Italian Journal of
Gynæcology & Obstetrics
March 2019 - Vol. 31 - N. 1 - Quarterly - ISSN 2385 - 0868

Vaginal deliveries after Cesarean section: heterogeneity of outcome according to the hospital policies in Italy

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ABSTRACT

Objective: assessing the characteristics of some Italian women with previous Cesarean section and to establish predictors for failure of trial of labour after Cesarean. It was hypothesized that local policies of facilities could affect the success of trial of labour after Cesarean.

Methods: retrospective study included 328 pregnant women at term, with one previous Cesarean section and a cephalic singleton pregnancy, enrolled in four hospitals of the Emilia Romagna, Italy. Multivariate logistic regression models was built and assessment of heterogeneity of data (Q-statistic) was also performed.

Results: the factors involved in the failure of vaginal birth after Cesarean seems to be the ones already reported in literature. However, even the hospital where patients delivered matters on the vaginal birth after Cesarean. Very high heterogeneity among hospitals was found.

Conclusions: local policies about the management of women with previous Cesarean section affect the proportion of vaginal birth after Cesarean. This finding is a concern if rates of vaginal births after Cesarean are compared among Italian hospitals and worldwide.

Keywords: labour; vaginal birth after cesarean; trial of labor; caesarean section.

SOMMARIO

Scopo: valutare le caratteristiche di alcune donne Italiane con pregresso taglio Cesareo e stabilire ciò che predice il fallimento del travaglio di parto dopo Cesareo. É stato ipotizzato che le politiche locali delle maternità potrebbero condizionare il successo del travaglio di parto dopo Cesareo.

Metodi: studio retrospettivo includente 328 donne a termine, con un pregresso taglio Cesareo ed un feto cefalico singolo, arruolate in quattro ospedali dell'Emilia Romagna (Italia). Sono stati costruiti dei modelli logistici multivariati ed è stata anche effettuata la statistica Q per valutare l'eterogeneità dei dati.

Risultati: i fattori che influiscono sul fallimento del parto vaginale dopo Cesareo sembrano essere i medesimi riportati in letteratura. Tuttavia, anche l'ospedale in cui le pazienti partoriscono influisce sul parto vaginale dopo Cesareo. È stata riscontrata una eterogeneità molto alta fra ospedali.

Conclusioni: le politiche locali sul management delle donne con pregresso taglio Cesareo influiscono sulla proporzione di parti vaginali dopo Cesareo in Italia. Questo riscontro è un problema se vengono confrontate le frequenze dei parti vaginali dopo Cesareo fra ospedali Italiani e nel mondo.

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DOI: 10.14660/2385-0868-102

INTRODUCTION

In the last years the rate of Cesarean section (CS) deliveries has increased worldwide and a major concern has grown for the higher risks of maternal mortality and morbidity[1,2]. Consequences of the rise in Cesarean rates include elevated risks of complications such as placenta accreta, placenta praevia, placental abruption, and stillbirth in subsequent pregnancies, although the stillbirth rate has remained stable over the last three decades[1,3]. An average rate of CS of 21.1% in developed countries is reported in the literature[4,5]. Europe shows the highest incidence, in particular: Cyprus has the highest overall Cesarean rate with 52.2%, followed by Italy with 38.0%, Romania with 36.9%, and Portugal with 36.3%. Germany, Hungary, Luxembourg, Malta, Poland, and Switzerland also have rates of 30% or higher. Only the Netherlands, Slovenia, Finland, Sweden, Iceland, and Norway have rates below 20%. Between 2004 and 2010, an increase of Cesarean rate has been observed in all countries; in Italy the increase was under 0.2%[1].

The most significant factor contributing to overall increased CS rate is the repeated CS after one or more previous CSs. However, women with a successful vaginal birth after previous Cesarean delivery show lower morbidity than women undergoing an elective repeated Cesarean delivery[6].

Trial of labor after previous Cesarean delivery should be offered to women to successfully achieve vaginal birth after Cesarean delivery. Several guidelines recommend that vaginal birth after Cesarean (VBAC) may be offered to women with a singleton pregnancy of cephalic presentation at 37+0 weeks or beyond who have had a single previous lower segment Cesarean delivery, with or without a history of previous vaginal birth[5,7,8,9,10]. Women who have had two or more prior lower segment Cesarean deliveries may be offered VBAC after counselling by a senior obstetrician. Counselling should be done on the risk of uterine rupture, on maternal morbidity and on the individual likelihood of successful VBAC (e.g. given a history of prior vaginal delivery). Success of reported VBAC is consistently high, ranging from 72 % to 75% according to the RCOG[5]; it is estimated that 60–80 % of appropriate candidates who attempt VBAC will be successful delivering according to the American Congress of Obstetricians and Gynecologists (ACOG)[5,11].

