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Rationale of the Cross-Sectional Descriptive Study on Factors Associated with Failure of Vaginal Delivery Trial after Cesarean Section in the University Clinics of Kinshasa, DR Congo

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Abstract

Background: Delivery in a scarred uterus is nowadays a real problem in Obstetrics practice, due to the inflation in the number of caesarean sections and the non-unanimous attitude of Obstetrics' teams towards uterine scars. The factors associated with failed vaginal birth attempts after caesarean section (VBAC) are crucial information that would contribute effectively to deciding on the most appropriate mode of delivery for the mother and her fetus. Their identification would enable us to detect pregnant women at high risk of failure to attempt vaginal birth after caesarean section, and thus contribute to reducing the complications associated with this failure. **Objective:** We will study the factors associated with failure to vaginal delivery trial after caesarean section at the University Clinics of Kinshasa (UCK). **Methods:** This study will be a cross-sectional descriptive study with analytical aims. The minimum sample size will be 239. Our study population will consist of records of pregnant women with unicatricial uterus who underwent attempted vaginal delivery after caesarean section at UCK from January 2014 to June 2023. Results will be reported as percentage proportion and mean plus or minus standard deviation. Comparison of means between groups will be made using Student's t-test, and of proportions using Pearson's Chi-square test. Logistic regression will be used to generate Odds Ratios to measure the strength of association between variables. The test will be statistically significant for a p value < 0.05. Data will be collected and processed confidentially and anonymously. **Conclusion:** This study will identify the factors associated with the failure of attempted vaginal delivery after caesarean section in order

to contribute to the reduction of complications related to its failure in our setting.

Keywords

Associated Factors, VBAC Failure, Scarred Uterus

1. Introduction

The rate of caesarean sections has risen considerably over the last twenty years in the vast majority of countries, generating a significant proportion of scarred uterus [1] [2].

In most countries, this rate is well above 15%, the threshold long defined as optimal by the World Health Organization (WHO) [3].

This rate reaches 32% in the United States, 21% in France and 18.4% in Africa [4] [5] [6].

In Africa, 5% to 14% of women presenting to the labour ward are thought to have a scarred uterus [7] [8].

A scarred uterus is a uterus with one or more myometrial scars anywhere on the body or isthmus, following surgery or trauma. The uterine scar, due to its predominantly fibrous nature, represents the zone of elective fragility of the scarred uterus [9].

Pregnancy in a scarred uterus is associated with high maternal-fetal morbidity and mortality, due to its many complications, including dynamic dystocia, delivery haemorrhage resulting from placenta previa or accreta, and uterine rupture [10].

The uterine test is an attempt at vaginal delivery on a scarred uterus [11] [12]. It is also known as scar test, vaginal birth after caesarean section (VBAC), and the current trend is to refer to attempted vaginal birth after caesarean section (VBAC).

The frequency of delivery on a scarred uterus is higher in America: 9.4% in the USA (1999) and 7.1% in Canada (1992); in Europe: 6.6% in France (1994) and in North Africa (1994): 7.1% in Tunisia (1993); in Black Africa: 1.5% in Senegal (1997); 1.8% in Tanzania (1991); 2.43% in 1991 and 8.45% in 2009 in the DRC; 3.7% in South Africa (1994); 8.87% in Guinea (2001) and 7.8% in Mali (2008) [13] [14] [15] [16].

The management of childbirth with a scarred uterus is a hotly debated topic in developing countries, where technical facilities and qualified human resources are still inadequate, while the frequency of scarred uterus is on the rise as a result of inflation in caesarean section rates worldwide. Childbirth in a scarred uterus carries a high risk of uterine scar disunion [4] [17].

What to do with a scarred uterus is one of the most hotly debated topics in modern Obstetrics, because of the considerable increase in caesarean section rates [18] [19].

Childbirth with a scarred uterus is a challenge for Obstetrics, as there is no unanimous agreement on what should be done, hence the contradictions in modern Obstetrics' management in recent years. The obstetrician is frequently called upon to decide on the most appropriate mode of delivery for mother and fetus [5] [20].

It is therefore appropriate to examine the factors associated with failure to vaginal delivery trial after caesarean section in our setting, in order to help reducing the complications associated with this failure.

2. Objective

The present project will study the factors associated with the failure of attempted vaginal delivery after caesarean section at the UCK in the Democratic Republic of Congo.

2.1. Rationale for the Study

To answer the question of what factors are associated with failure to vaginal delivery trial after caesarean section at UCK, our study will take place at the UCK during the period from January 2014 to June 2023. Our study population will consist of the records of pregnant women with unicatricial uterus who have benefited from VBAC at that hospital during the study period. We will use records from the maternity ward, delivery room, emergency room and operating theatre.

2.2. Study Method

2.2.1. Sample Size

This will be a cross-sectional descriptive study with an analytical purpose. The minimum sample size will be calculated according to the SCWARTZ formula [21] that is, $n \geq (z^2 \cdot p \cdot q)/d^2$. In this formula, n is the minimum sample size, z is the confidence interval (1.96), p is the assumed proportional prevalence of the problem in the population equal to 19.3%, q is the proportion of people with no problem ($q = 100 - p$) and d is the degree of precision set at 0.05. After incorporating these elements into the formula, our minimum sample size will be at least 239 files. This study is designed and will be supported by our own funds.

