

Prognostic Factors of Induction of Labor with Misoprostol at CHUD/B in Parakou, Benin in 2016

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Abstract

Introduction: Misoprostol is a molecule used for inducing labor these days in order to reduce perinatal morbidity and mortality. This study aimed at appreciating maternal and fetal prognosis after induction of labor on indication for delivery with misoprostol on live fetus at CHUD/B in 2016. **Patients and Method:** It was an observational case-control type study with prospective data collection carried out in the gynecology and obstetrics department of CHUD/B. Were included, 37 WA healthy pregnant women whose Bishop score was less than 6. Their fetal heart rate and their pelvis were normal. Fisher chi-2 test was used and the significance threshold of different associations was 5%. **Results:** In the study, 99 women involved were divided into 33 cases and 66 case-controls. The average age of cases was 29.70 ± 5.03 years old with extremes of 20 and 40 years and that of case-controls was 29.44 ± 4.96 years with extremes of 21 and 40 years. Out of the 1195 deliveries which took place in the gynecology and obstetrics department of CHUD/B, 33 inductions of labor on full-term live fetuses with misoprostol were performed that is to say a frequency of 2.76%. The factors associated with maternal and fetal prognosis were profession, mode of admission, Bishop score with respectively *p*-values of 0.049, 0.00005, 0.00001. **Conclusion:** The use of misoprostol seems beneficial as regards maternal and fetal prognoses in our practice at a low cost.

Keywords

Induction of Labor, Misoprostol, Prognosis, Parakou

1. Introduction

Artificial induction of labor is carried out for maternal or fetal indications in

order to reduce perinatal morbidity and mortality without increasing the mother's ones [1]. Since its contractile properties on myometrium were brought to the fore, misoprostol has been used for cervical ripening before induction of labor when the cervix is unfavorable. In practice, it is noticed that once administered, it ensured not only ripening but it also induced labor. On account of these two properties, this molecule has gained acceptance in obstetrics for this latter indication even without a marketing authorization [2]. Then, it is quickly adopted in Africa in general and in Benin in particular where it offers the advantage of being inexpensive and suitable for storage condition [3]. After five years of use for the induction of labor in the gynecology and obstetrics department of CHUD/B, it is appropriate to take stock of this practice. The purpose of this study is to appreciate maternal and fetal prognosis after the induction on the indication for delivery with misoprostol on live fetus in CHUD/B in 2016.

2. Method

It was an observational case-control type study with a prospective data collection carried out in the gynecology and obstetrics department of CHUD/B which took place over a period from 1 January to 31 July 2016. A comprehensive census of all the women who met the inclusion criteria and who delivered during the survey period was performed.

The target population consisted of all the women who had been pregnant since the 37th WA and who met the following criteria.

Definition of cases: Any woman whose delivery term was more than or equal to 37 WA determined on the LMP or the ultrasound for dating basis and whose labor had been induced with misoprostol.

Definition of controls: Any pregnant woman whose delivery term was more than or equal to 37 WA determined on the LMP or the ultrasound for dating basis and who had spontaneously gone into labor.

Inclusion criteria: Were included, healthy pregnant women of at least 37 WA meeting the following criteria:

- 1) Medical or obstetric indication for induction of labor.
- 2) Bishop score was less than 7.
- 3) Normal fetal heart rate: fetal heart rate which vary between 120 beats per minute and 160 beats per minute.
- 4) Normal female pelvis: when at the upper strait basin.
 - a) the promonto-retropubic diameter ≥ 10.5 cm,
 - b) the median transverse diameter ≥ 12.5 cm and,
 - c) the oblique diameters ≥ 12 cm.
- 5) Monofetal pregnancy with cephalic presentation.

Exclusion criteria: Were excluded, pregnant women of at least 37 WA following the criteria below:

- 1) Refusal to use misoprostol for induction of labor.
- 2) Scarred uterus.

- 3) Absolute contraindication to vaginal delivery.
- 4) Known allergy to misoprostol.

Matching criteria: Matching of cases and case-controls was based on:

- 1) The parturient woman's age.
- 2) Gravidity.
- 3) Parity.
- 4) Gestational age.
- 5) Cephalic presentation.

Choice of control-cases: They were pregnant women who met the matching criteria and who were received after the case.

2.1. Induction Technique

The induction was performed after making sure that the fetus was well, and that the condition of the cervix has a Bishop score < 7. After that, 50 µg misoprostol (a quarter of 200 µg scored tablet) is deposited in the posterior fornix. This misoprostol dose is renewed every six hours without exceeding the total dose of 200 µg in 24 hours. If the induction does not work after this total dose, it is considered as a failure.

2.2. Variables

The main variable was the maternal and fetal prognosis. The maternal prognosis was defined as the mother's condition at the time of the child's birth and during her hospitalization as well as complications. The fetal prognosis is defined as the aspect of the fluid before and after the induction and also the recording of fetal heart sounds (FHS) before and after the first placement of misoprostol. Independent variables were socio demographic and clinical ones. After the collection, data were coded and entered with Epi Data version 3.1 software and analyzed with the SPSS version 21 software. Qualitative variables were expressed in percentage and quantitative variables were expressed in averages. Fischer chi-2 test was used and the significance threshold of the different associations was 5%.

