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Original Article

Effect of Short Inter-Pregnancy Interval on the Outcome of Vaginal Birth after Cesarean Section

Nafeesa Hiba, Salma Nisar*, Zainab Abbas Mirza, Khansa Qadeer, Sadaf Mumtaz, Munawar Jannat Rana**

Pak Emirates Military Hospital/National University of Medical Sciences (NUMS) Rawalpindi Pakistan, *Combined Military Hospital Medical College, Kharian/National University of Medical Sciences (NUMS) Pakistan, **Combined Military Hospital, Peshawar/National University of Medical Sciences (NUMS) Pakistan

ABSTRACT

Objective: To determine the effect of short inter-pregnancy interval on the outcome of vaginal birth after cesarean section.
Study Design: Comparative cross-sectional study.
Place and Duration of Study: Obstetrics and Gynecology Department, Pak Emirates Military Hospital, Rawalpindi Pakistan, from Jan to Oct 2021.
Methodology: A total of 400 pregnant females were selected for this study. For every consecutive pregnant woman with a previous cesarean section and short inter-pregnancy interval (<18 months) recruited into the study, a suitable control with inter-pregnancy interval ≥18 months were recruited.
Results: Only 107(53.5 %) females with short interpregnancy interval had a successful vaginal birth after cesarean section, whereas 143(71.5 %) females with >18 months' inter-pregnancy interval had a successful VBAC. In patients with a history of vaginal delivery, the success of vaginal birth after the cesarean section was significantly higher than in those without previous vaginal delivery or VBAC (p=0.005). 231 out of 250(92.4%) pregnant females with spontaneous onset of labour had a successful VBAC compared to those who had induction of labour, 19(7.6%) (p=0.005). Patients who needed augmentation during delivery had a higher rate of undergoing a cesarean section than VBAC (p=0.003). However, no significant difference was observed in the spontaneous onset of labour and the need for induction and augmentation of labour for the inter-pregnancy interval.
Conclusion: Our study concluded that with increasing inter-pregnancy interval, the chances of a successful VBAC increase (p=0.001) with fewer reported complications.

Keywords: Cesarean section, Obstetric labor, Repeat cesarean section, Vaginal birth after cesarean.

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INTRODUCTION

Prof. Edwin Bradford Cragin, a renowned American Gynecologist and Obstetrician, once stated, "Once a Caesarean section, always a Caesarean section".[1] Before the 1970s, this phrase had dictated obstetrics practice leading to 40 % of the cesarean sections being done to repeat a cesarean section. In 1981, vaginal birth after the cesarean section was considered a safe option after a lower segment transverse cesarean section.[2] Within the last few decades, Caesarean section rates in many countries have risen almost 10-fold. The current Caesarean section rate of 22% in Pakistan, according to Pakistan Demographic and Health Survey (PDHS) done in 2018, is too high and unsustainable and does not lead to further improvement in perinatal outcomes as compared to outcomes at a Caesarean section rate of 10%–15%, as advised by the World Health Organization.[3] This rising rate is due to many factors, which mainly include too much reliance on electronic fetal monitoring, no use of fetal scalp blood (pH) testing, litigation fears, decreasing expertise in instrumental vaginal deliveries, as well as lifestyle choices of patients influenced by wealth and higher education.[4] Despite the rising trend of the cesarean section rate, many obstetricians, enthusiastically promote vaginal birth after Caesarean section. Moreover, the trial of labour after cesarean section (TOLAC) remains an attractive option for many patients despite knowing the associated risks (0.5-1% rate of uterine rupture) and leads to a successful outcome in the majority of the cases.[5] The decision to undergo a trial of labour (TOLAC) is individual and should be based on careful and thorough counselling. Any patient willing to undergo TOLAC should be counselled and evaluated early in labour and managed in a hospital setting where uterine rupture can be recognized and managed expediently. Uterine rupture, the most devastating complication of TOLAC, can lead to maternal and perinatal morbidity and mortality.[6] Available evidence shows that the complication rates are lowest when the trial of labour after cesarean section (TOLAC) leads to successful vaginal delivery. It is even lower than in women who undergo a planned Caesarean section.

