

# Comparison of Oxytocin and Prostaglandin E2 for Induction of Labour in Patients with Pre Labour Rupture of Membrane

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## ABSTRACT

**Objective:** To compare the efficacy of vaginal prostaglandin E2 and oxytocin infusion for induction of labor in patient with prelabor rupture of membranes at term.

**Study design:** It was randomized clinical trial in which random selection of the two groups was done.

**Setting:** Department of Obstetrics and Gynecology, Ghurki Trust Teaching Hospital, Lahore.

**Duration:** 6 months (7<sup>th</sup> March' 2009 to 6<sup>th</sup> September, 2009).

**Material and methods:** One hundred and twenty patients with rupture of membrane at term admitted through emergency for induction of labour randomly allocated to the two drug trial groups and followed till delivery. Number of vaginal deliveries within 24 hours and induction to delivery interval was noted.

**Results:** Among the patients induced with intravenous oxytocin 50% and from those induced with vaginal PGE2 75% patients delivered vaginally within 24hours.

**Conclusion:** Vaginally prescribed PGE2 results in more patients to deliver vaginally within 24 hours.

**Key words:** Rupture of membranes, induction of labor, PGE2, oxytocin.

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## INTRODUCTION

Spontaneous rupture of membranes at term before the onset of labour<sup>1</sup> occurs in 10% of pregnancies<sup>1, 2, 3</sup>. 90% women with pre-labour rupture of membrane (PROM) go into labour within 24 hours<sup>1, 3</sup>. Management options for PROM at term include expectant management and active induction.<sup>2</sup> Both active and expectant management are equally effective with a significant percentage delivering vaginally however the caesarean rate is higher among the actively managed<sup>4</sup>.

Expectant management policy may be justified initially<sup>5</sup> but postnatal complications are observed in 17% of patients managed expectantly<sup>6</sup>. Neonatal risks of expectant management include infections (2.8%)<sup>5</sup>, admission to intensive care unit(8%)<sup>1, 7</sup>, placental abruption, fetal distress (2%)<sup>5</sup>, fetal restriction deformities, pulmonary hypoplasia and neonatal death(1%)<sup>1</sup>.

Induction of labor as opposed to expectant management decreases the risks of chorioamnionitis<sup>1</sup>. Various methods for induction of labour are available<sup>2</sup>. Oxytocin is the pharmacological agent most commonly used<sup>2</sup>. The most common complication related to induction of labour by oxytocin is uterine hyper stimulation<sup>4</sup>.

Prostaglandins have been used for induction of labour since 1960. Vaginal prostaglandin E2 increases the likelihood of vaginal delivery within 24

hours<sup>8</sup>. However the risk of uterine hyper stimulation with fetal heart rate changes is increased 4.6%<sup>8, 9</sup>. The rate of vaginal delivery within 24 hours is 72% for prostaglandin and 48% for oxytocin<sup>10</sup>.

## AIMS AND OBJECTIVE

To compare the efficacy of intravenous oxytocin infusion and vaginal PGE2 for induction of labor in patients with PROM at term. Efficacy was judged by the rate of vaginal delivery within 24hours.

## MATERIAL AND METHODS

It was a randomized clinical trial conducted in the Department of Obstetrics and Gynecology Unit I of Ghurki Trust Teaching Hospital, Lahore from March 07, 2009 to September 06, 2009. All pregnant patients of 20-40 years of age with rupture of membranes after 37 completed weeks of gestation were enrolled in the trial. Patients with Previous LSCS, Breech presentation, Placenta previa, Malposition, Placental abruption, Twin pregnancy, Cephalopelvic disproportion, Fetal distress and Chorioamnionitis were put in exclusion criteria.

**Sample technique:** Non probability purposive sampling. Sixty cases were allocated randomly to each group A and B and were induced with I/V oxytocin and vaginal PGE2 respectively.

