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Long vs Short Inter-Delivery Intervals: Investigating the Relationship Between Birth Interval and VBAC

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ABSTRACT

Vaginal Birth After Cesarean (VBAC) is an alternative method of delivery that provides post-cesarean women with the opportunity to have a normal vaginal delivery and reduce the number of cesarean sections. The American College of Obstetricians and Gynecologists (ACOG) recommends VBAC as an option for women who are at low risk of complications. The success of VBAC is influenced by multiple risk factors, one of the most critical being pre-labor observation and preparation. Among these, inter-delivery intervals (IDI) play a significant role. This research emphasizes the influence of IDI in predicting maternal and fetal outcomes, aiming to evaluate the optimal timing and associated risks. A comprehensive review of the literature was conducted to assess the correlation between IDI and VBAC success rates, focusing on maternal and neonatal outcomes. An optimal IDI for VBAC is 24-59 months, as it correlates with higher success rates and fewer complications. A short IDI (<18-24 months) is associated with an increased risk of complications, including uterine rupture, emergency cesarean delivery, and adverse neonatal outcomes. Conversely, a long IDI (>59 months) is linked to higher maternal complications and lower VBAC success rates. IDI is a major modifiable factor in VBAC planning. Therefore, individualized and personalized assessments for each patient are essential to enhance birth outcomes.

Keywords: VBAC; inter-delivery interval; vaginal birth.

INTRODUCTION

VBAC (Vaginal Birth After Cesarean) is an alternative approach aimed at reducing the number of cesarean sections in women with a history of previous cesarean deliveries. The rising trend in cesarean sections today is often associated with significant skepticism regarding the safety of the VBAC method. Many people still adhere to the belief that "once a cesarean, always a cesarean," although this is not entirely accurate. American College of Obstetricians and Gynecologists (ACOG) recommends women who have low-risk factors to attempt a vaginal birth, even though they have a history of one or two cesarean sections. The rate of success for VBAC depends on its pre-labor preparation which may also help reduce the risks of complication for current and preceding delivery [1].

The inter-delivery interval is one of the most important factors to consider when determining the outcome of a VBAC. Research has suggested that an interpregnancy interval of less than 12 months can significantly increase risks for both maternal and fetal outcomes. A study by Yassin and Ahmed [2], concluded that a short interpregnancy interval may lead to various complications, including preterm birth, low birth weight, and increased maternal morbidity. The objective of this review is to identify and examine the influence of inter-delivery interval on VBAC outcomes, with the aim of enhancing knowledge about this risk factor and contributing to the reduction of cesarean sections in daily practice.

REVIEW CONTENT

1. Physiological Processes of Uterine Healing After Cesarean Delivery

The healing process of the uterus following a cesarean delivery is complex and not yet fully understood. This theory was studied by Debras et al, 2024 and it stated that tissue recovery begins with the initial inflammatory phase, which involves cytokines and growth factors that significantly influence subsequent tissue maturation). The uterus wound healing process includes inflammation, proliferation, and maturation phases.

In which, collagen as the main player in initiating the growth process of granulation tissue. A study from Lofrumento, 2018 concluded that multiple inflammatory factors such as TGF- β, CTGF, bFGF, PDGF, VEGF, and TNF-β are the main keys to developing optimum wound healing. Collagen plays a key role in forming granulation tissue and smooth muscle, aiding the healing process. This process can also be influenced by the method of wound closure from the previous cesarean section.

Type of suturing technique used in previous cesarean sections could lead to a significant impact on the process of uterus wound healing, A study by Qayum et al. (2021) found that double-layer closure of the uterine incision results in greater myometrial thickness compared to single-layer closure [3]. This enhanced thickness contributes to improved wound healing while maintaining similar outcomes regarding complications, such as uterine rupture or dehiscence. Current studies by Basbug et al, 2019 also mentioned that types of sutures such as monofilament could lead to thicker residual myometrium compared to multifilament [4].

2. Classification of IDI

Interdelivery interval could be described as a time when a woman is not pregnant between one live birth or pregnancy loss and the next pregnancy [5]. The inter- delivery interval (IDI) also could be defined as the time between live birth and subsequent conception. The definition of time for a short birth interval is not consistent, Study by Santoso et al, 2018 suggests that a short birth interval is <18 months [6], Whereas a study from Dude, 2018 suggests that 18-60 months is considered optimal IDI time for conception. Interpregnancy interval plays a major modifiable risk factor in determining the success of VBAC in pregnant women. Evaluating these intervals during each pregnancy is crucial for assessing risks and predicting the progression of uterine healing thus affecting the outcome of VBAC [7,8].