2.3. Ethics Committee Authorization

The present research work was approved by the ethics committee local in Parakou.

3. Results

3.1. Description of the Target Population

In the survey, 99 women were involved and divided into 33 cases and 66 control-cases.

The average age of the pregnant women, the average parity and the average gestational age of cases and control-cases are documented in **Table 1**.

The age group between 25 and 34 years old predominates in cases (66.6%) but in control-cases it was those between 20 and 30 years old (74.2%).

Primiparous women represented the largest number among cases with

Table 1. Characteristics of the sample.

	Case		Control-cases		<i>P</i>
	Average	Extreme	Average	Extreme	
Age (year)	29.70 ± 5.03	20 - 40	29.44 ± 4.96	21 - 40	0.900
Parity	1.64 ± 1.45	0 - 5	1.59 ± 1.56	0 - 6	0.900
Gestational age	39.31 ± 1.07 SA	37 - 41	39.31 ± 1.07 SA	37 - 41	1.000
Bishop score	3.22	1 - 6	-	-	-

SA: Gestational age in Week of Amenorrhea.

30.30%. Nulliparous and pauciparous with 27.27% each ranked second. In control-cases, pauciparous represented the largest number 36.36% nulliparous 33.33% in second position.

Bishop score in all cases was unfavorable before induction.

3.2. Frequency of Induction

Out of 1195 deliveries which took place in the gynecology and obstetrics department of CHUD/B, 33 inductions of labor on full-term live fetuses with misoprostol were initiated that is to say a frequency of 2.76%. The number of labor induced was 29 that is to say 87.87% of cases. In 4 cases, the failure of the induction led to cesarean section. The main indications for induction are presented in **Table 2**.

Clinically, the pregnant women were directly admitted. Bishop score was between 1 and 4 in 75.75% of cases and statistically, there was no significant difference between the two groups as regards the maternal and fetal conditions before induction (**Table 3**).

As regards prognosis, the average duration of labor was, from the induction of labor to the expulsion of the fetus, 4.04 ± 2.59 hours with extremes of 2 and 12 hours. Cesarean section rate was 39.39% in cases as against 30.3% in case-controls without difference statistically $p = 0.36$. In the group of cases, all cesarean sections were performed for Bishop scores between 1 and 4.

Acute fetal distress was observed in the proportion of 15.15% in the group of cases as against 21.21% in the group of case-controls. No perinatal death was reported in the two groups.

3.3. Associated Factors

Sociodemographic and clinical characteristics were associated with the induction of labor namely Bishop score, mode of admission and profession with nine times greater risks of maternofetal complication for housewives whose labor was induced with misoprostol (**Table 4**).

3.4. Discussion

In total, 99 subjects divided into 33 cases and 66 case-controls were surveyed. The average as regards age, parity, gestational age was similar in the two groups.

Table 2. Distribution of cases according to the indication for induction of labor in CHUD-B, 2016.

Indications	Number	Percentage
PROM	13	39.40
Exceedance of term	12	36.36
Pregnancy HBP	8	24.24
Total	33	100.00

Table 3. Distribution of cases and control-cases according to clinical characteristics when admitted to the gynecology and obstetrics department of CHUD/B in 2016.

	Cases		Control-cases		P
	Number	%	Number	%	
FHS					
Bradycardia	0	00	3	4.54	0.152
Normal	33	100	59	89.4	
Tachycardia	0	0.00	4	6.06	
Amniotic sac					
Intact	20	60.61	37	56.06	0.666
Ruptured	13	39.39	29	43.94	
Amniotic fluid					
clear	11	84.62	14	51.86	0.08
Meconium-stained	2	15.38	13	48.14	
Bishop score					
[1 - 4]	25	75.75	0	0	0.000
[5 - 6]	8	24.24	1	1.51	
≥7	0	0	65	98.48	

As for parity, it should be noted that although averages were close to each other in the two groups, primiparous women predominate among the cases (30.30%) and (33.33%) in the control-group. This difference can account for the length of labor which is shorter for case-controls (2.5 ± 2.59 hours) than for cases (4.04 ± 2.59 hours). Moreover, there is no statistical difference between the two groups.

3.5. Frequency of Induction of Labor

These 33 inductions of labor were performed over a period of 7 months during which 1195 deliveries were carried out in the department that is to say a frequency of 2.76%. This frequency is by far less than those found in studies conducted in France and the USA [4] [5] on the one hand and in Brazil (59.2%) and Tunisia [6] [7] on the other hand. In general, the frequency of induction varies widely from a region to another and even from a health care institution to another [4] [7]. Thus, the frequency of induction is generally higher in western

Table 4. Distribution of women whose delivery was carried out with or without misoprostol according to sociodemographic and clinical characteristics in CHUD/B in 2016.

