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The effectiveness of misoprostol or dinoprostone in neonatal outcome after labour induction in post-term nulliparas

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Summary

Objective: The object of this study was to investigate the efficacy of vaginal administration of misoprostol versus dinoprostone in neonatal outcome. *Materials and Methods:* The first Group A included 77 pregnant women, who requested pregnancy termination one week after labour term and received vaginally misoprostol 50 μg, while the other 69 pregnant women in Group B were vaginally administrated three mg dinoprostone. According to the authors' protocol this procedure was repeated after six hours for a maximum of two times. *Results:* The labour duration was longer in Group B ($p = 0.000$), while the APGAR score was better in Group A ($p = 0.015$). In Group A the labour modus was as follows: 86.9% normal vaginal labour, 3.8% vacuum extraction, and 9.3% cesarean section, while in Group B it was 82.83% normal vaginal labour, 3.07% vacuum extraction, and 14.1% cesarean section. *Conclusion:* Misoprostol has advantages according to neonatal outcome compared to administration of dinoprostone.

Key words: Misoprostol; Dinoprostone; Neonatal outcome; Post-term induction.

Introduction

Misoprostol is an analogue of prostaglandin E1(PGE1) which was registered in many countries during the second half of the 1980s particulary those caused by nonsteroidal anti-inflammatory drugs [1, 2]. Although misoprostol is not registered for reproductive health use, it is however widely used by gynecologists and obstetricians [3]. Misoprostol has been studied since 1993 for induction of labor in term pregnancies [4].

Labor induction may be indicated when the advantages outweigh the disadvantages of allowing the pregnancy to continue until spontaneous labor onset [5]. In cases of labor induction with an unfavorable cervix, either exogenous prostaglandins or mechanical methods are used to stimulate the production of endogenous prostaglandins through physical stretching of cervix for cervical ripening [6]. Recent studies reported the evaluation of the role of adjuvant interventions to shorten the duration of induced labor using misoprostol [7, 8]. The aim of this study was to certify and compare the efficacy and of vaginal administration of 50 μg misoprostol versus three mg dinoprostone for cervical ripening to neonatal outcome after labor induction in nulliparas or primiparas with singleton post-term pregnancies.

Materials and Methods

This study was a prospective, double–blinded observational trial of nulliparous or primiparous pregnant undergoing labor induction from March 2004 to June 2007 in Department of Obstetrics and Gynecology, Hospital Xanthi. All participants with a medical or obstetric indication for labor induction were eligible to participate in this study. Inclusions criteria were: gestational age measured from the first day of the least menstrual period according to menstrual history and vaginal ultrasonography longer than 40 weeks, age ≥ 17 years, singleton cephalic presentation of fetus, intact membrane, unfavorable cervical Bishop score < 6, and absence of spontaneous uterine contractions. Exclusions criteria were: ruptured membranes, parity more than two children, suspected chorioamnionitis or other serious infection, previous cesarean section, history of uterine myoma nucleation, risk factors for pregnancy, and fetal pathology. All study participants were admitted to labor induction and underwent cardiotocography (CTG) to rule out fetal distress and presence of uterine contractions. A cervical Bishop score was assigned and noticed on admission by attendance from the on–call physician. Prior to cervical ripening, a fetal ultrasound examination was performed to confirm the fetus presentation. The 77 pregnant participants from Group A, were administrated as a labor induction agent, misoprostol 50 μg, vaginally while other the 69 pregnant women from Group B received vaginally as agent one tablet dinoprostone three mg. Prostaglandin analogues were inserted in the left and right vaginal fornix and were previously moistened with two to three drops for injection. All participants remained on examination bed for one hour following insertion. CTG recordings were continued during the first hour of insertion and thereafter when the contractions occurred. CTG tracings were independently reviewed and noticed by the on–call physician and contraction abnormalities were noticed and coded as tachysystole and hyperstimulation. If obstructed labor was confirmed six hours after administration of the pharmacological agents, then the

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same parameters were examined, dosing was repeated, and waited for another six to12 hours. Time from induction to delivery, second dose administration in the two groups, neonatal APGAR score, and labor modus were determined and evaluated.

