients with previous one cesarean section:
From the 1st of May 2017 to the 30th of April 2018 the total admission ofprevious one CS in labor was (1414) patients, as illustrated in Table (1):

- (713) of those were given a trial of vaginal birth after cesarean section(644) had successful vaginal delivery and only (69) ended by an emergency repeat

cesarean section with a failure rate of 9.6%

- (701) patients needed an emergency repeat CS for various causes (mal presentation, postdate with un favorable cervix, poor integrity ofthe previous scar).

Table (1) Total previous scar admission from 1st of May 2017 to 30th of April 2018

	TOLACS	Successfultrial	Failed trial	Immediate CS without TOLACS
May 2017	39	38	1	43
June 2017	49	45	4	48
July 2017	69	63	6	62
August 2017	62	58	4	59
September 2017	71	62	9	80
October 2017	53	47	6	73
November 2017	88	76	12	55
December 2017	72	64	8	66
Jan 2018	53	49	4	61
Feb 2018	59	51	8	49
March 2018	53	48	5	67
April 2018	45	43	2	38
Sum A = 713 + 701 = 1414	B = 713 (B/A) % = 50.4 %	C = 644 (C/B) % = 90.32 %	D = 69 (D/B) % = 9.62 %	E = 701 (E/A) % = 49.6 %

Maternal Age

Maximum age of patients enrolled in the study was (42) years and minimumage was (15) years, the mean age of participants was (24.87) years, as illustrated in Table (2). No statistically associated significance between maternal age and the success ofTOLACS (p value is 0.603) (p value is significant if <0.05)

Table (2) Maternal Age Group in Relation to TOLACS

Age Group	Total Number = 200	Successful VD = 170		Emergency repeat CS = 30		P Value
		Number	%	Number	%	
15-20	27	22	81.481	5	18.518	0.60387
21-25	56	45	80.357	11	19.642	
26-30	59	54	91.525	5	8.474	
31-35	42	35	83.333	7	16.666	
36-40	14	12	85.714	2	14.285	
More than 40	2	2	100	0	0	

Previous VD

Number of patients who had no previous vaginal delivery before or after the cesarean section (P1CS) was (87), and multiparous with previous one CS were (113)

patients, success rate was higher for the latter group and highest for multiparous patients who had a previously successful TOLACS as illustrated in Table (3).

Table (3) Success rate of TOLACS in relation to presence of previous vaginal birth

		Total Number = 200	SuccessfulVD = 170		Emergency Repeat CS = 30		P Value
			Number	%	Number	%	
P1 CS No previousVD		87	68	78.16	19	21.83	0.017467
Multiparous with previousone CS	Total	113	102	90.26	11	9.73	
	No VD after CS	48	41	85.41	7	14.58	
	VD after CS	65	61	93.84	4	6.15	

There was significant association between result of TOLACS and presence of previousvaginal birth. P value = 0.017467 (P value is significant when < 0.05).

Partogram Zones

Table (4) gives the successful and failed vaginal delivery trials in the fourzones (A, B, C and D).

Table (4) Success of TOLACS in Relation to Partogram Zones.

Zone	Total Number	Successful VD	Success Rate	Failed TOLAC	Failure Rate	Positive Predictive Value	Negative Predictive Value	P Value
A	155	153	90 %	2	6.6 %	98.7 %	1.29 %	< 0.00001
B	20	12	7 %	8	26.6 %	60 %	40 %	
C	7	3	1.76 %	4	13.3 %	42.85 %	57.14 %	
D	18	2	1.17 %	16	53.3 %	11.11 %	88.8 %	
Sum	200	170	100 %	30	100 %	-	-	

Majority of successful vaginal delivery was in zone A (153) patients (90%), as illustrated in Figures (1), and the majority of emergency repeat cesarean section was in zone D (16) patients (53.3%), as illustrated in Figures (2). Zones had significant association with the delivery mode (p value is < 0.00001) (p value is significant when < 0.01).