	Maternal and fetal complications				<i>p</i>
	Cases	Case-controls	OR	CI _{95%}	
Educational level					0.541
Primary	12	19	1		
Secondary	8	12	0.95	[0.30 - 2.99]	
Higher education	6	12	1.26	[0.37 - 4.27]	
None	7	23	2.08	[0.68 - 6.31]	
Profession					0.049
Trader	15	16	1		
Civil servant	8	13	1.52	[0.49 - 4.71]	
Housewife	2	19	8.91	[1.77 - 44.93]	
Craftswoman	3	10	3.13	[0.72 - 13.59]	
Student	4	7	1.64	[0.40 - 6.76]	
Others	1	1	0.94	[0.05 - 16.37]	
Mode of admission					0.00005
Came by herself	10	43	1		
Referred by a health care center	6	16	0.62	[0.19 - 1.99]	
Referred by a clinic	13	7	0.13	[0.04 - 0.39]	
Amniotic sac					0.666
Intact	20	37	1		
Ruptured	13	29	1.21	[0.52 - 2.82]	
Bishop score					0.00001
[1 - 4]	25	0	-	-	
[5 - 6]	8	1	1		
≥7	0	65	-	-	
Maternal complications					
Hyperkinesia					1
Yes	2	3	1.35	[0.15 - 10.73]	
No	31	63	1		
Prerupture syndrom					
Yes		0	1	-	1.00
No		33	65		
AFD					
Yes	4	14	1	[0.13 - 1.89]	0.270
No	9	52	0.51		
Apgar score					
1 min					
≥7	32	63	1.52	[0.13 - 39.63]	1.000
<7	1	3	1		
5 mins					
≥7	33	64	-	-	0.55
<7	0	2			

countries than in developing countries [8]. This difference between developed countries and developing ones as regards induction of labor could be accounted for by a broadening of indications especially the indications on personal grounds [6]. Clinically, the two groups differed from each other by Bishop score which was unfavorable in all cases and 98.48% favorable for the control-group. The indication for misoprostol was justified by the fact that it offered the opportunity to prepare the uterine cervix for induction by both ensuring ripening and leading to uterine contractions [6] [7] [8]. As a result, it is more beneficial in the context of obstetric practice in developing countries.

The favorable outcome of inductions of labor with misoprostol was 8.87%. It was 70.4% in Tunis [7]. The greater frequency of nulliparous in the Tunisian series (52%) as against 30.30% in ours could result in this difference. According to Bognon *et al.* [8], parity is the most important data to predict a vaginal delivery within 24 hours, more important than the elements of Bishop score considered one at a time even after adjustment to confounding factors. Nevertheless, Bishop score remains the essential predictive factor of vaginal delivery in case of induction [4] [8] [9] and then the better the Bishop score is, the better the induction is [10]. The same observation is reported in Canada with an increased failure rate of induction in women whose Bishop score was very low (from 0 to 3) and this, both for nulliparous women and multiparous ones [9] [10]. In addition, the increased frequency of PROM in the group of cases could partly account for this good prognosis since PROM often initiates labor.

3.6. Factors Associated with Maternofetal Complications

Other factors can be considered as being at risk of complication in case of induction of labor with misoprostol. These factors are profession, housewives, craftswomen and students running respectively 9, 3, 13 and 1.3 times greater risks of developing complications than traders. It is the same with the mode of admission. Maternal and fetal complications were statistically associated with the pregnant women's mode of admission. This prognosis was better for pregnant women referred from clinics to the CHUD revealing thereby the advantages of referrals carried out unemotionally. Referred in such a context, the pregnant women were offered a monitoring based on a well-codified protocol implemented in a serene atmosphere. The induction of labor with misoprostol did not lead to perinatal death as reported by some authors [11]. There was not either any significant difference statistically between the two groups as regards Apgar score at 5 min. The same observations were made in Bembéréké in Benin by Dénakpo *et al.* [12]. However, in literature, induction, all methods taken together, increases the risk of having an Apgar score less than 7 to 5 mins of life and it leads to an increase in the incidence of admissions in pediatric intensive care units [11]. These pejorative observations with regard to Apgar score found in literature could be due to indications for induction; fetal population being more fragile in their series than in ours. Furthermore, the high proportion of PROM induced after a 48

hour-period of expectancy with prophylactic antibiotics as advocated in our protocols contributes to the support of this prognosis. El FEKIH Firaz *et al.* reported that the shorter the expectancy period is, the greater the risk of cesarean section is without increasing perinatal mortality even if infectious maternal and fetal morbidity grows [13].

4. Conclusion

The use of misoprostol seems beneficial as regards maternal and fetal prognoses in our practice at a low cost. But it becomes necessary to carry out other comparative multicenter studies in order to highlight its advantages and decide upon a standard protocol for its use in an obstetric setting. In parallel, it is appropriate to strengthen surveillance during inductions with misoprostol to derive maximum advantage from it.

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