3. Correlation Between IDI and VBAC Outcome

3.1 *Short IDI (<18-24 months)*

A short Inter-Delivery Interval is a crucial marking point for determining the visibility of the VBAC procedure in most cases. A shorter inter-pregnancy interval is associated with lower success rates for VBAC [9]. Multiple complications shown in several studies, in most cases short Delivery intervals of less than 24 months are associated with an increasing risk of emergency cesarean section, uterine scar dehiscence, and adverse neonatal outcome [10]. Some studies also suggest in 9040 women, that VBAC is associated with an increased risk of uterine rupture, with a 4.8% increase in IDI at 18 months IDI in order to reduce the risk for uterine rupture [11]. Other research also mentions that a short inter-pregnancy interval following a complicated pregnancy could have a mixed outcome, a short IPI <18 months after cesarean delivery is associated with increasing rates of repeat cesarean and neonatal complication [12]. In some cases such as extremely short inter-delivery intervals <6 months, this case could be associated with higher rates of preterm delivery, uterine rupture, and higher blood transfusion rate (Baig & Malik, 2021).

3.2 *Optimal IDI (24-59 months)*

Some studies mention the optimal interpregnancy interval (IPI) on Post-Cesarean Section women for VBAC. The optimal IPI in all studies is mentioned around 24 months to 59 months, however, the correlation between the IDI and VBAC outcome is still in mixed results. One study mentioned by Maroyi et al, 2021. Suggested that inter Delivery interval >18 months is not sufficient for predicting the outcome of VBAC [13]. Other studies also reported that IPI <24 months is associated with a higher risk of anemia in later pregnancy and incomplete uterine rupture [14]. All of these findings show that even though IDI is a huge thing to consider other variables are also important for calculating the success of VBAC and its associated risks.

3.3 *Long IDI (>59 months)*

A long Interval between deliveries could have a big impact on predicting the success of VBAC. Some studies reported that there is a correlation between longer intervals with the odds of VBAC, with each year after cesarean section the success rate reduced by 11% [8]. Long Inter-Delivery Intervals are also related to higher incidences of pre-eklmpsia, gestational diabetes, and still birth (Mohammed et al,2020; Mahfouz et al, 2018; Qin et al,2017). This condition also caused the pre-term and term low birth weight babies in a study in China [15]

4. Factors Influencing IDI & VBAC Correlation

4.1 *Patient Characteristics*

Some patient characteristics need to be considered for determining the chance of VBAC, since each individual may have risk factors that are related to one another. Several maternal characteristics have been reported from studies that may help influence the success of VBAC such as age, <35 years old, non-obese patient, absence of diabetes, and white race [16,17]. Other studies also mentioned that previous successful spontaneous birth, especially after cesarean section increases the success of VBAC significantly [16,17]. Previous cesarean indications also could contribute to some non-recurring indications, one of which such as breech presentation [16,17].

Other predicting characteristics that may influence the success of VBAC are also onset of spontaneous birth and how favorable the bishop score is [17,18]. On the other hand, Makrosomia and twin gestation are mostly cases that will lead to a reduced chance of VBAC success. Thus, predictive models are needed to aid patients in their decision-making of VBAC [19]. Recent studies also investigate the influencing factors of uterine scars, the measured thickness of scars has been found to be related to the success of VBAC as thicker scars are associated with a higher success rate [20,21]. Some specific studies mentioned that women with scar thickness >3.5 mm significantly had a higher VBAC success rate compared to <3.5 mm [21].

4.2 *Labor Management*

Management of labor for patients of VBAC requires careful risk measurement and specific individual assessment [22]. VBAC patients have a different labor pattern from normal primiparas and multiparas, Oxytocin use for active management of labor could increase the success of VBAC, especially with non-recurrent indications [23]. Compared to primiparas, women who have undergone VBAC tend to have lower intervention for oxytocin and analgesia, they also had a longer 2nd stage of labor but shorter duration of labor compared to primiparas [24]. VBAC patients also have a higher risk of postpartum hemorrhage and episiotomy, although with proper management it will have significant outcomes for both maternal and perinatal[23,24].

4.3 *Pregnancy History*

Data about previous pregnancy history is also helpful for knowing the history of prior spontaneous delivery and successful VBAC, patient with a history of successful VBAC is associated with a high rate of success and a low rate of uterine rupture [25]. Another study by Atia et al, 2020 also stated that women with prior successful VBAC procedures had a significantly higher success rate of (96%) compared to patients without prior vaginal birth and VBAC.