Statistical analysis

Statistical analysis was performed using the SPSS 11.5 statistical package for Windows. The quantity comparison from investigated parameters was described with statistical comparison of continuous variables, while the quality comparison from investigated parameters was described with the frequency variation from the continuous variables.

Test of normality from the quantity variables was performed by the one-way Kolmogorov–Smirnov test. The quantity variables had no normally distribution and due to this reason were described by median, maximum, and minimum values (Table 1). The comparison from the quantity variables between the two groups was performed using Mann Whitney statistical package, while the comparison from the quantity variables between the two groups was performed using Pearson Chi Square statistical package.

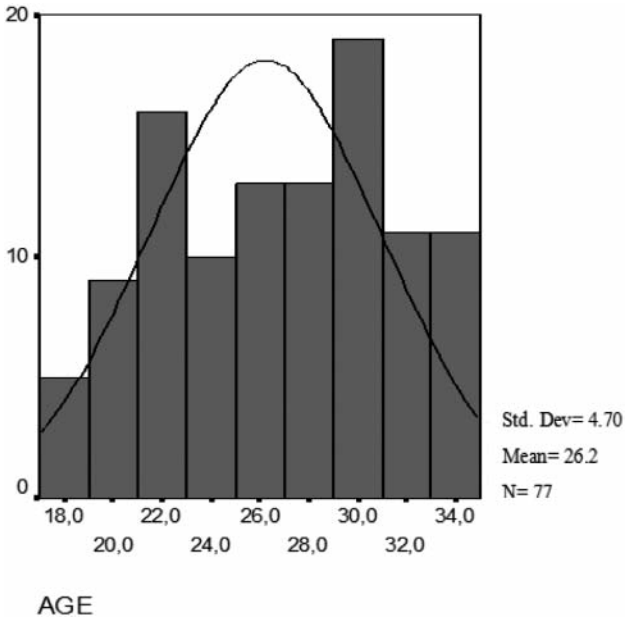

Figure 1. — Age distribution in Group A.

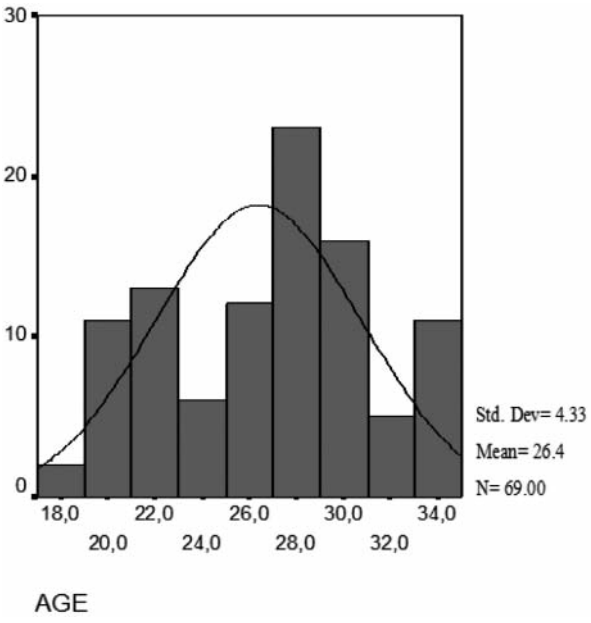

Figure 2. — Age distribution in Group B.

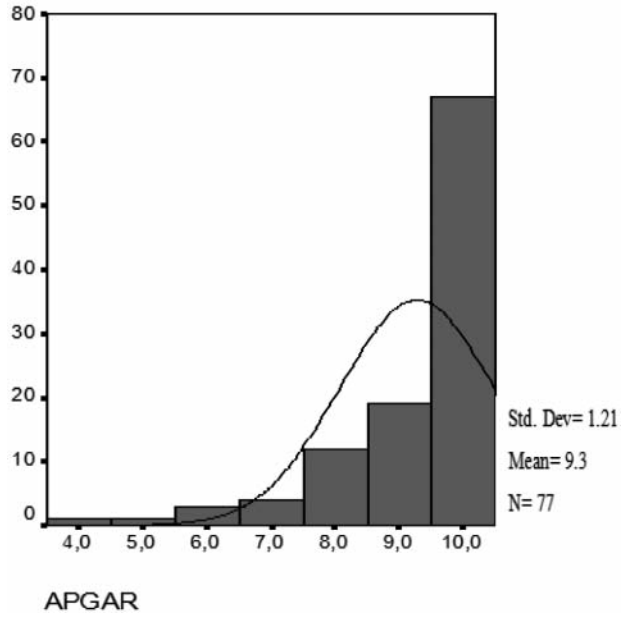

Figure 3. — APGAR score in Group A.

