

Factors Predicting the Outcome of Trial of Labor After Prior Caesarean Section in the Gynecology-Obstetrics Service of the Provincial Hospital Cherif Idrissi, Kenitra, Morocco

Mohamed EL Bakkali¹, Amine Arfaoui², Younes Azzouzi³,
Nabil Ait Ouaziz⁴, Farid EL Khlifi⁵, Abdelrezzak Khadmaoui⁶

^{1, 3-6} Faculty of Sciences, University Ibn Tofail, Kenitra,

² Royal Institute of Management Training, Sale,
MOROCCO.

¹ elbakkalibio@gmail.com

ABSTRACT

The aim is to find out whether the trial of labor after prior caesarean section increases the risk of rupture and whether it has an influence on the foetal and maternal prognosis.

A retrospective study of 224 cases of trial of labor was conducted from 01/04/2011 to 30/09/2011, in the Cherif Idrissi Provincial Hospital which is located in the Gharb Chrarda Bni Hssen Region in Morocco. The data was collected from patient folder.

Among the studied cases, we registered 77 cases with scarred uterus due to previous caesarean section (34% of all cases). The success rate of vaginal delivery was 71%, 60 % and 40% respectively in less than 30 years age group, 30-35 years age group and more than 35 years age group. These percentages were respectively 89 %, 78% and 47 % in patients who had experienced childbirth by vaginal delivery.

Furthermore, the trial of labor led to vaginal delivery in 56% of scarred uterus cases, the highest rate of vaginal delivery success was observed in most multiparous mothers (OR=3.7; CI95% = 1.32-10). Nevertheless, no uterus rupture and no deaths were registered in giving birth patients with previous caesarean section.

Moreover, the failure rate of vaginal delivery after caesarean section was significantly higher in obesity grades II and III (78% and 82% ; $p < 0.05$). On the other hand, low failure rate and low intrauterine mortality were observed in patients with grade III of obesity with no caesarean experience (43%; $p < 0.01$). The cephalic presentation appeared like a protector factor whereas twin pregnancy and macrosomia seem to display the same risk of vaginal delivery failure ($p < 0.01$).

The present work showed that gemellarity, macrosomia and obesity would be risk factor of the failure of vaginal delivery in patients with caesarean section history. However, multiparity seems to protect from this failure.

Keywords: scarred uterus, trial of labor, caesarean section, vaginal delivery, Kenitra, Morocco

INTRODUCTION

Caesarean rate has increased since the last 20 years in several countries. This trend exposes women increasingly to the scarred uterus situation for the following pregnancies which bring up the problematic of managing pregnant women with scarred uterus.

The specific risk related to the delivery with a scarred uterus is the uterine rupture and its complications for the mother and the new-born. In the case of labour trial of vaginal delivery, this risk is estimated at 0.5 to 1% (Lydon-Rochelle et al., 2001; Landon et al., 2004).

The uterine rupture is one the most dangerous obstetrical complications because of the seriousness of its mother and foetal consequences. Nowadays, the majority of uterine ruptures occur during the labor in patients with caesarean section history (Zwart et al., 2009).

The present work aims to find out whether the trial of labor after prior caesarean section increases the risk of rupture and whether it has an influence on the foetal and maternal prognosis, compared to vaginal delivery in patients with no caesarean section history.

MATERIALS AND METHODS

This is a retrospective study carried out on 224 cases of childbirth that happened in the provincial hospital Cherif Idrissi (Region of Gharb Chrarda Bni Hssen, Morocco) between April the first and September the 30th 2011. Among these cases, 77 had a scarred uterus.

The data was collected from patients' folders. The studied variables was age, parity, obesity bracket according the Body Mass Index (BMI), foetus presentation during labor, pregnancy type (monofetal or twin), macrosomia, prior caesarean section, prior vaginal delivery, uterus rupture. The results were compared with those of control group with no caesarean section history during the same period.