DISCUSSION

From the previous analysis, both short and long inter-delivery are associated with an increased risk of both maternal and fetal complications. Short IDI (<18-24 months has several pieces of evidence that suggest that short intervals could significantly increase the risk of uterine rupture, emergency cesarean, and also poor neonatal outcome. Not only that, a short birth interval also does not provide adequate time. This study analysis shows that both short and long inter-delivery intervals are associated with increased risk of maternal and perinatal outcomes. The optimum IDI for pregnant women with previous cesarean section is 24-59 months for improving the outcome and lowering the mortality. An interval of 24-59 months is also associated with lower rates of complication and higher success, although the outcome is still influenced by other variables, such as maternal health and previous cesarean techniques.

CLINICAL IMPLICATION

The main point of this literature review is to enhance and mark the importance of detailed counseling and also multiple risk management for pregnant women who consider VBAC. Hence, Discussion between health providers and patients is needed to prioritize an optimal birth interval reduce the modifiable risk factors for the patients during their visits, and help them enhance their decision later for delivery.

LIMITATION OF THIS STUDY

With the limitation of studies and limited variability of definitions of short and long Inter-delivery Intervals and lack of high-quality data, future research is needed and should focus on standardizing the inter-delivery interval, exploring the long-term effects of variations of IDI and VBAC attempts, and lastly enhancing the research of biochemical markers for assessing the uterus healing process.

CONCLUSION

In this study, the writer could emphasize the importance of inter-delivery intervals for determining the outcome of VBAC. With many studies suggesting that an optimal IDI of 24-59 months may have the best outcome, other factors could also contribute to the safety such as patient characteristics, labor management, and previous pregnancy history, which play a major role in predicting the success of VBAC. Thus, a personalized approach and counseling are needed in all management of VBAC candidates.

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REFERENCES

[1] Khairunisa, Nisrina H. Vaginal Birthafter Caesareansebagai Upaya Peningkatankesehatanmaternal: Literature Review Vaginal. J Kesehat Madani Med 2022;12:141–51.

[2] Yassin A, Ahmed M. Interpregnancy Interval and Postpartum Family Planning: Does it matter? Gynecol Reprod Heal 2020;4:2–7. https://doi.org/10.33425/2639-9342.1112.

[3] Qayum K, Kar I, Sofi J, Panneerselvam H. Single-Versus Double-Layer Uterine Closure After Cesarean Section Delivery: A Systematic Review and Meta-Analysis. Cureus 2021;13. https://doi.org/10.7759/cureus.18405.

[4] Başbuğ A, Doğan O, Ellibeş Kaya A, Pulatoğlu Ç, Çağlar M. Does Suture Material Affect Uterine Scar Healing After Cesarean Section? Results from a Randomized Controlled Trial. J Investig Surg 2019;32:763–9. https://doi.org/10.1080/08941939.2018.1458926.

[5] Vaginal Birth After Cesarean Delivery (VBAC) | ACOG n.d. https://www.acog.org/womens-health/faqs/vaginal-birth-after-cesarean-delivery (accessed May 5, 2023).

[6] Santoso BI, Surya R, Firdaus KK, Hakim S. How Long is the Safest InterDelivery Interval in Women with Previous History of Cesarean Delivery? Indones J Obstet Gynecol 2018;6:71. https://doi.org/10.32771/inajog.v6i2.764.

[7] Rao J, Fan D, Ma H, Lin D, Zhang H, Zhou Z, et al. Is there an optimal inter-delivery interval in women who underwent a trial of labor after cesarean delivery (TOLAC)? Reprod Health 2022;19:1–7. https://doi.org/10.1186/s12978-021-01319-0.

[8] İmamoğlu M, Şimşek D, Dinçgez B, Ünal S, Demirci A, İlhan O, et al. Short interdelivery interval in modern obstetrics: Maternal and neonatal outcomes. Turkish J Obstet Gynecol 2022;19:295–301. https://doi.org/10.4274/tjod.galenos.2022.50576.

[9] Hiba N, Nisar S, Mirza ZA, Qadeer K, Mumtaz S, Rana MJ. Effect of Short in Inter–Pregnancy Intervalonthe Outccome of Vaginal Birth after Cesarean Section 2022; 72; 1799-803.