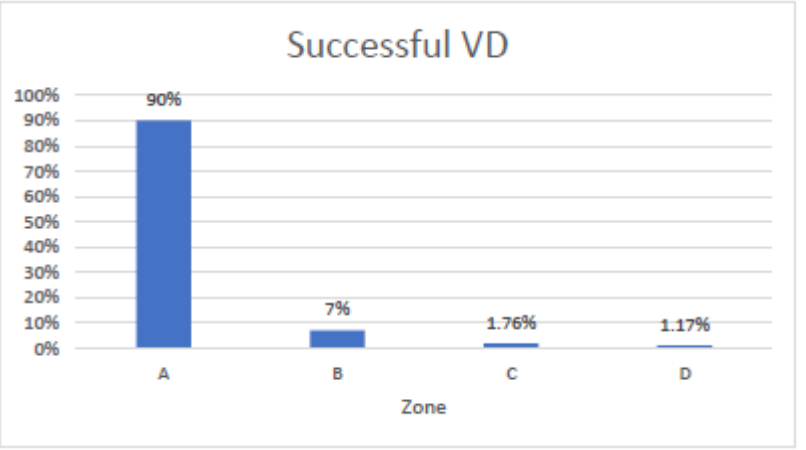

Figure (1) Success Rate of TOLACS in Relation to Partogram Zones

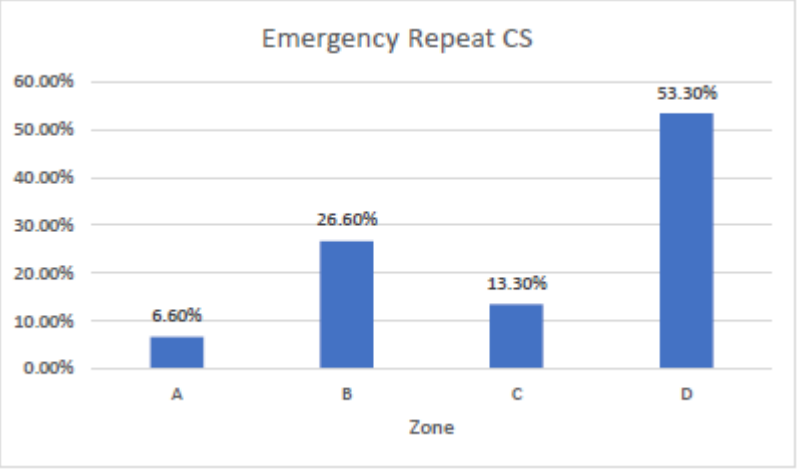

Figure (2) Rate of failed TOLACS in Relation to Partogram Zones

Interpregnancy Interval

Table (5) gives the Interpregnancy interval for patients participating in the study. Interpregnancy Interval was not found to have a significant association with the results of the trial of vaginal birth after cesarean section (p value is o.729) (p value is significant when < 0.05), as illustrated in Figure (3).

Table (5) Interpregnancy interval in relation to results of TOLACS

	Inter Pregnancy Interval (in years)	No. of Cases given a Trial	SuccessfulVD		Emergency RepeatedCS		P Value
			Number	%	Number	%	
1	1 - 1.9	29	22	75.86	7	24.13	
2	2 - 2.9	37	30	81.08	7	18.91	
3	3 - 3.9	36	31	86.11	5	13.88	

4	4 - 4.9	22	19	86.36	3	13.63	0.72963
5	5 - 5.9	20	17	85	3	15	
6	6 - 6.9	10	9	90	1	10	
7	7 - 7.9	15	13	86.66	2	13.33	
8	≥ 8	31	29	93.54	2	6.45	

