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Outcome of induced labor: a cohort analysis of 247 deliveries at the Yaoundé Gynaeco-Obstetric and Pediatric Hospital, Cameroon

Effet de l'induction du travail sur le devenir maternel et foetal : cohorte de 247 accouchements à l'Hôpital Gynéco-Obstétrique et Pédiatrique de Yaoundé, Cameroun

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Article original

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ABSTRACT

Objective: The objective of this study was to assess the effects of induced labor on maternal and fetal outcomes.
Methods: It was a cohort study comparing the occurrence of complications during labor and the early postpartum period among 247 pregnant women consecutively recruited at the Yaoundé Gynaeco-Obstetric and Pediatric Hospital, Cameroon,
Results: 122 of which (49.4%) underwent induction of labor and 125 (50.6%) who had spontaneous labor, from December 10th 2014 to May 10th 2015. Only women with singleton pregnancies were included. Induction of labor was mostly indicated for premature rupture of membranes (39.3%), convenience (23.0%) and prolonged pregnancy (21.3%). Women in whom labor was induced were at a greater risk of caesarean section (RR=2.56; CI=1.93-3.37) and uterine tear (RR=6.15; CI=4.77-7.92). They also had a decreased risk of episiotomy (OR=0.41; CI=0.21-0.82). Additionally, three cases of uterine rupture were recorded among them.
Conclusion: Careful selection of patients to be induced and close follow-up of induced women are recommended to prevent these identified related hazards.

RESUME

Objectif : L'objectif de ce travail était d'évaluer les effets de l'induction du travail sur le devenir maternel et foetal.
Méthodes : Il s'agissait d'une étude de cohorte comparant la survenue de complications pendant le travail et la période du post-partum précoce chez 247 femmes ayant été consécutivement recrutées à l'Hôpital Gynéco-Obstétrique et Pédiatrique de Yaoundé (Cameroun), du 10 Décembre 2014 au 10 Mai 2015. Seules les parturientes porteuses d'une grossesse monofoetale avaient été incluses.
Résultats : L'induction du travail était le plus souvent indiquée pour rupture prématurée des membranes (39,3%), convenance (23,0%) et grossesse prolongée (21,3%). Parmi celles-ci, 122 (49,4%) avaient bénéficié d'une induction du travail et 125 (50,6%) avaient eu un travail spontané. Les femmes ayant eu une induction du travail avaient un risque plus élevé de césarienne (RR=2,56; IC=1,93-3,37) et de déchirure cervicale (RR=6,15; IC=4,77-7,92). Cependant, elles présentaient un risque moins élevé d'épisiotomie (OR=0,41; IC=0,21-0,82). Par ailleurs, trois cas de rupture utérine ont été documentés parmi elles.
Conclusion : Une sélection minutieuse des patientes devant bénéficier d'une induction du travail et une surveillance minutieuse du travail induit sont recommandées pour prévenir les complications retrouvées dans cette étude.

Introduction

Induction of labor is defined as the process of artificially stimulating the uterus to start labor. It is indicated in circumstances in which the risks of waiting for the onset of spontaneous labour are judged by clinicians to be greater than the risks associated with shortening the duration of pregnancy (1). Induction of labor is a medical procedure practiced worldwide (2-3). A systematic elective induction of labor is even recommended at 41 weeks gestation and beyond (2). An incidence rate of 9.8% has been reported in Cameroon (4). On the other hand, induction of labor has been associated with poor fetal and maternal outcomes (3). Oxytocin usage has been documented in 53.3% of obstetric shock cases leading to emergency hysterectomies in a Cameroonian reference hospital (5). To date, little is known on the effects of induced labor on the outcome of delivery in a sub-Sahara African setting. The objective of this study therefore was to assess the effects of induced labor on the outcome of delivery in a Cameroonian reference hospital.