[10] Bauserman M, Nowak K, Nolen TL, Patterson J, Lokangaka A, Tshefu A, et al. The relationship between birth intervals and adverse maternal and neonatal outcomes in six low and lower-middle-income countries. Reprod Health 2020;17:1–10. https://doi.org/10.1186/s12978-020-01008-4.

[11] Dy J, DeMeester S, Lipworth H, Barrett J. No. 382- Trial of Labour After Caesarean. J Obstet Gynaecol Canada 2019;41:992–1011. https://doi.org/10.1016/j.jogc.2018.11.008.

[12] Dong H, Chi J, Wang W, Liu L. Association between interpregnancy interval and maternal and neonatal adverse outcomes in women with a cesarean delivery: a population-based study. BMC Pregnancy Childbirth 2023;23:1–16. https://doi.org/10.1186/s12884-023-05600-x.

[13] Maroyi R, Naomi B, Moureau MK, Marceline BS, Ingersoll C, Nerville R, et al. Factors associated with successful vaginal birth after a primary cesarean section in women with an optimal inter-delivery interval. Int J Womens Health 2021;13:903–9. https://doi.org/10.2147/IJWH.S334269.

[14] Xu C, Chi X, Guo Y, Chen Y, Chen X. The association between the inter-delivery interval and early postpartum urinary incontinence in women who had consecutive vaginal deliveries: a retrospective cohort study. Ann Transl Med 2023;11:208–208. https://doi.org/10.21037/atm-22-4684.

[15] Shrestha B, Subedi N, Thapa NKC, Bhattarai A. Clinical Patterns and Outcome of Low Birth Weight Babies Admitted in NICU Tertiary Hospital of Western Nepal. J Nepal Paediatr Soc 2022;42:22–5. https://doi.org/10.3126/jnps.v42i2.41457.

[16] Trojano G, Damiani GR, Olivieri C, Villa M, Malvasi A, Alfonso R, et al. VBAC: Antenatal predictors of success. Acta Biomed 2019;90:300–9. https://doi.org/10.23750/abm.v90i3.7623.

[17] Wu Y, Kataria Y, Wang Z, Ming WK, Ellervik C. Factors associated with successful vaginal birth after a cesarean section: A systematic review and meta- analysis. BMC Pregnancy Childbirth 2019;19. https://doi.org/10.1186/s12884-019-2517-y.

[18] Prabha J. DS, N. DP. Factors affecting the success rate of vaginal birth after cesarean section. Obs Rev J Obstet Gynecol 2020;6:44–50. https://doi.org/10.17511/joog.2020.i02.03.

[19] Perez WM, Vricella LK, Tomlinson TM, Gross GA. 810: Can we improve our ability to predict VBAC success in the contemporary labor management era. Am J Obstet Gynecol 2019;220:S531. https://doi.org/10.1016/j.ajog.2018.11.833.

[20] Ramteke S, Wankhede S. Scar Thickness as a Variable for Deciding the Mode of Delivery in Patients with Previous One Caesarean Section: A Prospective Observational Study. IOSR J Dent Med Sci e-ISSN 2020;19:21–5. https://doi.org/10.9790/0853-1904052125.

[21] Ali AT, Al-Ani O, Al-Ani F. Epidemiology and risk factors for ovarian cancer. Prz Menopauzalny = Menopause Rev 2023;22:93–104. https://doi.org/10.5114/pm.2023.128661.

[22] Carauleanu A, Tanasa I, Nemescu D, Socolov D. Risk management of vaginal birth after cesarean section (Review). Exp Ther Med 2021;22:1–6. https://doi.org/10.3892/etm.2021.10545.

[23] Reddy V, Reddy A, Reddy GA, Reddy NN. To Determine the Role of Active Management of Labour in Patients Undergoing Trial of Labour in Our Experience. Int J Acad Med Pharm 2023;5:971–6. https://doi.org/10.47009/jamp.2023.5.2.206.

[24] Lan Y, Pan S, Chen B, Peng L, Chen R, Hua Y, et al. Labor characteristics and intrapartum interventions in women with vaginal birth after cesarean section. BMC Pregnancy Childbirth 2022;22:1–11. https://doi.org/10.1186/s12884-022-04919-1.

[25] Atia O, Rotem R, Reichman O, Jaffe A, Grisaru-Granovsky S, Sela HY, et al. Number of prior vaginal deliveries and trial of labor after cesarean success. Eur J Obstet Gynecol Reprod Biol 2021;256:189–93. https://doi.org/10.1016/j.ejogrb.2020.11.009.