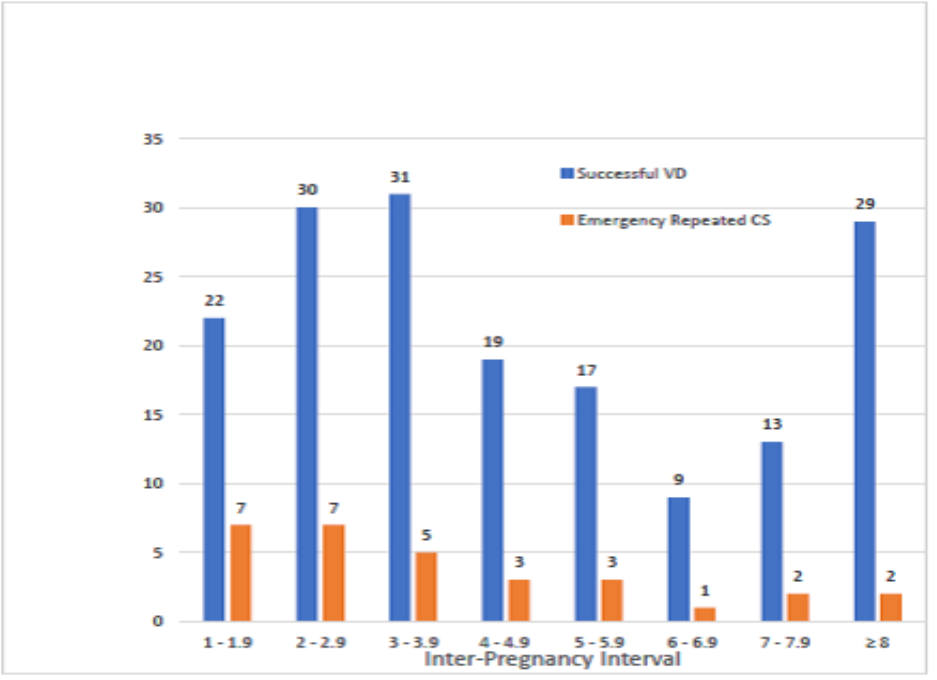

Figure (3) Interpregnancy interval in relation to results of TOLACS

Baby Weight

The association of baby weight with the outcome of the trial. The majority of babies were in in weight group (2.5-3) kg and (3-3.5) kg, success rate of TOLACS was the highest for weight group (2.5-3) kg and it decreased gradually for relatively bigger babies. no sufficient data for babies between (4.1-5) kg, but it was noted that success of the trial decrease with increased baby weight, asillustrated in Table (6) and Figure (4).

Table (6) Baby Weight in Relation to Result of TOLACS

	Baby WeightKg	Total Number	Successful VD		Emergency Repeat CS		P Value
			Number	%	Number	%	
1	< 2.5	0	0	0	0	0	0.033
2	2.5 – 3	90	81	90	9	10	
3	3.1 – 3.5	70	61	87.14	9	12.85	
4	3.6 – 4	36	26	72.22	10	27.77	
5	4.1 – 4.5	2	1	50	1	50	
6	4.6 – 5	2	1	50	1	50	

Significant association was discovered between baby weight and results of TOLACS.(P value is significant when < 0.05)

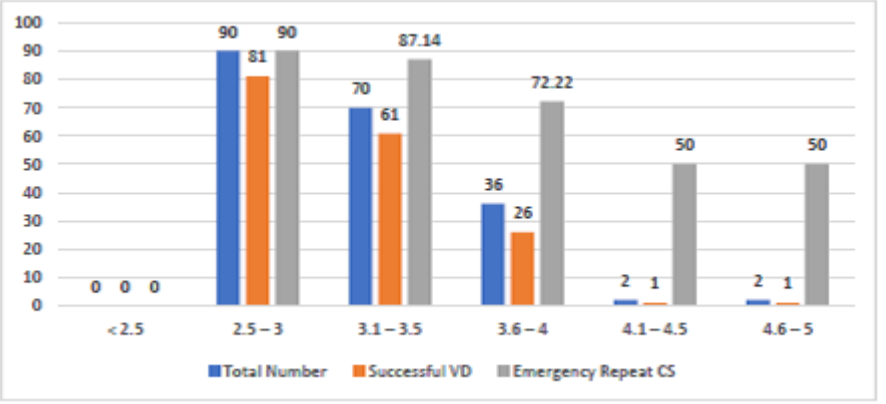

Figure (4) Baby Weight in Relation to Result of TOLACS

Cause of previous CS

A substantial number of patients are having CS for a non-scientifically indicated cause, more than (50) cases included in our study the indication of their previous scar was patient wish. There was no Significant association between Fate of the Trial in Relation to the indication of the previous CS (p value is 0.455), as shown in Table (7) and Figure (5).