Correspondence: Dr Nafeesa Hiba, Department of Obs & Gynea, Pak Emirates Military Hospital, Rawalpindi, Pakistan
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However, the risks and costs of care rise even further if the attempt fails.[7] Of the multiple factors influencing the success of TOLAC, the short inter-pregnancy interval is one and is defined as the time spent not being pregnant prior to the index pregnancy of ≤18 months.[8]

Short inter-pregnancy interval is associated with many complications like preterm birth, anaemia etc.[9,10] However, limited studies are available to see its impact if the previous mode of delivery was a cesarean section and to gauge the success rate of TOLAC. Therefore, to determine the effect of short inter-pregnancy interval on the success rate of trial of labour, we conducted a study in Pak Emirates Military Hospital to determine whether an inter-pregnancy interval <18 months lead to a reduced rate of successful VBACs after a prior single cesarean section.

METHODOLOGY

This comparative cross-sectional study was conducted at the Obstetrics and Gynecology Department, Pak Emirates Military Hospital, Rawalpindi Pakistan, from January to October 2021. The sample size of 380 was calculated using the OpenEpi sample size calculator (version 3.0), considering the frequency of successful VBAC achievement as 51.4% with an inter-delivery interval of more than 19 months taken from a study conducted by Mohsin *et al.*[11] This sample size was inflated to 400. The sampling technique was non-probability consecutive sampling. For every consecutive pregnant woman with a previous cesarean section and short inter-pregnancy interval (<18months) recruited into the study, a suitable control with inter-pregnancy interval ≥18 months were recrui-ted. The eligible females were counselled regarding the study, and informed consent was taken from each participant.

Inclusion Criteria: All pregnant females with a history of one lower segment (transverse) Caesarean section previously and singleton pregnancy with the cephalic presentation at term (37-42 weeks gestation) with no contraindication to vaginal birth were included in the study.

Exclusion Criteria: We excluded all pregnant females for whom vaginal delivery was contraindicated (>1 prior cesarean section, history classical/T shaped uterine incision or uterine rupture, placenta previa etc.)

The primary outcome was the labour outcome or mode of delivery i.e., cesarean section (unsuccessful trial of labour) or vaginal birth (successful trial of labour). Secondary outcomes were complications, including uterine rupture, post-partum haemorrhage (defined as blood loss ≥1000 ml) and 5-minute Apgar score <7. Data was gathered through direct interviews of the eligible pregnant females upon admission, and the outcomes (vaginal birth/cesarean section) were recorded afterwards. Data collected included the socio-demographic data like; age, gestational age, parity, interpregnancy interval, an indication of previous cesarean section and history of any previous vaginal delivery or VBAC. In addition, the need for induction and augmentation during labour, as well as the mode of delivery, APGAR score of the neonate at 5 minutes of birth and complications (post-partum haemorrhage and uterine rupture) in the current pregnancy, were recorded.

Upon admission, after ruling out all the contrain-dications, all eligible pregnant females in spontaneous or induced labour were monitored. One-to-one care was provided. Vital signs, frequency and severity of uterine contractions were recorded every thirty minutes. Intermittent electronic fetal monitoring was being done. Partogram was plotted. At the time of delivery, a neonatologist's presence was ensured. Maternal outcomes were recorded as either cesarean section or vaginal birth after cesarean section. Complications were reported as post-partum haemorrhage, uterine dehiscence and uterine rupture. The Fetal Apgar score was recorded at 5 minutes.

Statistical Package for Social Sciences (SPSS) version 26.0 was used for the data analysis. Mean and SD were calculated for numerical variables such as age, parity and gestational age. Percentage and frequency were calculated for categorical variables such as the indication of previous cesarean section, history of previous vaginal delivery, augmentation needed during delivery, the onset of labour, any complications during labour etc. The association of inter-pregnancy interval (<18 months vs >18 months) with the parameters mentioned earlier was carried out using the chi-square test. The *p*-value lower than or up to 0.05 was considered as significant.

RESULTS

Out of 400 participants, 250(62.5%) had a vaginal birth after a cesarean section, whereas 150(37.5%) underwent a cesarean section. In addition, only 107 (53.5 %) females with short interpregnancy interval had a successful vaginal birth after cesarean section, whereas 143(71.5 %) females with >18 months inter-pregnancy interval had a successful VBAC.

The baseline characteristics of the pregnant females in both groups have been shown in Table-I. The mean age of the patients was 28.2±5.29 years, ranging from 18 to 40 years. The mean gestational age of patients was 39.1±1.1 weeks. The parity of the study population ranged from 1 to 4. 89(22.4%) patients had a history of vaginal delivery or vaginal birth after cesarean section, while 311(77.8%) had no history of vaginal delivery. 355(88.8%) of the patients had spontaneous onset of labour, and 45(11.3%) had to be induced for labour. In addition, 64(16%) patients required augmentation with oxytocin during labour, whereas 336(84%) required no augmentation during labour.