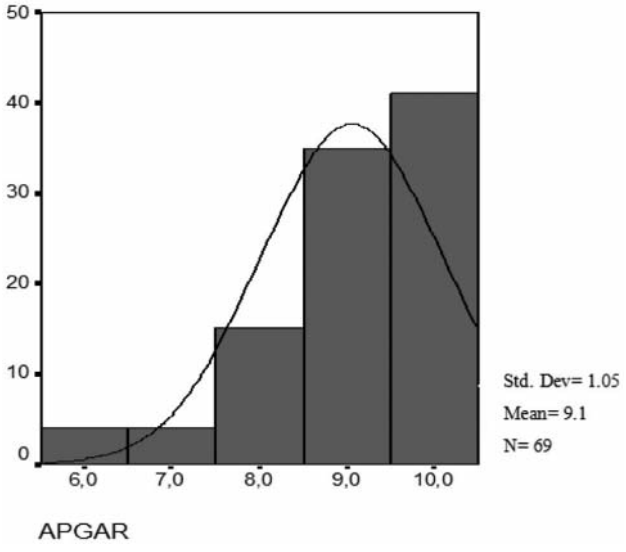

Figure 4. — APGAR score in Group B.

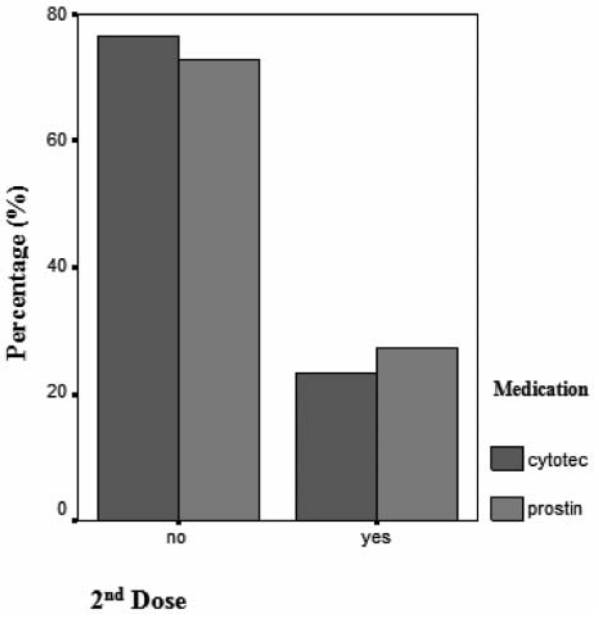

Figure 5. — Second medication dose.

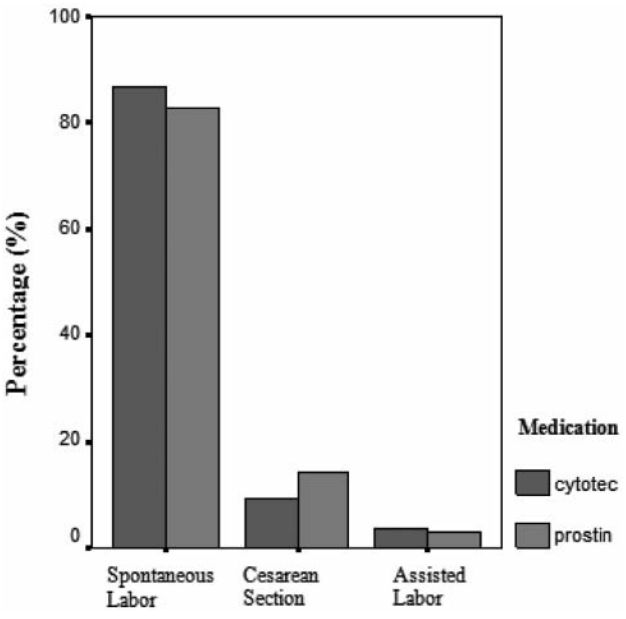

Figure 6. — Labor modus.