Several models are available to predict the probability of successful trial of labour after Cesarean. The most utilized and validated model is the one firstly reported by Grobman et al, regarding women with one prior low transverse Cesarean and singleton vertex presentation after 36 6/7 weeks' gestation[12]. Annesi et al.[13] validated the Grobman's nomogram[12] on Italian population, reporting a rate of successful VBAC of 77.9%. Factors correlated to successful VBAC were Asian ethnicity, previous vaginal delivery or a previous vaginal delivery after Cesarean section[13]. Annesi et al.[13], therefore, concluded that the Grobman et al.[12] nomogram could be applied to Italian population too. As the sample of Annesi et al.[13] is not representative of the whole Italian population, the Authors of the present article would check if the Annesi et al.[13] conclusion is correct. We hypothesize that the policies of hospitals could affect the outcome of trial of labour after Cesarean, thereby depicting an heterogeneity of the outcomes of the trial of labour after Cesarean.

MATERIALS AND METHODS

Women delivering in four hospitals of the Emilia Romagna (Italy) (Sant'Anna Hospital of Cona – Ferrara, hospital of Ravenna, hospital of Lugo, hospital of Faenza) from January 2015 to December 2015 were retrospectively screened. This sample is similar to the one of the Annesi et al.[13], as it came from the same Emilia Romagna population. Out of 4324 deliveries, 2941 (68%) women had a spontaneous vaginal birth, 140 (3.2%) had operative deliveries and 1243 (28.8%) had a Cesarean section. These outcomes are also similar to the ones of Annesi et al.[13] Authors of the current study enrolled women with singleton pregnancy at term with only one prior low-transverse Cesarean section in their medical history. Demographic and obstetrical data were extracted from the patient electronic medical records: age, education, body mass index, history of vaginal birth, indication for Cesarean, outcome of trial of labor after Cesarean. Obesity was defined as a body mass index ≥30.

The descriptive statistics were reported as means and standard deviations for the continuous variables, while rates have been used for categorical variables. Inferential statistics were performed by using univariate tests and mulitivariable logistic regression model (backward stepwise, conditional). To check if the model of Annesi et al.[13] is overall appropriate in the present sample, it would be awaited that same results of Annesi et al.[13] would be found by building multivariate

logistic regression models with the dependent and independent variables set according to the ones reported by Annesi et al.[13] (**Model I**). As the present sample is smaller than the one of Annesi et al.[13], the independent variables of the logistic regression model were simplified. They were: Italian nationality (yes/no), age (continuous variable), previous Cesarean section without vaginal delivery (yes/no), university degree (yes/no), obesity (yes/no). The dependent variable was the VBAC. Moreover, it was built another logistic regression model (**Model II**) by adding another independent variable: the hospital where the delivery occurred among the hospital of Ferrara (reference category), Ravenna, Faenza and Lugo. Heterogeneity among the proportions of VBAC in each hospital was calculated by applying the Cochrane' Q-statistic. Fixed model was assumed.

Statistical analyses were performed by using SPSS 16.0 for obtaining logistic regression models, while the Q-statistic was computed by using the OpenOffice.org calc.3.3. Significance was set at p level ≤0.05.

RESULTS

Three-hundred-twenty-eight patients had had one or more previous CS. **Table 1** reports rates of dependent variables along whit univariate comparisons. Two-hundred-thirty-five patients underwent CS (69.5% of the total deliveries). Among patients undergone CS, 104 (44.3%) requested the Cesarean delivery (no other indication than previous Cesarean) while indication (additional to previous Cesarean) for repeated Cesarean section was found in 131 (55.7%) out of 235 CS.

Table 2 reports outcomes of delivery on the 328 patients, disaggregated for hospitals. The proportion of CS on maternal request (CSMR) is also reported in **Table 2**.

Among variables resulted involved in the VBAC reported by Annesi et al.[13], increasing age, previous CS without previous vaginal deliveries reduce the odds ratio of VBAC, while university degree increases the odds ratio of a VBAC (**Table 3 – Model I**). By introducing also the hospital where the delivery has occurred, it

Table 1.
Descriptive statistics.

	VBAC (n = 93)	CS (n = 235)	p
Italian nationality	63 (67.7%)	164 (69.8%)	n.s.
Age	33.0 ±5.48	34.3 ±5.63	n.s.
Previous Cesarean section without previous vaginal delivery	66 (71.0%)	219 (93.2%)	<0.001
University degree	29 (31.2%)	62 (26.4%)	n.s.
Obesity (BMI ≥30) before pregnancy	9 (9.7%)	40 (17.0%)	n.s.

Rates were calculated on the overall number of VBACs and on overall number of the CSs

Table 2.
Descriptive statistics. Disaggregated data.