Table-I: Baseline Characteristics of the Pregnant Females in Both Groups (n=400)

Parameters	<18 Months Inter Pregnancy Interval (n=200)	>18 Months Inter Pregnancy Interval (n=200)
Age (years)	28.39±5.37	28.05±5.21
Gestational age (weeks)	39.22±0.99	39.02±1.30
Parity	1.27±0.53	1.26±0.51

The association of labour onset, need for augmentation, mode of delivery, complications, and APGAR score during delivery in groups based on an inter-pregnancy interval has been shown in Table-II.

Table-II: Association of Labour Onset, APGAR Score And Need Of Augmentation During Delivery in Groups Based On Inter Pregnancy Interval (n=400)

Parameters		<18 Months Inter Pregnancy Interval (n=200)	>18 Months Inter Pregnancy Interval (n=200)	*p*-value
Previous vaginal delivery/VBAC	Yes	46(23.0 %)	43(21.5%)	0.005
	No	154(77.0%)	157(78.5%)	
Onset Of Labour	Spontaneous	175(87.5 %)	180(90.0%)	0.400
	IOL	25(12.5 %)	20(10.0%)	
Need of augmentation	Yes	33(16.5 %)	31(15.5%)	0.750
	No	167(83.5%)	169(84.5%)	
Labour outcome	VBAC	107(53.5%)	143(71.5%)	0.001
	Cesarean Section	93(46.5%)	57(28.2%)	
Complications	Nil	182(91.0%)	193(96.5%)	0.030
	PPH	9(4.5 %)	4(2.0%)	
	Uterine rupture	4(2.0%)	0	
	Dehiscence	5(2.5%)	3(1.5%)	
APGAR score	<7	3(1.5%)	0	0.080
	>7	197(98.5%)	200(100%)	

In patients with a history of vaginal birth, the success of vaginal delivery after the cesarean section was significantly higher than in those without previous vaginal delivery or VBAC. (p=0.005). 231 out of 250 (92.4%) pregnant females with spontaneous onset of labour had more successful VBAC as compared to those who had induction of labour IOL, 19(7.6%) (p= 0.005). Patients who needed augmentation during delivery had a higher rate of ending up in a cesarean section than VBAC (p=0.003). However, no significant difference was observed in the spontaneous onset of labour and the need for induction and the augmentation of labour for the interpregnancy interval.

Of the 400 study population, 375 had no major complications during delivery. However, 13(3.3%) patients had a post-partum haemorrhage, 4(1%) had a uterine rupture and dehiscence (2%) was observed in eight patients. Three babies (0.8%) had an APGAR score of <7. With increasing inter-pregnancy interval, the chances of a successful VBAC increased (p=0.001) with fewer reported complications.

Figure showed the indications of previous cesarean sections in our study population. One hundred twenty-two pregnant females (30.5%) had previous cesarean section due to malpresentation. Thus, it was the most frequent indication of previous cesarean section.

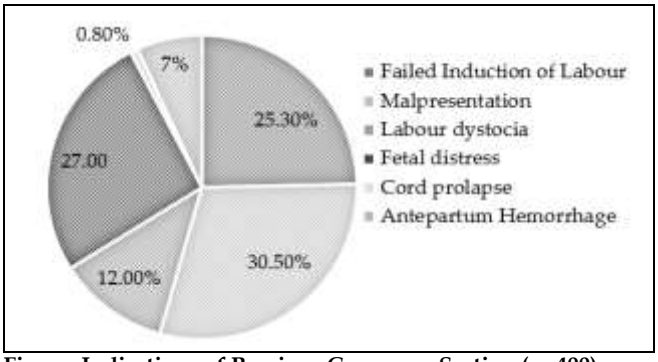

Figure: Indications of Previous Caesarean Section (n=400)

A comparison of various indications of previous Caesarean sections among the two groups was shown in Table-III. One hundred twenty-two pregnant females (61%) had previously undergone cesarean section due to malpresentation followed by fetal distress in 108(54 %), Failed IOL in 101(25.2%), Labour Dystocia in 48(12 %), Antepartum haemorrhage in 18 (4.5%), and Cord Prolapse in 3(0.75%) pregnant females respectively.