According to the statistical analysis, we used the Khi-square test to compare absolute frequencies between categories and the Odds Ratio (OR) to evaluate the association between the outcome of trial of labor (vaginal delivery or caesarean delivery) and each studied variable.

RESULTS

The results concerning all the studied variables are gathered in table 1. Among 224 patients, we registered 77 cases (34%) with caesarean history and 147 cases (66%) without caesarean history. The trial of labor ended in vaginal delivery in 56 % of cases for the first group and in 75% for the second group (table 1).

The comparison of the groups « with prior caesarean section » and « without prior caesarean section » showed a significant difference in age, parity, obesity, foetus presentation, type of pregnancy and macrosomia.

For patients with scarred uterus and who had never given birth through vaginal delivery, the success rate of trial of labour was 71% in those who are less than 30 years old, 60 % in those who are between 30 and 35 years old and 40% in those who are more than 35 years old (OR=3.8; IC95%=1.12-12.7). These rates were different in patients who had experienced vaginal delivery, they were 89 %, 78% and 47 % respectively in less than 30 years age group, 30 to 35 years age group and more than 35 years age group (OR=9.6; IC95%=3.41-27).

The rates of uterus rupture did not display significant difference between age groups, respectively 2.23%, 0.90% and 1,33 for women who had never given birth through vaginal delivery, and 0.44%, 0.90% et 1.78% for women who had experienced vaginal delivery.

As for multiparity, the results show that the rate of success of trial of labor is significantly higher in grand multiparous patients (OR=3.7; IC95%: 1.32-10). No rupture or morbidity cases during the trial of labor were observed.

The analysis of obesity classes in the two groups (with and without caesarean history) show that the failure rate of vaginal delivery after caesarean is significantly higher in obesity grade II with 78% (OR=4.1; IC95%: 1.05-21.6) and obesity grade III with 82% (OR=6.2; IC95%:

1.2-31.9). On the other hand, the success rate of vaginal delivery in patient without caesarean history is significantly lower in obesity grade III with 57% (OR=6.1; IC95%: 1.9-19.86). We noticed no cases of uterus rupture in these patients, but three cases of intrauterine mortality were observed, two in the group with caesarean history and one in the group without caesarean history.

Table 1. Univariate analysis of risk factors according to the outcome of the trial of labor in two groups of patients: with and without prior caesarean section)

| Risk Factors | Patients with Prior Caesarean Section (Scarred Uterus)N=77 | | | | Patients without Prior Caesarean Section, N= 147 | | | |
|---------------------|--|-------------|-------------|--------|--|--------------|-------------|---------------|
| | VD n= 43 | CS n=34 | OR | 95% CI | VD n= 43 | CS n=34 | OR | 95% CI |
| Age | ≤ 29 years | 17 (71%) | 7 (29%) | 1 | | | | |
| | 30-35 years | 12 (60%) | 8 (40%) | 1,6 | 0,5-5,7 | 40 (78%) | 11 (22%) | 1,6 0,64-4,25 |
| | ≥ 36 years | 9 (40%) | 14 (60%) | 3,8 | 1,12-12,7 | 10 (47%) | 16 (53%) | 9,6 3,41-27 |
| Parity | multiparous | 13 (41%) | 19(59%) | 3,7 | 1,32-10 | 60 (76%) | 19 (24%) | 1,1 0,54-2,4 |
| | Grand multiparous | 25 (71%) | 10 (29%) | | | 50 (74%) | 18 (25%) | |
| Obesity | Overweight | 8 (47%) | 6 (53%) | 1 | | 40 (89%) | 5 (11%) | 1 |
| | Obesity grade I | 7 (40%) | 6 (60%) | 1,1 | 0,5-5,2 | 30 (83%) | 6 (17%) | 1,6 0,45-5,74 |
| | Obesity grade II | 4 (22%) | 14 (78%) | 4,1 | 1,05-21,6 | 23 (71%) | 9 (29%) | 3,1 0,94-10,4 |
| | Obesity grade III | 3 (18%) | 14 (82%) | 6,2 | 1,2-31,9 | 17 (57%) | 13 (43%) | 6,1 1,9-19,86 |
| Foetus Presentation | Breech | 9 (43%) | 12 (57%) | 0,2 | 0,04-0,51 | 10 (53%) | 9 (47%) | 0,3 0,11-0,84 |
| | Cephalic | 27 (84%) | 5(6%) | | | 100 (78%) | 28 (22%) | |
| Pregnancy type | Monofetal | 30 (75%) | 10 (25%) | 6,6 | 1,64-23,6 | 95(76%) | 30(24%) | 2,5 0,6-10 |
| | Twin | 5 (31%) | 11 (69%) | | | 5 (55%) | 4 (45%) | |
| Infant | Eutrophic | 30 (78%) | 8 (22%) | 6,7 | 2,42-18,5 | 88 (78%) | 25 (12%) | 1,9 0,84-4,4 |
| | Macrosomic | 14 (36%) | 25 (64%) | | | 22 (67%) | 12 (33%) | |
| Pregnancy length | ≥ 40 AW | 10 (59%) | 7 (41%) | 1,0 | 0,32-3,69 | 30 (65%) | 16 (35%) | 2 0,91-4,6 |
| | 37≤ AW < 40 | 17 (61%) | 11 (39%) | 1 | | 65 (79%) | 17 (21%) | 1 |
| | < 37 AW | 16 (62%) | 10 (38%) | 0,9 | 0,32-2,9 | 15 (79%) | 4 (29%) | 1,0 0,3-3,47 |