	VBAC	Indications for repeating Cesarean	CSMR	Total
Ferrara	22 (20.8%)	55 (51.9%)	29 (27.4%)	106
Ravenna	21 (18.6%)	47 (41.6%)	45 (39.8%)	113
Lugo	20 (64.5%)	8 (25.8%)	3 (9.7%)	31
Faenza	30 (38.5%)	21 (26.9%)	27 (34.6%)	78

Data on the outcome of deliveries are reported disaggregately according to centers

results that the hospital of Lugo and Faenza have an higher odds ratio of VBAC (**Table 4 – Model II**).By appling the Q-statistics, it was highlighted an high hetherogeneity among hospitals for VBAC (I2 95.9%). The hetrogeneity was resolved partitioning the variance of VBAC rate among hospitals in wich an higher CSMR is observed (Ravenna and Faenza) and hospitals in which a lower CSMR is observed (Ferrara and Lugo), p<<0.001.

DISCUSSION

Results in this study are overall in line with what already reported in literature, among factors involved in the VBAC[12,13,14,15]. However, it must be highlighted that hospital policies in managing patients with previous CS could cause heterogeneity in the proportion of patients who agree to undergo a trial of labour after Cesarean. Many patients want to repeat CS not in labour, thereby avoiding labour pain (CSMR). The rate of success of VBAC was higher in women who delivered at Lugo and Faenza hospitals than in Ferrara and Ravenna hospitals. It cannot be fully explained what is the factor explaining such difference from the findings of this study. Faenza and Lugo are first level hospitals, while Ravenna and Ferrara are second level hospitals. It cannot be excluded that being first level or second level hospitals could play a role in managing the trial of labour after Cesarean. Indraccolo et al.[16] have reported that a second level hospital manages low-risk pregnancies as high risk pregnancies, thereby performing more CSs. In a recent study, Lundgren et al stress that the factors for improving the VBAC rate are related to the structure of the maternity care system in the country, to the liaison between midwives and obstetricians and to the care offered during pregnancy and birth[17]. Italian pregnant women, some Gynecologists and other stakeholders feel that the CSMR is overall appropriate[2] and it is already reported by other Authors that Italian hospital would concede the Cesareans most likely than others according to local policies[18,19]. This should be applied even on pregnant women with previous Cesarean, who are counselled on the VBAC.

The current study is limited by the small sample size and by retrospective nature of data collection. Despite such limitations, the statement of Annesi et al.[13] that the Grobman' nomogram[12] can be applied to the Italian population is at least incorrect. Italian population of pregnant women with a previous CS is very heterogeneous. This is also a concern when comparing obstetric outcomes among Italian hospital overall, and, specifically, when comparing the repeated Cesareans rates.

Pregnant women with a previous CS should receive appropriate counselling concerning trial of labour after Cesarean versus elective repeated Cesarean. It is important to develop social-health processes uniforming hospitals policies on the management of labour and delivery and aiming at a responsible motherhood and fatherhood with protection of the health of both mother and newborn.

DECLARATION OF INTEREST

The authors declare no conflict of interest.

Table 3.
VBAC – Model I.

	Unadjusted odds ratio 95% confidence intervals p	Adjusted odds ratio 95% confidence intervals p
Italian nationality	1.448 0.766-2.737 0.254	1.448 0.766-2.737 0.254
Age	0.909 0.862-0.959 0.001	0.918 0.873-0.965 0.001
Previous Cesarean section without previous vaginal delivery	0.124 0.058-0.264 <0.001	0.132 0.064-0.274 <0.001
University degree	1.719 0.931-3.176 0.083	1.968 1.088-3.559 0.025
Obesity (BMI ≥30) before pregnancy	0.622 0.279-1.383 0.244	0.615 0.276-1.370 0.956

Factors affecting the odds of VBAC. The model does not hypothesize a role of the center.

Table 4.
VBAC - Model II.

	Unadjusted odds ratio 95% confidence intervals p	Adjusted odds ratio 95% confidence intervals p
Italian nationality	1.448 0.766-2.737 0.254	1.448 0.766-2.737 0.254
Age	0.909 0.862-0.959 0.001	0.918 0.873-0.965 0.001
Previous Cesarean section without previous vaginal delivery	0.124 0.058-0.264 <0.001	0.132 0.064-0.274 <0.001
University degree	1.719 0.931-3.176 0.083	1.968 1.088-3.559 0.025
Obesity (BMI ≥30) before pregnancy	0.622 0.279-1.383 0.244	0.615 0.276-1.370 0.956
Setting		
Ferrara	1	1
Ravenna	0.908 0.445-1.853 0.791	0.909 0.447-1.846 0.791
Lugo	7.006 2.723-18.031 <0.001	6.790 2.686-17.166 <0.001
Faenza	2.011 0.992-4.073 0.053	2.042 1.013-4.118 0.046

Factors affecting the odds of VBAC. The model hypothesizes a role of the center.

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