Table 1. — *Comparison of age, labor duration from introduction, and neonatal APGAR score between the two groups.*

		Misoprostol	Dinoprostone	*p* (Mann Whitney test)
Age (years)	Mean time	26.21	26.37	0.907
	Median time	27.00	27.00	
	Max value	34	34	
	Min value	17	18	
Duration of labor (hours)	Mean time	10.92	13.55	0.000
	Median time	10	12	
	Max value	26	27	
	Min value	5	6	
APGAR Score 1 and 5 min	Mean time	9.27	9.06	0.015
	Median time	10	9	
	Max value	10	10	
	Min value	4	6	

Table 2. — *Repeat of second medication dose and labor modus.*

	Misoprostol	Dinoprostone	*p* (Pearson Chi Square)
Second dose			
Yes	25 (23.37%)	27 (27.28%)	0.519
No	82 (76.53%)	72 (72.72%)	
Labor modus			
Spontaneous	93 (86.9%)	82 (82.83%)	0.551
Cesarean section	10 (9.3%)	14 (14.1%)	
Vacuum extraction	4 (3.8%)	3 (3.07%)	

Results

The age difference was not statistically significant between the two groups; conversely the labor duration was longer in the dinoprostone group and the APGAR score was better in the misoprostol group. The differences were statistically significant (Table 1). The figures from age, APGAR score, second medication dose, and labor modus for the two groups are shown in Figures 1-6, The differences according to quality characteristics (second dose of medication, labor modus) were not statistically significant (Table 2). No serious side effects were noticed in both groups of the participants.

Discussion

Clinical trials have compared misoprostol with placebo, oxytocin, and other prostaglandins, primarily dinoprostone and prostaglandin gel E2 [9-14]. Misoprostol administrated vaginally or orally is superior to placebo for inducing cervical ripening before induction of labor with oxytocin. In a Cochrane pregnancy and childbirth group which included 26 randomized trials, it was concluded that misoprostol is effective for labor induction, is associated with low incidence from side effects, however uterine hyperstimulation, changes of fetal heart rate, and the frequency of meconium stained amniotic fluid was higher in the misoprostol group compared to dinoprostone group [15]. It is unknown fetal distress is increased in the misoprostol group.

Main advantage of medical misoprostol is the combintion of its uterotonic and cervical-ripening actions. Miso-

prostol is useful for elective medical abortion, cervical ripening before surgical abortion, evacuation of the uterus in cases of embyonic or fetal death, and induction of labor. The drug may also be used to treat and even prevent postpartum hemorrhage [15]. No differences were reported in the rates of caesarean section and neonatal maternal morbidity between women who received misoprostol and those who received prostaglandin E2. According to the present results no differences in the labor modus and the necessity of repeating a second dose were found. None of the participants in the present study had received oxytocin. The authors noticed the time of labor duration depended only on either misoprostol or dinoprostone and founded timely advantage in the misoprostol group (Table 1). According to current literature research, the indexes of neonatal effects (APGAR scores, admissions to neonatal intensive care, and meconium passage are similar compared to those women with dinoprostone labor induction) [15, 16]. Based on the results of the current investigation, the authors revealed differences in the indexes of neonatal effects, which are statistically significant (Figures 3-4). However misoprostol is not recommended from American College of Obstetricians and Gynecologists for labor induction and cervical ripening [17]. Prostaglandin E2 or dinoprostone is the only prostaglandin approved by the USA Drug Administration for cervical ripening in pregnant women at or near term with a obstetric need for labor induction [18].

Although the sample of this study is moderate, it was proved that misoprostol intravaginally administration has no adverse effects in neonatal outcome by labor induction in post-term pregnant women. The effect of this medication should be investigated in third-trimester pregnancies beyond 38 weeks and in post-term singleton pregnancies with relatively high risk factors like hypertension. More detailed studies in the future are necessary to confirm any aspects not yet clarified and to compare this medical agent with other prostaglandins.

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