

Reducing surgical complications after cesarean section: Vaginal birth after cesarean section. Identifying the ideal candidate

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ABSTRACT

Vaginal birth after cesarean section (VBAC) is worldwide accepted and encouraged. Currently, in Romania due to increased cesarean section rate especially for maternal request, a high number of patients with scarred uterus is seeking for VBAC at subsequent pregnancies. Because of specific complications of trial of labor after cesarean section (TOLAC), risks and benefits need to be individualized for each specific candidate.

This study is about VBAC in Filantropia Clinical Hospital from Bucharest and how we are selecting the ideal candidate.

Keywords: VBAC, TOLAC, selection model, cesarean section, vaginal birth, uterine rupture

INTRODUCTION

In Romania, the incidence of cesarean rate (CS) is continuously rising due to multiple causes (maternal request and obstetrician fear of malpractice) [1]. The main reason for increasing CS rate is suspected to be defensive CS to avoid medico-legal aspects associated with unstandardized vaginal delivery legislation in Romania [2]. Because most of the CS are low-transverse, the primary indication is often unknown or nonrecurring, the patients are unsatisfied with previous recovery after surgery, Romania is dealing with a high number of candidates willing for TOLAC.

The main complication of a scarred uterus during pregnancy is uterine rupture which account for approximately 0.3 percent independent of mode of delivery, but this complication is more often seen during TOLAC [3]. Other studies found that uterine rupture is 18 fold greater during TOLAC than for planned repeat cesarean section (RCS) [4]. Other complication associated with a uterine scar is pla-

centa accreta spectrum and cesarean scar pregnancy [5], with increased maternal and fetal morbidity.

To minimize uterine rupture complication the obstetrician needs to precisely evaluate risks for every TOLAC candidate. According to Eden et al., patient with a previous vaginal delivery have the highest chances of successful VBAC [6]. Also, VBAC is associated with a higher risk of obstetric anal sphincter injury (OASIS) – 5% vs. 3.5% [7].

Risk factors for uterine rupture

There are multiple risk factors that needs to be identified before recommending TOLAC to a willing patient. Correct identification is associated with a lower risk of specific complications and failed VBAC.

Uterine incision type

It is well known that previous low segment cesarean section (LSCS) especially transverse incision carries the lowest risk of rupture. However, some studies reported that patients with low vertical

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uterine incisions have similar risk of uterine rupture [8,9]. Other types of incisions as inverted T, J, extended low transverse or fundal are reported to have increased risk of rupture compared with LSCS [10,11].

Previous uterine rupture and dehiscence

Patients who experienced uterine rupture in the past have an increased risk of uterine rupture to subsequent pregnancy therefore they should be planned for RCS between 36 to 37 weeks of gestation [12]. Uterine dehiscence is often discovered incidentally during RCS, however some authors consider this as an increased risk factor for uterine rupture and indicate planned intervention between 37-39 weeks at subsequent pregnancies [13].

Induction of labor

Patients who require induction of labor (IOL) and have a scarred uterus need to be carefully evaluated and counseled before recommending IOL. There is a higher incidence of uterine rupture associated with induction, but the exact rate varies between obstetric services depending on methods of induction and internal clinical protocols [14,15] (American College of Obstetricians and Gynecologists advised against the use of Misoprostol for IOL because of an increased risk of uterine rupture, Oxytocin appears to be safe and not contraindicated in most of the reports [16]).

Other possible risk factors

- Gestational age > 40 weeks [17] was suspected to be associated with failed TOLAC, but a larger study [18] found no difference, therefore maternal age should not be taken into account alone for contraindicating TOLAC.
- Estimated fetal weight > 4,000 g is associated with a lower likelihood of VBAC, but the success rate is also high - 60%, therefore a fetal weight of more than 4,000 g is not a contraindication alone. However, supplementary caution needs to be taken into account for evaluation before TOLAC [18,19].
- Interdelivery interval less than approximately 18 months. In 2001, Shipp et al. found a higher incidence of uterine rupture for an interpregnancy interval of 9 months or less [20] (2.3% vs. 1.1% risk of uterine rupture). One year later, Huang et al. found no difference between these groups but he found a decrease rate of VBAC success in patients who underwent induction for interdelivery intervals less than 19 months [21]. Stamilio et al. also found a significant association between short interpregnancy interval (less than 6 months) and risk of uterine rupture (2.7% vs. 0.9%) [22].
- Single-layer uterine closure. Single layer closure was suspected to contribute to scar resistance for a subsequent TOLAC. In a large

study in 2002, Bujold showed a 4-fold increased risk associated with single layer closure [23]. Six years later, Durnwald did not find any difference but showed an increased rate of scar dehiscence [24] in single layer group. The last studies from Sweden and Denmark showed no differences during TOLAC regarding method of uterine closure after cesarean [25,26].

- More than one previous cesarean birth. Even though ACOG recommended in 2004 TOLAC after more than one CS only to women with a history of VBAC or previous vaginal delivery [27], Macones [28] and MFMU Cesarean Registry [29] found no differences in uterine rupture rates.
- Previous second-trimester cesarean birth. This hypothesis has been raised due to anatomical changes of the pregnant uterus at term. Low transversal incision during second trimester when lower uterine segment is not yet developed may lead to muscular incision in contractile area of the uterus. Incision in this area was suspected to have a raised risk of rupture during subsequent TOLAC [30].

Model evaluation for predicting success

To minimize risk of uterine rupture during TOLAC a standardized classification of eligible candidates was needed. In order to detect the ideal candidates, several scoring calculators were studied and implemented however these calculators needs to be adjusted for each obstetric service according to local possibilities for fetal monitoring, time to incision required for emergency CS, availability of anesthesia, possibility of complication management and neonatal service.