Methods

This was a cohort study comparing the occurrence of complications during delivery between 122 pregnant women who underwent induced labor (exposed group) to 125 parturients in whom labor was spontaneous (non-exposed group). They were consecutively recruited from December 10th 2014 to May 10th 2015 at the Yaoundé Gyneco-Obstetric and Pediatric Hospital, Cameroon. After the approval of the protocol by the ethical committee of the hospital, all pregnant women admitted into the labor room who gave informed consent, were recruited into the study. Referred women, those undergoing augmentation of labor, preterm or twin pregnancies, women admitted in active phase of labor or scheduled for an elective cesarean section were excluded.

The enrolled pregnant women were examined on admission by an obstetrician/gynecologist or a resident in obstetrics and gynecology. Labor was monitored by midwives and residents, using a partograph, as recommended by the World Health Organization. A pretested questionnaire was administered by an investigator and the women were followed from the time of their inclusion into the study, to the time of discharge from the hospital. The variables studied were: maternal age, parity, indication and methods of labor induction, characteristics of labor (gestational age during labor, uterine contractions, oxytocin usage, premature rupture of membranes, cervical dilatation on admission, duration of the active phase, pattern of labor, mode of delivery), intrapartum complications (hemorrhage, uterine rupture, cervical and uterine tears), characteristics of the newborn (birth weight, sex, the 5th minute Apgar score, admission to neonatology), postpartum complications (endometritis, hemorrhage, hypertension).

For calculation of the minimal sample size for each group, it was assumed that induced labor would multiply by two the rate of cesarean section from 19.7% reported by Foumane et al. in the same setting (6). The calculated minimal sample size using the formula proposed by Schulz et al. (7) was 108 subjects for each group with chosen precision and power respectively of 5% and 90%. During analysis, recruited women were divided into the exposed group (induced labor) and the non-exposed group (non-induced labor).

Statistical analyses were done using CSPro version 5.0 and SPSS version 18.0 software. The difference was statistically significant for P-value<0.05. The Pearson's Chi square and the Fisher's exact test were used to compare proportions. The difference was statistically significant for P-value<0.05. The relative risk (RR) was calculated to measure the association between induced labor and outcome variables.

Results

On the 1104 deliveries registered during the study period, 146 (13.2%) underwent an induction of labor, 24 of which did not give their consent and were excluded. Two hundred and forty-seven pregnant women meeting the inclusion criteria were included in the study. Among them, 122 (122/247; 49.4%) delivered after induced labor (exposed group) while 125 (125/247; 50.6%) gave birth following spontaneous labor (non-exposed group). Among the pre-inclusion variables analyzed (table 1), age group between 20 and 25 years, married women, student status and gestational age ≥41 weeks were significantly associated with induction of labor.

Table I: Significant pre-inclusion variables between the exposed (**N=122)** and the non-exposed (**N=125)** groups

Variable	Induced labor n (%)	Spontaneous labor n (%)	P-value
[20-25[years age group	16 (13.1)	29 (23.2)	0.04
Married women	50 (40.0)	68 (55.7)	0.01
Student	31 (25.3)	50 (40.1)	0.01
Gestational age ≥ 41 weeks	30 (24.6)	15 (12.0)	0.01

Other pre-inclusion variables did not show any significant association with induced labor. Most of the inductions of labor were indicated for premature rupture of membranes (39.3%), convenience (23.0%) or prolonged pregnancy (21.3%) (Table 2).

Intravaginal misoprostol and oxytocin infusion, given alone or in association, were the most common methods used to induce labor. Women who underwent induction of labor had a higher risk (table 3) of caesarean section (RR=2.56; CI=1.93-3.37), cervical tear (RR=4.61; CI=3.39-6.28) and uterine tear (RR=6.15; CI=4.77-7.92). Three cases of uterine rupture were recorded among parturients undergoing induced labor, but the difference was not significant. Induced women had significantly less episiotomies (OR=0.41; CI=0.21-0.82). Fetal outcome variables did not show any significant difference between the two groups, as well as the other outcome variables studied.

