

# Comparison of Two Methods in Labor Induction in Nulliparous Women with Unfavorable Cervix at Term: Oxytocin Alone Versus Dinoprostone Vaginal Slow-Release System (Propess<sup>®</sup>) + Oxytocin

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**OBJECTIVES:** To investigate the efficacy of two labor induction protocols.

**STUDY DESIGN:** In this retrospective study, pregnancy records of 50 nulliparous singletons at term with intact membranes and Bishop score  $\leq 6$ , delivered vaginally with one of the two induction methods were reviewed. Subjects were divided into 2 groups. Group 1; labor induction with oxytocin alone (n=20), Group 2; labor induction with dinoprostone + oxytocin (n=30).

**RESULTS:** Maternal age, time of amniotomy, labor induction to active labor interval, birth weights, pre and post-labor hemoglobin levels and uterine hyperactivity did not show any statistical difference between groups. Oxytocin use was significantly lower and labor induction to delivery interval was found statistically shorter in group 2 ( $p < 0.05$ ).

**CONCLUSIONS:** The use of dinoprostone vaginal slow-release system plus oxytocin for labor induction in nulliparous women with unfavorable cervix at term seems to be more effective than oxytocin alone.

**Key Words:** Dinoprostone, Oxytocin, Induction of labor.

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## Introduction

Induction of labor has become a common procedure in routine obstetric practice and viewed in 20 % of all births.<sup>1</sup> In term women with unfavorable cervix labor induction is still a challenging condition for the obstetricians, because it can result with increased cesarean section rate compared with vaginal birth.<sup>2</sup> Oxytocin has long been used for labor induction and augmentation but prostaglandin E2 (PGE2) analogue dinoprostone vaginal insert slow-release system has been approved by the Food and Drug Administration for cervical ripening and uterine contractility stimulation.<sup>3</sup>

Intravaginal PGE2 for labor induction has better results for achieving vaginal birth than intravenous oxytocin alone.<sup>4</sup> Although PGE2 is available as tablet, gel and pessary, slow-release pessary system has some advantages over the others.<sup>5</sup> In this study, we aimed to compare the efficacy of oxytocin alone and dinoprostone vaginal slow release system followed by oxytocin in labor induction at term pregnancies delivered vaginally in our clinic.

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## Material and Method

We conducted a retrospective study in Kent Hospital department of obstetrics and gynecology between 2006 and 2010. Nulliparous, singleton pregnant women at term, with intact membranes, vertex presentations, no prior uterine surgery, reactive nonstress test and Bishop scores  $\leq 6$  who were delivered in 24 hours vaginally after labor induction was reviewed. A total of 50 patients were included in the study. Subjects were divided into two groups: Group 1; labor induction with oxytocin alone (n=20), Group 2; labor induction with dinoprostone vaginal slow release system followed by oxytocin (n=30). In all groups, newborns were healthy with good follow-up so that the comparison of neonatal outcomes was beyond the scope of our study.

In all cases, membrane stripping was done and Bishop scores were recorded before the induction process started. In group 1, oxytocin (Synpitan forte 5 U, Deva) was prepared as 10 U of oxytocin/500 ml 5% dextrose. Induction was started at 4 mU/minute and increased by 4 mU/minute every 15 minutes to a maximum of 32 mU/minute.<sup>6</sup> In group 2 a 10 mg dinoprostone containing vaginal pessary slow-release system (Propess<sup>®</sup>, Vitalis) was placed digitally in the posterior fornix. In our clinic, dinoprostone was removed after spontaneous rupture of membranes or at the time of amniotomy and thereafter oxytocin infusion was started according to the same mentioned protocol. Epidural analgesia was performed in all patients.

In cases with uterine hyperactivity (six or more contractions per 10 minutes) without fetal heart rate abnormality, oxytocin infusion rate was halved every 10 minutes until  $\leq 5$  contractions per 10 minutes were achieved. In pregnant women with uterine hyperactivity and fetal heart rate abnormality, oxytocin infusion was stopped and/or dinoprostone was removed if still present and a vaginal examination was performed. In addition, the patient was turned on to left and oxygen was given until the situation overcomes.

In our clinic, blood counts were performed on admission and 12 hours after delivery routinely. Both groups were compared for maternal age, weeks of pregnancy, time of amniotomy (artificial or spontaneous rupture of membranes), labor induction to active labor interval, labor induction to delivery interval, oxytocin dose, birth weights, pre and post-labor hemoglobin levels and uterine hyperactivity.

Data were stored and analyzed by using the Statistical Package for Social Sciences software program version 16.0 (SPSS Inc. IL, USA). Pearson's correlation analysis was used to compare the relationship between variables. Categorical data were analyzed with Chi-square test. Data are presented as means  $\pm$  SD if they were normally distributed. Statistical significance was defined as  $p < 0.05$ .

## Results

General characteristics of two groups were similar and summarized in Table 1. There were no significant differences in age, weeks of pregnancy, birth weight and Bishop score on admission between groups. Time of amniotomy (spontaneous or artificial) was almost the same between groups. Labor induction to active labor interval was shorter in group 2, but it did

not show statistical significance. Labor induction to delivery interval was significantly shorter and the amount of oxytocin used was significantly lesser in group 2 ( $p=0.04$  and  $p < 0.001$ , respectively). Pre and post-labor hemoglobin levels and uterine hyperactivity were almost similar between two groups. Clinical outcomes of both groups were summarized in Table 2.