VD: vaginal delivery; CS: Caesarean section; AW: amenorrhoea weeks.

Furthermore, the analysis of the foetus presentation revealed that the cephalic presentation is a protector factor. Indeed, the trial of labor after caesarean ended in vaginal delivery in 84% of cases when the presentation is cephalic and in 43% of cases only when the foetus is in

breech presentation (OR=0.2; IC95%: 0.04-0.51). The same result was registered in the group without caesarean history with success rates of 78% for the cephalic presentation and 47% for the breech presentation (OR=0.3; IC95%: 0.11-0.84).

Moreover, gemellarity and macrosomia present similar and significant risks of failure of vaginal delivery table 1. Nevertheless, no significant differences were observed for the birth terms.

DISCUSSION

First, the present work showed that getting older exposes women to the failure of trial of labor particularly in those with scarred uterus. Nevertheless, the numerous studies that worked on this subject found different and sometimes discordant success rates of trial of labor. In fact, our results confirm those of some studies (Bujold et al., 2004; Cohen et al., 1980; Seoud et al., 2002) but are not consistent with others (Landon et al., 2005; McNally & Turner, 1999; Weinstein et al., 1996). The literature does not display sufficient elements to determine a threshold of age beyond which the practice of caesarean section in patient with scarred uterus would be preferable to the trial of labor for vaginal delivery.

Furthermore, we found that grand multiparity is associated with an increase of success rate of trial of labor and with a decrease of morbidity after caesarean section. This finding confirms those of a monocentric study in United Arab Emirates (Dyack et al., 1996), a retrospective study in Israël (Kugler et al., 2008) and a work of Grobman and al. on the morbidity risks according to success chances of trial of labor after caesarean (Grobman et al., 2009).

The present results also showed that obesity increase the risk of failure of trial of labor in women with scarred uterus, which is due to several factors. In fact, parturition is delayed in obese women (Cedergren, 2004; Nohr et al., 2008) because the local cervix conditions are less favourable. The obstetrician is confronted with a situation in which he has to decide between carrying out a programmed caesarean that would expose the patient to the morbid complications of the surgery under these conditions (Doyle et al., 2010; Myles et al., 2002), and trying labor for vaginal delivery which would expose the patients to more dangerous complications if it does not succeed (caesarean section during labor). On the other hand, the intrauterine mortality in obese women would be explained by the fact that obesity is closely associated with hyperlipidaemia which harms endothelial cells leading to vasoconstriction and placental aggregation (Ramsay et al., 2002). Moreover, by reducing thromboxane secretion, obesity increases the risk of placental thrombosis and reduces the placental perfusion (Stone et al., 1994). According to Nohr et al. (2005), intrauterine mortality in obese women is associated with histological lesions and placental dysfunction in comparison with normal weight women.