Table II: Characteristics of induction of labor in the exposed group **(N=122)**

Characteristic	n (%)
Indication	
Premature rupture of membranes	48 (39.3)
Convenience	28 (23.0)
Prolonged pregnancy	26 (21.3)
Other	20 (16.4)
Method	
Intravaginal misoprostol	53 (43.4)
Oxytocin infusion	20 (16.4)
Intracervical Foley's catheter	02 (1.6)
Intravaginal misoprostol + oxytocin infusion	24 (19.7)
Intracervical Foley's catheter + oxytocin infusion	17 (13.9)
Intracervical Foley's catheter + intravaginal misoprostol	03 (2.5)
Intracervical Foley's catheter + intravaginal misoprostol + oxytocin infusion	03 (2.5)

Table III: Comparison of the outcome variables between exposed (**N=122)** and non-exposed (**N=125)** groups

Variable	Induced labor n (%)	Spontaneous labor n (%)	RR (95% CI*)	P-value
Duration of active phase of labor				
[1h - 4 h [	33 (32.4)	44 (37.6)	0.86 (0.63–1.17)	0.79
[4h - 8h [	56 (54.9)	64 (54.7)	1.01 (0.75–1.33)	0.48
[8h – 12h [	9 (8.8)	8 (6.8)	1.29 (0.8 – 2.07)	0.38
≥ 12 h	4 (3.9)	1 (0.9)	4.59 (0.89–7.28)	0.14
Maternal complications				
Cesarean section	20 (16.4)	8 (6.4)	**2.56 (1.95-3.37)**	**0.01**
Episiotomy	6 (4.9)	15 (12.0)	**0.41 (0.21-0.82)**	**0.04**
Perineal tear	20 (16.4)	26 (20.8)	0.79 (0.55-1.13)	0.23
Vaginal tear	11 (9.0)	8 (6.4)	1.41 (0.94-2.11)	0.30
Cervical tear	9 (7.4)	2 (1.6)	**4.61 (3.39-6.28)**	**0.03**
Uterine rupture	**3 (2.5)**	0 (0.0)	7.05 (0.37-135.21)	0.19
Uterine tear (cervix, lower segment and corpus)	12 (9.8)	2 (1.6)	**6.15 (4.77-7.92)**	**0.00**
Postpartum hemorrhage	17 (37.0)	17 (32.1)	1.02 (0.71-1.47)	0.54
Neonatal complications				
Fifth minute Apgar score <7	5 (4.1)	5 (4.0)	1.02 (0.54-1.93)	0.61
Transfer to the neonatalogy unit	6 (4.9)	4 (3.2)	1.54 (0.91-2.59)	0.35

*CI= Confidence Interval

Discussion

Induction of labor has been found to predispose to cesarean section in this study. A similar finding has been reported by BAUD et al (3). However, many authors have found that induced labor was not associated with increased risk of cesarean section in low-risk patients at term, some of them objectifying a decreased incidence of operative delivery among induced women (8-10). Our finding can find an explanation in the fact that the study was carried out in reference hospital, where high risk pregnant women are referred for better management.

Uterine tears, including cervical tears and uterine ruptures, were also identified as complications associated with induction of labor. Whereas severe lacerations of the

genital tract have not been reported to be significantly associated with induced labor (8), post-partum hemorrhage, mostly due to uterine atony or genital tract lacerations, is known to have an increased incidence after induction of labor (3, 11). Additionally, an increased risk of uterine rupture has been documented in women with a scarred uterus (12-13), which was the case in two of our three reported uterine ruptures. However, the results of our study should be considered with some caution. Our study was carried out in a low-resource reference hospital on a limited number of subjects. At the same time, many women in labor were excluded. This might have given some bias to our results.

Conclusion:

In our setting, induction of labor predisposes to caesarean section, cervical and uterine tears. Careful selection of the patients to be induced and close follow-up of induced women are recommended to prevent these identified related hazards. In this purpose, practices based on the best scientific evidence are recommended (14-15).