2.2.2. Patient Selection

Inclusion criteria

All pregnant women with unicatricial uterus who underwent VBAC and gave birth at CUK during the study period will be included in the present study.

Non-inclusion criteria

Files not found or containing less than 50% of the variables studied will not be included in this study.

2.2.3. Study Variables

1) Sociodemographic variables: maternal age, marital status, profession, level of education, previous history (parity, gestational age, abortion, previous vaginal delivery, indication of previous caesarean section, number of previous cae-

sarean sections, ultrasound scar quality, estimated fetal weight on ultrasound, weight of largest baby, intergenital space);

2) Pregnancy-related variables: follow-up, place and number of prenatal cares's attendance, pathologies associated with pregnancy, weight, height, BMI;

3) Labor-related variables: age of pregnancy at time of delivery, uterine height, fetal heart rate (FHR), cervical dilatation on admission, status of membranes on admission, degree of engagement, duration of labor, progress of labor, mode of labor onset of labor, indication for emergent cesarean section;

4) Variables related to the outcome of the uterine test: route of delivery, maternal complications, variables related to newborns (status of newborn during delivery, birth weight, gender, APGAR score, admission to neonatology, perinatal death, other neonatal complications, neonatal resuscitation cares at birth.

2.3. Data Collection Procedures

After obtaining authorization for the survey from the Department and Faculty, we will begin by identifying pregnant women with once scarred uterus who have undergone attempted vaginal delivery after caesarean section in the registers of the maternity ward, delivery room and operating theatre, and then search the records of the pregnant women in order to transcribe the information collected in the data collection forms.

2.4. Expected Results of the Study

At the end of the present study, the frequency of attempted vaginal birth after caesarean section and its failure rate at CUK will be known; the socio-demographic and clinical characteristics of women who underwent attempted vaginal birth after caesarean section at CUK will be described; the factors associated with failure of attempted vaginal birth after caesarean section with CUK will be identified; the strength of association between these factors and failure of attempted vaginal birth after caesarean section, and between these factors and complications, will be determined.

2.5. Statistical Considerations

Data will be entered using Microsoft Excel 2019 and then exported to a database in Statistical package for social sciences (SPSS) version 22.0 for analysis. Results will be expressed as percentage proportion and mean plus or minus standard deviation.

Comparison of means between groups will be made using Student's t-test or analysis of variance (ANOVA) as appropriate for quantitative variables, and comparison of proportions will be made using Pearson's Chi-square test. The test will be considered statistically significant for a p value < 0.05.

2.6. Ethical Considerations

This project was approved by the staff of the Department of Gynecology-Obstetrics and by the Ethics Committee of the University of Kinshasa public Health school.

The collection of information for this study will be carried out with respect for confidentiality, and the data will be processed and published anonymously.

3. Discussion

The frequency of attempted vaginal delivery after caesarean section and its failure rate are variables in the literature, ranging from 13% to 51% [5] [22].

Tshilombo at UCK in 1995 reported that uterine testing was performed at 86.2% with a uterine test success rate of 63.4% and a failure rate of 36.6% [14], while Boffendakini 18 years later at the same institution found a uterine test frequency of 44.8%, a reduction of almost half, with a uterine test success rate of 80.7%, a uterine test failure rate of 19.3% and a uterine rupture rate of 4.6% [15]. This reduction may be attributed to the rigorous selection of cases for uterine testing in order to maximize the chances of success, as the rate of vaginal deliveries is a function of the selection of pregnant women [23] [24], and it has been reported that complications of delivery on a scarred uterus occur mainly when the attempt at vaginal delivery fails [25]. This reduction in the frequency of uterine tests is also linked to the systematization of elective caesarean section for multiple scars on uterus.

Four explanatory factors for uterine test failure were identified in Momat's series in DR Congo in 2017: maternal age under 20 years, large uterine fundus, presentation other than cephalic vertex and premature rupture of membranes were the factors associated with uterine test failure [26].

This raises the question of its temporal impact in terms of frequency, risk factors and complications at UCK.

We therefore need to examine the frequency of failed vaginal birth attempts after caesarean section, and the factors associated with it in our setting, in order to help reducing the complications associated with this failure.

3.1. Study Highlights

Our study will be one of the first to investigate the factors associated with failure to vaginal delivery after caesarean section at the UCK. It will therefore be set as a reference for future studies. This study will make it possible to identify or detect pregnant women at high risk of failure to vaginal delivery after caesarean section, and thus contribute to the reduction of complications associated with this failure.

3.2. Study Limitations

Some missing data could affect the accuracy of the results. Although it cannot fully reflect the trend for the whole country, our sample will be representative of part of the city of Kinshasa, and future studies should take this into account.

4. Conclusion

Maternal-fetal morbidity related to failed attempts at vaginal birth after caesa-

rean section can be avoided or significantly reduced by detecting gestations at high risk of failure to vaginal delivery after caesarean through appropriate identification of the associated factors to be investigated in the present study.

Authors' Contributions

MMA and KNB are the main investigators. MMA generated and designed the study. KNB participated in the study design and will be actively involved in data collection. MMA, LMEP, LAJ, MNF, LMEP, NOC, LBJ, LNN, MFM and MSP contributed to the drafting and improvement of the manuscript.

Conflicts of Interest

The authors report no conflicts of interest in this work.

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