If using calculators, observational data suggest that the risk of specific scar complications is similar between TOLAC and RCS groups when predicted chances of VBAC is more than 60-70% [31,32].

Irrespective of which calculator is being used there are some limitations including lack of validation regarding interference with patient decision-making process.

MFMU Network calculator for use at entry to prenatal care

In 2021, Grobman et al. developed a calculator [33] for VBAC chances which can be used at first prenatal visit to women with previous cesarean section. This calculator has the advantage that can be used to all patients at first visit irrespective of race and ethnicity and takes into account: maternal age, BMI and previous obstetrical history as well as previous medical conditions associated with pregnancy and labor: risk of hypertension and indication

for previous cesarean section. Also, this calculator has the disadvantage that it does not include the risk factors that can arise later during pregnancy that can influence the likelihood of VBAC.

Sharing decision-making model

In 2020, Kuppermann et al. developed a method for counseling women with a history of cesarean section for TOLAC based on shared decision [34].

The tool was developed for physicians with the intention to recruit more willing candidates for TOLAC in order to reduce CS rate and is based on obstetrical history, location of previous uterine incision, gestational age and other known lower uterine segment pathology as well as using VBAC calculator.

Prediction model for preterm cesarean section

In 2016, Mardy developed a model for VBAC prediction rate for women having a previous cesarean section between 26 to 36+6 weeks of gestation using 8 variables [35]. He found that diabetes, cervical dilation, history of vaginal birth or VBAC is associated with higher success rates in contradiction with induction, recurring indication for previous CS, and hypertensive disease which are associated with lower success rates.

MATERIALS AND METHODS

We performed a retrospective study including women with previous CS having successful VBAC after going through Filantropia Hospital internal selection model for ideal candidate (Table 1) during 1 year between 1 Jan 2020 and 31 Dec 2020. Information was selected from internal hospital database and processed with MS Excel for descriptive diagrams. Inclusion criteria were term pregnancies, history of previous one low segment CS, spontaneous labor, qualifying for ideal candidate according to internal prediction model. Exclusion criteria were preterm labor, non-qualifying candidates, history of more than one CS, unknown CS incision type, high possibility of recurring CS indication.

TABLE 1. Selection criteria for Ideal Candidate in Filantropia Clinical Hospital, Bucharest

| |
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| History of one previous low segment CS |
| Spontaneous labor at ≤ 40 weeks |
| Previous non-recurring indication for CS |
| Well-prepared cervix for labor |
| Estimated fetal weight < 4,000 g |
| More than 12 months between pregnancies |
| Without other medical conditions associated with pregnancy (including but not limited to hypertension, diabetes, asthma, renal or cardiac disease) |
| BMI < 25 |

RESULTS

After applying inclusion and exclusion criteria, 83 candidates were selected from which 54 cases were identified having successful VBAC. From 29 candidates who had failed VBAC, 13 changed their option during latent stage of labor and the other 16 delivered by CS from other reasons than the first CS (Figure 1) such as non-reassuring fetal heart rate, labor dystocia, failure to progress in active second stage and failed to progress after spontaneous rupture of membranes during latent first stage of labor.

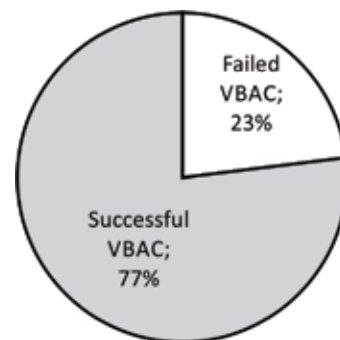


FIGURE 1. VBAC success rate in Filantropia Clinical Hospital

During selected period, 654 cases were identified having a previous CS. After applying ideal candidate criteria, 420 possible candidates were included which accounted for 64% of patients with a previous CS. From these candidates, only 83 consented for TOLAC (Figure 2).

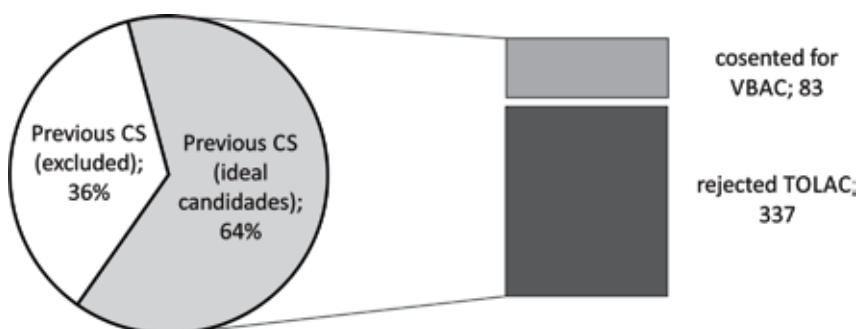


FIGURE 2. Selection of ideal candidate for TOLAC

DISCUSSIONS

During selected period, the rate of successful VBAC when applying internal selection protocol was 77% (54 cases), which correspond to previous reported rates worldwide [36]. However, we noticed that much more women met the ideal candidate characteristics but did not consent for VBAC from various reasons (which were not centralized for the present report).

The incidence of CS is continuously rising worldwide therefore specific actions are needed to reduce this perspective. Also, the scarred uterus group is getting bigger because many women with one or more CS are planning a future pregnancy. It is well known and demonstrated that reducing the primary CS rate is the best effort in order to reduce CS [37] globally but also actions regarding the previous CS group plays a special role. There is a large number of patients with a LSCS history that qualify for TOLAC but did not consent (in our study – 80% from qualified patients refused TOLAC). In order to achieve this, more antenatal counselling regarding way of delivery is needed with accent on benefits associated with vaginal delivery. Also, the low risk of uterine rupture needs to be well explained (0.5% without induction or augmentation) [38].

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