Table (7) Fate of the Trial in Relation to the Previous CS Cause

	Cause of Previous CS	Total No.	Successful VD	Emergency CS	P value
2	Malpresentation Breech	32	26	6	0.455
3	FD	33	26	7	
4	Post Date	20	17	3	
5	FTP	20	17	3	
6	Malpresentation Transverse	9	7	2	
7	PET	7	7	0	
8	APH	5	5	0	
9	Twin Pregnancy	6	6	0	
10	HSV	4	4	0	
11	Congenital Anomaly	3	3	0	
12	CPD	5	2	3	
13	Cord Prolapse	2	2	0	
14	2nd Stage Arrest	1	1	0	
15	Trauma-Bullet Injury	1	1	0	
16	Placenta Previa	1	1	0	

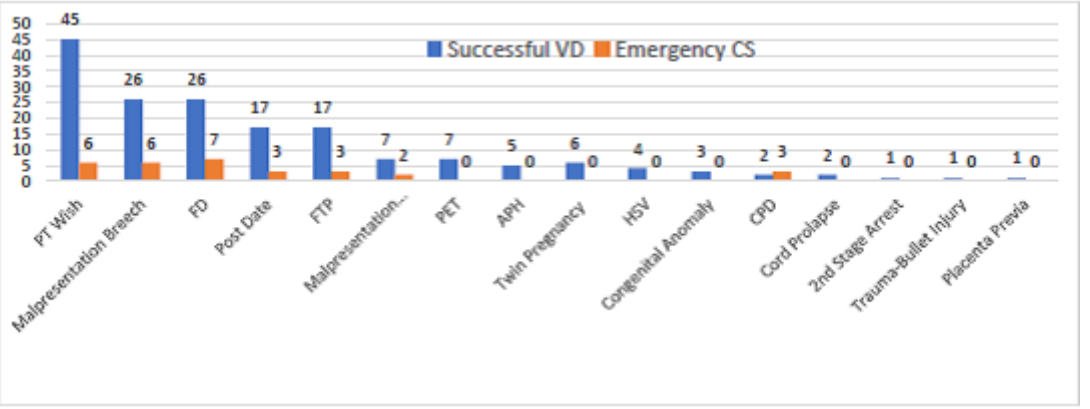

Figure (5) Fate of the Trial in Relation to the Previous CS Cause

Discussion

It is generally accepted that VD is associated with lower maternal morbidity and mortality when compared to cesarean section. The morbidity associated with a successful vaginal birth is about one-fifth that of an elective cesarean. Perinatal riskis significantly more after a failed trial of labor compared to elective repeated cesarean section without labor trial. Failed trials of labor, with the subsequent cesarean section, involve almost twice the morbidity of the elective cesarean section [20,21].

From the total admission of (1414) patients in the year starting from 1st of May 2017 to 30th of April 2018 trial of vaginal birth after cesarean section was given to (713) patients (50.4%), the remaining (701) patients (49.6%) had an emergency repeat cesarean section with no labor trial. Of those who had a trial of vaginal birth (644) had successful vaginal delivery with a success rate of more than (90.32%). In this study the use of partogram in the studied group had success rate of (85%).thisis in consistent with a studies conducted by Gyamfi et al and Bangal VB et al [23, 24].

At Al-ElWIYAH maternity teaching hospital obstetricians have high index of suspicion regarding which patient is qualified for a trial of vaginal birth and which is not a suitable candidate for it. since patients with high risk of failure were not given a trial, another reason contributing to the high success rate was a non- scientifically indicated previous cesarean section, (51) cases included in the study had a previous cesarean section because they wished so. Only (6) of those had an emergency repeat cesarean section.

For a longtime the old status “once a cesarean section always a cesarean section “shaped the obstetric practice [25, 26]. But as time went on the procedure was modified by introducing lower uterine segment cesarean section, continuous monitoring using a cardiotocograph, Montevideo for intrauterine pressure monitoring, partograph, all these facilities made obstetricians bolder to tryvaginal birth after cesarean section.