DISCUSSION

For a woman with a previous cesarean section, a trial of labour is often her last chance to undergo a

normal vaginal birth. A failed VBAC, on the other hand, is associated with a higher risk of maternal and perinatal morbidity than an elective repeat Caesarean section. Therefore, a more appropriate selection of patients willing for TOLAC is the potential answer to the concerns regarding VBAC.

Table-III: Comparison of Indications of Previous Caesarean Section and Inter-Pregnancy Interval (n=400)

Indications	<18 Months Inter-Pregnancy Interval n=200	>18 Months Inter-Pregnancy Interval n=200	Total n=400	*p*-value
Malpresentation	55(27.5%)	67(33.5%)	122 (61.0%)	0.01
Fetal Distress	46(23.0%)	62(31.0%)	108 (54.0%)	0.02
Failed IOL	53(26.5%)	48(24.0%)	101 (25.2%)	0.02
Labour Dystocia	31(15.5%)	17(8.5%)	48 (12.0%)	0.001
APH	12(6.0%)	6(3.0%)	18 (4.5%)	0.001
Cord Prolapse	3(1.5%)	0	3 (0.75%)	0.001

Our study aimed to determine the effect of short inter-pregnancy interval on the successful trial of labour leading to vaginal birth. Four hundred eligible pregnant females with a prior cesarean section were divided into two groups (200 in each group) based on interpregnancy interval. Only 107(53.5%) females with short inter-pregnancy interval had a successful VBAC, whereas 143(71.5%) females with >18months inter-pregnancy interval had a successful VBAC. These results were supported by a study conducted in Jaipur, India, by Mohsin *et al*.[11] and Stamilio *et al*. in Missouri, USA,[12] however, was contradictory to a study conducted by Rietveld *et al.* in Amsterdam, Netherlands,[13] according to which the inter-delivery interval of <24 months was not associated with the reduced success of vaginal birth after Caesarean section. According to our study, no significant difference was observed in the spontaneous onset of labour and the need for induction and augmentation of labour for the inter-pregnancy interval. The difference in the APGAR score of babies 5 minutes after delivery in both groups was also statistically insignificant. These results were supported by Gupta *et al*.[14] In patients with a history of prior vaginal birth, achieving a VBAC was significantly higher than those with no history of previous vaginal delivery. (p=0.005). Mercer *et al*.[15] in 2019, also noted similar results. A higher number of previous vaginal births is linked to a higher likelihood of VBAC success. 231 out of 250(92.4%) pregnant females with spontaneous onset of labour had a successful VBAC compared to those with induction of labour IOL, i.e., 19(7.6%). 231 out of 250 (92.4%) pregnant females with spontaneous onset of labour had a successful VBAC compared to those with induction of labour IOL, i.e., 19(7.6%) (p=0.005). The findings were corroborated by a study conducted by Al-Shaikh *et al*.[16] who found that when compared to the spontaneous labour group, induced women had a significantly higher rate of cesarean section (36.5% vs 28 %; p= 0.026). Our study found that patients who needed augmentation during delivery had a higher rate of ending up in a cesarean section than VBAC (p=0.003). Another study concluded that achieving a successful VBAC reduced dramatically among women who had augmentation with oxytocin in labour.[17] However, no significant difference was observed in the spontaneous onset of labour and the need for induction and augmentation of labour for an inter-pregnancy interval in our study. A few systemic reviews and meta-analysis,[18-20] done internationally and locally were available on the predictors of a successful VBAC; however, no local studies were available to determine the influence of shorter inter-pregnancy interval on successful vaginal birth prior to cesarean section; thus, we conducted this study on the local population. Our study concluded that with increasing inter-pregnancy interval the chances of a successful VBAC increase (p=0.001) with fewer reported complications.

LIMITATIONS OF STUDY

Understanding the various other maternal and fetal factors influencing VBAC will provide more evidence to assess the probability of a successful vaginal birth in women who have had a previous cesarean section which was not a part of our study.

CONCLUSION

Our study concluded that with increasing inter-pregnancy interval, the chances of a successful VBAC increase with fewer reported adverse effects.

Conflict of Interest: None.

Author's Contribution

Following authors have made substantial contributions to the manuscript as under:

NH & SN: Drafting the manuscript, data interpretation, critical review, approval of the final version to be published.

ZAM & KQ: Study design, data analysis, critical review, drafting the manuscript, critical review, approval of the final version to be published.

SM & MJR: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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