The practice of caesarean on scarred uterus is very frequent in our study; this would be due to the fact that the risk of scarred uterus ruptures increases with the increase of trial of labor (Gregory et al., 1999; Hashima et al., 2004; Mouzurkewich & Hutton, 2000; Rageth et al., 1999), which induces more wariness among obstetricians from accepting trial of labor in patients with caesarean history, and consequently the increase of the practice of caesarean.

Furthermore, we registered in the case of twin births hypotrophy and prematurity which are two characteristics of this type of birth (Blondel et al., 2003; Farooqui et al., 1973). The uterus rupture was observed in 1% of cases of trial of labor after caesarean versus 0.3% of cases in patients with programmed caesarean after caesarean. This result converges with that reported

by Ford and al. in United States of America in a study carried out between 1993 and 2002 (Ford et al., 2006). That is due to the uterus hyper distension which is amplified by the labor contractions during the delivery of the second twin.

As far as macrosomia is concerned, the success rate of trial of labor was 36%, with 1.1% of uterine rupture and no perinatal mortality for infants weighing more than 4000 g. This rate remains lower than that found by Aboulfalah et al. with 64% and 1.3% of uterine rupture (Aboulfalah et al., 2000). Other studies found success rates around 60% with no rupture cases (Phelan et al., 1984; Flamm & Goings, 1989; Ford et al., 2006; Zelop et al., 2001). However, these results don't present sufficient proof to justify the practice of caesarean section on scarred uterus in the case of suspicion of macrosomia.

CONCLUSION

The present work showed that twin pregnancy, macrosomia and obesity would be risk factor of the failure of vaginal delivery in patients with caesarean section history. However, multiparity seems to protect from this failure.

ACKNOWLEDGEMENTS

We would like to express our deepest appreciation to all those who provided us the possibility to complete this paper. A special gratitude we give to the manager of the Cherif Idrissi provincial hospital where the study was carried out, who gave us the permission to accede to the hospital data. We would also like to acknowledge with much appreciation the crucial role of the staff of the hospital, who gave us the permission to use all required equipment and the necessary materials to complete the data collection.

DISCLOSURE

The authors reported no conflict of interest related to this article. None of the authors has a financial or corporate relationship.