The total number of patients with previous one cesarean section and no vaginal delivery was (87) cases (68) of them had a successful vaginal delivery with a success rate of (78%). Multiparous patients with previous one CS included in our study were (113) and (102) of them had a successful vaginal delivery so success rate was (90.26%). So, in our study patients with previous successful vaginal delivery has higher success rate when compared with patients with no previous normal deliveries and these results are the same as those found in the following resources [24, 27,28].

It was also discovered that success rate for multiparous with P1CS and previously successful VBAC is higher than multiparous with no previously successful VBAC, this result is similar to that of the Ref. [29]. The majority of cases were in the age group (31-35) years with (42) cases included, (35) of those had a successful vaginal delivery witha (83.33%) success rate. Success rate in different age groups varied from (100%) in age group (40> years). {insignificant result because of insufficient data in this age group} to (81.4%) in agegroup (15-20). The incidence in our study did not match Srinivas S.K. et al results [30] which showed an increasing frequency of failed TOLACS and increasing rate of CS with increasing age.

In our study there was no statistically associated significance between age group and TOLAC (p value equals 0.60387 and it is significant if less than 0.05). Difference in success rate in regard to age group may be attributed chance only. Baby weight in the majority of cases in our study was in two weight ranges (2.5-3) kg. and (3.1-3.5) kg. The group (2.5-3) kg included (90) patients of them (81) cases had vaginal deliveryat a success rate of (90%).

In the weight range from (3.1-3.5) kg number of patients in the study were (70) and (61) of them had successful vaginal delivery with a success rate of (87.14%). Table (3-6) figure (3-4). There were no sufficient data for patients with big babies (only 4 cases with baby weight > 4 kg). Since patients with big baby and previous one cesarean section are rarely given a trial of vaginal delivery in Al-Elwiyah maternity teaching hospital (in our study big baby was estimated mainly by abdominal examination and rarely by US reports when available). There was a statistical significance between baby weight and the success of TOLAC (p value equals 0.033, the result is significant at p value less than 0.05). Our study results contradicted the results of Ilesanmi AO,Fakunle et al [31] which stated no association between baby weight and the result of TOLACS, meanwhile Bangal VB et al [64] pointed that success rate decrease when birth weight is more than (3) kg.

All the Patients included in our study were already in active phase of labor. for trials which ended by successful vaginal delivery the majority gave birth in zone(A); (153) patients making (90%) of successful vaginal delivery cases. And the majority of cases which ended in emergency repeat cesarean section were in zone (D); (16) cases out of the (30) failed trials making about (53.3%) of the failed trial cases. Number of cases delivered before crossing the alert line regardless the mode of delivery was (155) cases (77% of cases included in the study) only two cases had emergency repeat cesarean section.

While deliveries which took place in zone (D) were only (18) cases (9% of the casesof the study) only two of them ended by vaginal delivery and the remaining (16) ended by emergency repeat cesarean section. Thus, the likelihood of vaginal delivery is greatest if labor duration was short and did not cross the alert line. There was statistical significance between the partogram zones and the success of TOLACS (p value < 0.00001 and p value is significant when less than 0.01). Sharma R.K.et al [32] pointed in their study that (70%) of all vaginal deliveries took place before the alert line (zone (A)) and (20%) between the alert line and action line (zone (B+C)) while only (10%) occurred after the action line (in zone (D)).

In our study, only artificial rupture of membranes was used for acceleration of labor, oxytocin was not because of increased risk of rupture uterus when misused. This synthetic hormone was included in the list of the high alert medications of the institute for safe medication practices (ISMP), it is a non- profit organization that evaluate the safety of medication available all over the world, this institute stated that oxytocin could result in further risks of damages when misused [33]. Use of oxytocin must be registered in the partogram as stated by the WHO [10]. The risk of uterine rupture is at least two folds when labor in patients with previous one CS is induced using oxytocin or prostaglandin compared to those when no drugsare used [34].

The alert line simply indicates that a better clinical observation and reassessment are necessary [6]. So, reaching the alert line provide a good indication for requirementof reassessment and perhaps medical or surgical intervention. In our study (93.2%) of cases which ended in cesarean section crossed the alert line. Guleria et al [35] quote this figure to be (87.5%) and other studies [36,37,38] quotethis to be as high as (90%) to (100%).