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References

1. World Health Organization. Managing complication in pregnancy and childbirth: a guide for midwives and doctors. Geneva, 2000. Available from: http://www.who.int/reproductivehealth/publications/maternal_perinatal_ health/9241545879/en/index.html. Accessed 21/10/2016.
2. Caughey AB, Sundaram V, Kaimal AJ, Cheng YW, Gienger A, Little SE et al. Maternal and neonatal outcomes of elective induction of labor. Evid Rep Technol Assess (Full Rep). 2009 Mar;(176):1-257.
3. Baud D, Rouiller S, Hohlfeld P, Tolsa JF, Vial Y. Adverse obstetrical and neonatal outcomes in elective and medically indicated inductions of labor at term. J Matern Fetal Neonatal Med. 2013 Nov;26(16):1595-601.
4. Kouam L, Kamdom-Moyo J, Shasha W, Ngassa P. [Induced labor: conditions for success and causes of failure. A prospective study of 162 cases]. [Article in French]. Rev Fr Gynecol Obstet. 1993 Apr;88(4):243-8.
5. Nzintcheu Youssa JM, Foumane P, Mboudou ET, Dohbit JS, Mbu RE, Doh AS. [Obstetric emergency hysterectomy in the Yaoundé Gynaeco-Obstertric and Pediatric Hospital: a review of 30 cases]. [Article in French]. J SAGO 2009 ; 10(2) : 25-9.
6. Foumane P, Mve Koh V, Ze Minkande J, Njofang Ngantcha EA, Dohbit JS, Mboudou ET. [Risk factors and outcome of emergency cesarean section at the Yaoundé Gynaeco-Obstertric and Pediatric Hospital, Cameroon]. [Article in French]. Méd Santé Trop 2014; 24: 89-93.
7. Schulz KF, Grimes DA. Sample size calculations in randomized trials: mandatory and mystical. Lancet. 2005;365:1348-53.
8. Gibson KS, Waters TP, Bailit JL. Maternal and neonatal outcomes in electively induced low-risk term pregnancies. Am J Obstet Gynecol. 2014 Sep;211(3):249.e1-249.e16.
9. Darney BG, Snowden JM, Cheng YW, Jacob L, Nicholson JM, Kaimal A et al. Elective induction of labor at term compared with expectant management: maternal and neonatal outcomes. Obstet Gynecol. 2013 Oct;122(4):761-9.
10. Cheng YW, Kaimal AJ, Snowden JM, Nicholson JM, Caughey AB. Induction of labor compared to expectant management in low-risk women and associated perinatal outcomes. Am J Obstet Gynecol. 2012 Dec;207(6):502.e1-8.
11. Khireddine I, Le Ray C, Dupont C, Rudigoz RC, Bouvier-Colle MH, Deneux-Tharaux C. Induction of labor and risk of postpartum hemorrhage in low risk parturients. PLoS One. 2013;8(1):e54858.
12. Palatnik A, Grobman WA. Induction of labor versus expectant management for women with a prior cesarean delivery. Am J Obstet Gynecol. 2015 Mar;212(3):358.e1-6.
13. Ashwal E, Hiersch L, Melamed N, Ben-Zion M, Brezovsky A, Wiznitzer A et al. Pregnancy outcome after induction of labor in women with previous cesarean section. J Matern Fetal Neonatal Med. 2015 Mar;28(4):386-91.
14. Tsakiridis I, Mamopoulos A, Athanasiadis A, Dagklis T. Induction of labor: ban overview of guidelines. Obstet Gynecol Surv. 2020 Jan; 75 (1): 61-72.
15. Borovac-Pinheiro A, Inversetti A, Di Simone N, Barnea ER, FIGO Childbirth and Postpartum Hemorrhage Committee. FIGO good practice recommendations for induced or spontaneous labor at term: Prep-for-Labor triage to minimize risks and maximize favorable outcomes. Int J Gynaecol Obstet. 2023 Oct; 163 Suppl 2:51-6.