## Discussion

In this study, both groups are similar in maternal age, weeks of pregnancy, birth weight and Bishop score on admission to labor induction, so that they are proper for comparison. Furthermore, membrane stripping was done in both groups at the initiation of labor induction process, which is known to increase the vaginal delivery rate and reduce oxytocin use.<sup>7</sup>

In two recent Cochrane database reviews, it is concluded that prostaglandin agents have better outcomes in achieving vaginal birth in 24 hours compared to oxytocin and also oxytocin may increase the incidence of operative deliveries.<sup>4,8</sup> In addition, dinoprostone vaginal inserts seem to have positive effects on both increasing the rate of cervical ripening and starting of spontaneous contractions.<sup>9</sup>

The use of dinoprostone vaginal slow release system (Propess<sup>®</sup>) followed by oxytocin for labor induction in nulliparous women with unfavorable cervix at term delivered vaginally significantly shortened the labor induction to delivery interval compared to oxytocin alone in our study. In a previous study, concurrent use of oxytocin infusion and vaginal dinoprostone did not significantly increase vaginal delivery rate within 24 hours.<sup>10</sup> In addition, concurrent vaginal dinoprostone and intravenous oxytocin for labor induction of term pre-

Table 1: General characteristics

Variable	Group 1	Group 2	P
Age (years)	29.3 (3.6)	28.7 (2.7)	>0.05
Weeks of pregnancy	38.8 (1.5)	39.2 (0.9)	>0.05
Birth weight (g)	3251.5 (310.6)	3251 (349.5)	>0.05
Bishop score	3.15 (1.1) range:0-6	3.03 (1.2) range:0-6	>0.05

Variables presented as mean (SD)

Table 2: Clinical outcomes

Variable	Group 1	Group 2	P
Time of amniotomy (h)	4.4 (1.4)	4.5 (0.9)	>0.05
Labor induction to active labor interval (h)	5.3 (2.9)	4.8 (1.2)	>0.05
Labor induction to delivery interval (h)	10(3.4)	8.1 (2.1)	<0.05
Amount of oxytocin (mU/min)	14.7 (8.8)	5.7 (5.2)	<0.001
Pre-labor Hb (g/dl)	12.5 (0.9)	12.5 (1.2)	>0.05
Post-labor Hb (g/dl)	11.1 (1.0)	11.2 (1.4)	>0.05
Uterine hyperactivity	3 (10)	2 (10)	>0.05

Variables presented as mean (SD) or n (%)

mature rupture of membranes did not expedite the induction to vaginal delivery interval.<sup>11</sup>

In the present study, the amount of oxytocin use (mU/min) was significantly lower in dinoprostone followed by oxytocin group than oxytocin alone. This result is in accordance with the result of a review that PGE2 use reduces the need of oxytocin augmentation.<sup>8</sup>

Time of amniotomy did not show any difference between two groups. Labor induction to active labor interval was found shorter in dinoprostone followed by oxytocin group but could not reach to significance. In one study, at term women with premature rupture of membranes oxytocin use shortened the induction to active labor onset compared to dinoprostone, while another study comparing dinoprostone with expectant management in the treatment of premature rupture of membranes at term found that the time of dilatation was shorter in the dinoprostone group.<sup>12,13</sup> Pre and post-labor hemoglobin levels were almost the same between two groups in this study. In addition concurrent use of oxytocin with dinoprostone did not induce delivery blood loss.<sup>11</sup>

As a result, our study may indicate that in nulliparous women with unfavorable cervix at term labor induction with dinoprostone vaginal slow-release system followed by oxytocin seems to shorten the labor induction to delivery interval with reducing the amount of oxytocin used. Larger randomized-controlled trials are needed.

## **Olumsuz Serviks Sahip Nullipar Term Gebelerin Doğum İndüksiyonunda İki Yöntemin Karşılaştırılması: Sadece Oksitosin kullanımı ya da Dinoproston Vaginal Yavaş Salınım Sistemi (Propess®)+Oksitosin**

**AMAÇ:** İki doğum indüksiyonu protokolünün etkinliğinin araştırılması.

**GEREÇ VE YÖNTEM:** Bu retrospektif çalışmada, iki doğum indüksiyon yönteminden biri ile vaginal doğum yapan, nullipar, tekiz, term, membranları intakt, Bishop skoru  $\leq 6$  olan 50 gebenin kayıtları gözden geçirildi.

**BULGULAR:** İki grup arasında, anne yaşı, amniotomi zamanı, aktif travaya giriş zamanı, doğum ağırlıkları, doğum öncesi ve sonrası hemoglobin düzeyleri ve aşırı uterus aktivitesi yönünden istatistiksel fark saptanmadı. Grup 2'de kullanılan oksitosin anlamlı olarak daha az ve doğum süresi anlamlı olarak daha kısa idi ( $p < 0.05$ ).

**SONUÇ:** Olumsuz serviks sahip nullipar term gebelerin travay indüksiyonunda dinoproston vaginal yavaş salınım sistemi ile birlikte oksitosin kullanımı tek başına oksitosin kullanımına göre daha etkin görünmektedir.

**Anahtar Kelimeler:** Dinoproston, Oksitosin, Doğum indüksiyonu

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