In our study, the commonest cause of the previous cesarean section was patient wish, while in other studies, they found that the principal indications (85%) for caesarean delivery were the difficulties of labor, fetal distress, breech presentation and previous caesarean delivery [39]. WHO found that factors of the healthcare system have been ignored as potentially important determinants of C-section utilization in favor of the impact of women's choices and doctors' preferences [40]. A study from Egypt concluded that obstetricians' preference of caesarean delivery over vaginal was influenced by feelings of insecurity about performing problematic vaginal deliveries, fear of legal liability, nonorganized practice and higher revenue from CS births compared with uncomplicated vaginal births [41].

Our study showed no significant association between the previous cause of cesarean section and the success rate of vaginal birth after cesarean section (p valueis 0.45568, p value is significant when less than 0.05). In this study success rate increased with the increase in interpregnancy interval, patients with interpregnancy interval of 8 years and more had the highest success rate (31cases 29 of them had successful vaginal delivery) success rate is 93.5% while patients with interpregnancy interval less than 3 years success rate was 78.78% (66 patients 52 of them had successful TOLACS).

There was no statistically associated significance between interpregnancy interval and success of TOLACS (p value is 0.72963) this contradicts the results of

Archana Maurya et al. p value <0.001 [42] and Doshi et al p value <0.01 [43]. There was only one case of maternal morbidity: a patient had one previous cesarean section for postdate with no previous vaginal deliveries, interpregnancy interval was one year, gave birth in zone (A) to alive baby weigh (3,750) kg. patient suffered from postpartum hemorrhage US was done, there was a (10*8) cm hematoma anterior to the scar site, explorative laparotomy was done the previous scar was found to be opened by 4 cm at the left scar angle with active arterial bleeding at the site. Suturing was done hemostasis was secured. No maternal mortality took place in our study.

Conclusions

Trial of labor after cesarean section is safe and success rate is high when cases are properly selected and adequate fetal and maternal monitoring are implemented. The baby weight had significant association with the outcome of the TOLACS, the lower the baby weight the higher the success rate. The partogram is applicable in the follow up of TOLACS, detecting any deviation from normal that may develop as labor progresses, assist in identifying prolonged labor and deciding when to intervene.

Recommendations for Future Works

The accuracy of our study was limited by a relatively small sample size. SO, a study including a larger sample size is recommended. A similar analysis of labor progress plotted on partogram should be obtained from other centers to dictate widely accepted guidelines which may reduce the uncertainty and hesitancy associated with the inability to predict the possibility of uterine scar rupture during active labor, it will also help decision making process regarding when to abandon the trial in women with a prolonged active phase.

References

[1] F. Gary Cunningham et al., William obstetrics 24 th edition, McGraw-Hill Education, 2014.
[2] Friedman EA: Labor: Clinical Evaluation and Management, 2nd ed. New York, Appleton-Century-Crofts, 1978
[3] Pitkin RM. Primigravid labor: a graphicostatistical analysis. Obstetrics & Gynecology. 2003 Feb 1;101(2):216.
[4] Friedman EA. An objective approach to the diagnosis and management of abnormal labor. Bulletin of the New York Academy of Medicine. 1972 Jul;48(6):842.
[5] Groeschel N, Glover P. The partograph. Used daily but rarely questioned. Australian Journal of Midwifery. 2001 Sep 1;14(3):22-7.
[6] Yisma E, Dessalegn B, Astatkie A, Fesseha N. Completion of the modified World Health Organization (WHO) partograph during labour in public health institutions of Addis Ababa, Ethiopia. Reproductive health. 2013 Dec;10(1):23.
[7] Dwivedi AN, editor. Handbook of research on information technology management and clinical data administration in healthcare. IGI Global; 2009 May31.