REFERENCES

- [1] Lydon-Rochelle et al. (2001). Risk of uterine rupture during labor among women with a prior cesarean delivery. *N Engl J Med.*, 345, 3-8.
- [2] Landon et al. (2004). Maternal and perinatal outcomes associated with a trial of labor after prior cesarean delivery. *N Engl J Med.*, 351, 2581-2589.
- [3] Zwart et al. (2009). Uterine rupture in The Netherlands: a nationwide population-based cohort study. *BJOG*, 116, 1069-78.
- [4] Bujold et al. (2004). Trial of labor in patients with a previous cesarean section: does maternal age influence the outcome? *Am J Obstet Gynecol.*, 190, 1113-38.
- [5] Cohen et al. (1980). Risk of labor abnormalities with advancing maternal age. *Obstet Gynecol.*, 55, 414-6.
- [6] Seoud et al. (2002). Impact of advanced maternal age on pregnancy outcome. *Am J Perinatol.*, 19, 1-7.
- [7] Landon et al. (2005). The MFMU Cesarean Registry: factors affecting the success of trial of labor after previous cesarean delivery. *Am J Obstet Gynecol.*, 193, 1016-1023.
- [8] McNally, O. M., & Turner, M. J. (1999). Induction of labour after 1 previous caesarean section. *Aust N Z J Obstet Gynaecol.*, 39, 425-429.
- [9] Weinstein et al. (1996). Predictive score for vaginal birth after cesarean section. *Am J Obstet Gynecol.*, 174, 192-198.
- [10] Dyack et al. (1996). Vaginal birth after cesarean section in the grand multipara with a previous lower segment scar. *Int J Gynaecol Obstet*, 55:167-8.
- [11] Kugler et al. (2008). The safety of a trial of labor after cesarean section in a grand multiparous population. *Arch Gynecol Obstet*, 277:339-44.
- [12] Grobman et al. (2009). Can a prediction model for vaginal birth after caesarean also predict the probability of morbidity related to a trial of labor? *Am J Obstet Gynecol.*, 200, 56.e1-6.
- [13] Cedergren, M. I. (2004). Maternal morbid obesity and the risk of adverse pregnancy outcome. *Obstet Gynecol*, 103, 219-224.
- [14] Nohr et al. (2008). Davey births after cesarean delivery. *Obstet Gynecol*, 111:285-91.
- [15] Doyle et al. (2010). Obesity and postoperative complications in patients undergoing non-bariatric surgery. *Obes Rev*, 11, 875-886.
- [16] Myles et al. (2002). Obesity as an independent risk factor for infectious morbidity in patients who undergo cesarean delivery. *Obstet Gynecol*, 100, 959-964.
- [17] Ramsay et al. (2002). Maternal obesity is associated with dysregulation of metabolic, vascular, and inflammatory pathways. *J Clin Endocrinol Metab*, 87(9), 4231-4237.
- [18] Stone et al. (1994). Risk factors for severe preeclampsia. *Obstet Gynecol*, 83(3), 357-361.
- [19] Nohr et al. (2005). Prepregnancy obesity and fetal death: a study within the Danish National Birth Cohort. *Obstet Gynecol*, 106(2), 250-259.

- [20] Gregory et al. (1999). Vaginal birthe caesarean and uterine rupture rates in California. *Obstet. Gynecol.*, 94(6), 985-989.
- [21] Hashima et al. (2004). Predicting vaginal birth after caesarean delivery: A review of prognostic factors and screening tools. *Am. J. Obstet. Cynecol.*, 190, 547-555.
- [22] Mouzurkewich, L. E., & Hutton, E. K. (2000). Elective repeat cesarean delivery versus trial of labor: A meta-analysis of the literature from 1989 to 1999. *Am. J. Obstet. Gynecol.*, 183(5), 1187-1197.
- [23] Ragoth et al. (1999). Delivery after previous cesarean: A risk evaluation. *Obstet. Gynecol.*, 93, 332-337.
- [24] Blondel et al. (2003). Enquête périnatale. <http://www.sante.gouv.fr/htm/dossiers/perinat03/sommaire.html>
- [25] Farooqui et al. (1973). A review of twin pregnancy and perinatal mortality. *Obstet Gynecol Surv.*, 28, 144-153.
- [26] Ford et al. (2006). Vaginal birth after cesarean delivery in twin gestations: a large, nationwide sample of deliveries. *Am J Obstet Gynecol.*, 195, 1138-1142.
- [27] Aboulfalah et al. (2000). Delivery of large baby after cesarean section: role of trial of labor. A propos of 355 cases. *J Gynecol Obstet Biol Reprod*, 29, 409-413.
- [28] Phelan et al. (1984). Pre-viouscesarean birth. Trial of labor in women with macrosomic infants. *J Reprod Med.*, 29, 36-40.
- [29] Flamm, B. L., & Goings, J. R. (1989). Vaginal birth after cesarean section: is suspected fetal macrosomia a contraindication? *Obstet Gynecol.*, 74, 694-697.
- [30] Zelop et al. (2001). Outcomes of trial of labor following previous cesarean delivery among women with foetuses weighing > 4000 g. *Am J Obstet Gynecol.*, 185, 903-905.