[8] Starrs A. Improve access to good quality maternal health services. The safe motherhood action agenda: Priorities for the next decade. 1997 Oct:29-50.
[9] Mercer SW, Sevar K, Sadutshan TD. Using clinical audit to improve the quality of obstetric care at the Tibetan Delek Hospital in North India: a longitudinal study. Reproductive health. 2006 Dec;3(1):4.
[10] Fatusi AO, Makinde ON, Adeyemi AB, Orji EO, Onwudiegwu U. Evaluation of health workers' training in use of the partogram. International Journal of Gynecology & Obstetrics. 2008 Jan 1;100(1):41-4.
[11] Helal AS, Abdel-Hady ES, Refaie E, Warda O, Goda H, Sherief LS. Rising rates of caesarean delivery at Mansoura University hospital: a reason for concern. Gynecol Obstet. 2013;3(146):2161-0932
[12] Zeitlin J, Mohangoo A, Cuttini M. The European Perinatal Health Report: comparing the health and care of pregnant women and newborn babies in Europe.Journal of epidemiology and community health. 2009;63(9):681-2.
[13] Gibbons L, Belizán JM, Lauer JA, Betrán AP, Merialdi M, Althabe F. The global numbers and costs of additionally needed and unnecessary caesarean sections performed per year: overuse as a barrier to universal coverage. World health report. 2010;30:1-31.
[14] Zhao Y, Chen S. Psychosocial factors for women requesting cesarean section. International Journal of Clinical Medicine. 2013 Sep 4;4(09):395.
[15] Nakamura-Pereira M, do Carmo Leal M, Esteves-Pereira AP, Domingues RM, Torres JA, Dias MA, Moreira ME. Use of Robson classification to assess cesarean section rate in Brazil: the role of source of payment for childbirth. Reproductive health. 2016 Oct;13(3):128.
[16] Villar J, Valladares E, Wojdyla D, Zavaleta N, Carroli G, Velazco A, Shah A, Campodónico L, Bataglia V, Faundes A, Langer A. Caesarean delivery rates and pregnancy outcomes: the 2005 WHO global survey on maternal and perinatal health in Latin America. The Lancet. 2006 Jun 9;367(9525):1819-29.
[17] Ye J, Betrán AP, Guerrero Vela M, Souza JP, Zhang J. Searching for the optimal rate of medically necessary cesarean delivery. Birth. 2014 Sep;41(3):237-44.
[18] Dosa L. Caesarean section delivery, an increasingly popular option. Bulletin of the World Health Organization. 2001;79:1173-.
[19] Huang WH, Nakashima DK, Rumney PJ, Keegan Jr KA, Chan K. Interdelivery interval and the success of vaginal birth after cesarean delivery. Obstetrics & Gynecology. 2002 Jan 1;99(1):41-4.
[20] Goodall PT, Ahn JT, Chapa JB, Hibbard JU. Obesity as a risk factor for failed trial of labor in patients with previous cesarean delivery. American journal of obstetrics and gynecology. 2005 May 1;192(5):1423-6.
[21] Bangal VB, Giri PA, Shinde KK, Gavhane SP. Vaginal birth after cesarean section. North American journal of medical sciences. 2013 Feb;5(2):140.
[22] Gyamfi C, Juhasz G, Gyamfi P, Stone JL. Increased success of trial of labor after previous vaginal birth after cesarean. Obstetrics & Gynecology. 2004 Oct 1;104(4):715-9.
[23] Foster S. " Conservatism in Obstetrics"(1916), by Edwin B. Cragin. Embryo Project Encyclopedia. 2017 Apr 11
[24] Royal College of Obstetricians & Gynaecologists. Birth after previous caesarean birth. Green-top guideline. 2007(45).
[25] Landon MB, Hauth JC, Leveno KJ, Spong CY, Leindecker S, Varner MW,

Moawad AH, Caritis SN, Harper M, Wapner RJ, Sorokin Y. Maternal and perinatal outcomes associated with a trial of labor after prior cesarean delivery.New England Journal of Medicine. 2004 Dec 16;351(25):2581-9.
[26] Hendler I, Bujold E. Effect of prior vaginal delivery or prior vaginal birth after cesarean delivery on obstetric outcomes in women undergoing trial of labor. Obstetrics & Gynecology. 2004 Aug 1;104(2):273-7.
[27] Gyamfi C, Juhasz G, Gyamfi P, Stone JL. Increased success of trial of labor after previous vaginal birth after cesarean. Obstetrics & Gynecology. 2004 Oct 1;104(4):715-9.
[28] Srinivas SK, Stamilio DM, Sammel MD, Stevens EJ, Peipert JF, Odibo AO, Macones GA. Vaginal birth after caesarean delivery: does maternal age affect safety and success?. Paediatric and perinatal epidemiology. 2007 Mar;21(2):114-20.
[29] Ilesanmi AO, Fakunle B, Nkwocha GC, Umejioke C, Okunlola MA. Vaginal birth after one caesarean section in a low resource setting–Obio Cottage Hospital, Port Harcourt.2014
[30] Sharma R.K.,Sharma R.C., Sabrina Mhapankar, Archana Chterjee, Sonica Gaur .role of partogram in previous cesarean section. International journal of medical and clinical research; 2011.2(2):78-83
[31] Clark SL, Miller DD, Belfort MA, Dildy GA, Frye DK, Meyers JA. Neonatal and maternal outcomes associated with elective term delivery. American journal of obstetrics and gynecology. 2009 Feb 1;200(2):156-e1.
[32] Wallstrom T, Bjorklund J, Frykman J, Jarnbert-Pettersson H, Akerud H, Darj E, Gemzell-Danielsson K, Wiberg-Itzel E. Induction of labor after one previous Cesarean section in women with an unfavorable cervix: A retrospective cohort study. PloS one. 2018 Jul 2;13(7):e0200024.
[33] Guleria K, Dhall GI, Dhall K. Pattern of cervical dilatation in lower segment cesarean section patients. *JIMA 1997;95:131-4*.
[34] Tripathi Jagruti B, Doshi Haresh U. Pattern of cervical dilatation in women with a previous cesarean section.the journal of obstetrics and gynecology of India.2005 April;55(2):125-127.
[35] Agarwal A, Gupta HP, Anand S et al. Vaginal birth after cesarean- A partographic analysis. *J Obstet Gynecol India 2002;52:85-9*
[36] Gupta P, Jahan I, Jograjiya GR. Is vaginal delivery safe after previous lower segment caesarean section in developing country?. Nigerian medical journal: journal of the Nigeria Medical Association. 2014 May;55(3):260.
[37] Ajeet S, Jaydeep N, Nandkishore K, Nisha R. Women's knowledge, perceptions, and potential demand towards caesarean section. Natl J CommunityMed. 2011;2(2):244-8.
[38] Yılmaz M, _Isaog˘ lu U¨ and Kadanalı S. Investigation of the Ceasarean Section cases in our clinic between 2002 and 2007. Marmara Medical Journal2009; 22: 104–110.
[39] Üzel H, Kelekçi S, Devecioğlu C, Güneş A, Yolbaş İ, Şen V. Neonatalasphyxia: A study of 210 cases. Journal of Clinical & Experimental Investigations/Klinik ve Deneysel Arastirmalar Dergisi. 2012 Jun 1;3(2).
[40] Lauer JA, Betrán AP, Merialdi M, Wojdyla D. Determinants of caesarean section rates in developed countries: supply, demand and opportunities for control.World health report. 2010;29.
[41] Shaaban MM, Ahmed WS, Khadr Z, El-Sayed HF. Obstetricians' perspective towards cesarean section delivery based on professional level: experience

from Egypt. Archives of gynecology and obstetrics. 2012 Aug 1;286(2):317-23.

[42] Maurya A, Manik A. Original Research Article Study of factors associated with success of vaginal birth after previous one caesarean section. Scholar Journalof applied medical sciences, 2016;4(1C):210-213.

[43] Doshi HU, Jain RK, Vazirani AA. Prognostic factors for successful vaginal birth after cesarean section—Analysis of 162 cases. The Journal of Obstetrics andGynecology of India. 2010 Dec 1;60(6):498-502.

[44] Suryasa, I. W., Rodríguez-Gámez, M., & Koldoris, T. (2022). Post-pandemic health and its sustainability: Educational situation. *International Journal of Health Sciences*, *6*(1), i-v. https://doi.org/10.53730/ijhs.v6n1.5949