**Data collection procedure:** Once the patients were enrolled to the trial, data was entered in a especially designed proforma. The patients were divided in two equal groups randomly i.e. A and B. Group A received I/V oxytocin 4 mili units/min increased by

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4mili units every 30 min upto 32 mili units maximum. Group B received Tab PGE2 3mg which was placed in posterior vaginal fornix and was repeated after every 6 hours to a maximum of 3 doses (9mg). Contractions were assessed every two hours and administration of oxytocin / PGE2 was stopped when there were more than five contractions or lasting more than 90 seconds in 10 minutes.

For women in both the groups FHR was recorded electronically during one hour after the first administration, and at least every 04 hours for 20 min before the onset of labor and then ½ hourly when labor was started. In addition, intermittent auscultation was performed hourly before the onset of labor. Evaluation of the contractions and vaginal examination was done. The primary outcome was rate of vaginal delivery within 24 hours. The data was analyzed statistically on SPSS 11. Vaginal delivery within 24 hours was compared. Level of significance was P≤0.005 on Chi-square test (8.00).

**RESULTS**

It was observed that the incidence of PROM is more in younger age group as was evident from this study where out of 120 patients, 84 patients were reported between ages 21-30 years which constitutes 70% of the total patients and those reported between ages 31-40 years were 36 which constitutes 30% of the total patients (Table 1). Mean age of presentation was 26.91 years with SD(standard deviation) of 4.45. It was also observed that PROM is more prevalent in multigravida, as seen in this study where 40 patients were primigravida which constitutes 33.3% of the total patients and 60 patients were gravida 2-3 and only 20 patients reported who were gravida 4-5 which constitutes 50% and 16.66% of the total patients respectively (Table 2). The average induction to delivery interval was 12.94 hours for I/V oxytocin and 11.8 hours for vaginal PGE2 (Table 3). Out of the 60 patients induced with PGE2, 45 patients delivered vaginally within 24hours (75%) and out of the 60 patients induced with oxytocin 30 patients delivered vaginally within 24 hours which constitutes 50% of total patients respectively (Table 4).

Table 1: Distribution of cases by age

Age in years	n=	%age
21-30	84	70
31-40	36	30

Table 2: Distribution of cases by Parity

Parity	n=	%age
Primigravida	40	33.33
Gravida 2-3	60	50
Gravida 4 and above	20	16.66

Table 3: Induction delivery interval

Drug	Induction to delivery interval
I/V oxytocin	12.94 hrs
PGE2	11.8 hours

Table 4: Vaginal delivery within 24 hours

Drug	n=	n= delivered within 24 hrs	%age
I/V Oxytocin	60	30	50
Vaginal PGE2	60	45	75

Chi-square=8.00

lue=0.005

**DISCUSSION**

As the interval between rupture of membranes at term and delivery increases, so may the risk of fetal, neonatal and maternal infections<sup>11,12</sup>. When women have prelabour rupture of membranes at term, expectant or active management with immediate induction of labour is offered<sup>13</sup>. Both expectant and active management are equally effective with a significant percentage delivering vaginally<sup>4</sup>.

Expectant management of PROM at term has some advantages and disadvantages. It enhances the patient's chance of normal vaginal delivery<sup>14</sup> and seems to decrease the incidence of caesarian section. The concern with conservative management is the risk of infection to the mother and the fetus whereas immediate induction can increase cesarean rate<sup>15</sup>. Management recommendations for pregnancies complicated by PROM must consider the infectious risk to the mother and fetus associated with prolonged observation<sup>16</sup>.

Induction of labour is common in obstetric practice and it is on the rise in the United States (US) increasing from 9.5% in 1990 to 22.1% In 2004<sup>17</sup>. One possible reason for the rise in labour induction is the last 15years is the current age of convenience<sup>18,19</sup>.

According to the most current studies, the rate varies from 9.5% to 33.7% of all pregnancies<sup>20</sup>. There is much debate what to do when PROM happen at term. Induction of labour usually is indicated to prevent adverse maternal and neonatal outcome<sup>21</sup>. Both oxytocin and PGE2 are effective in inducing labour in women with prelabour rupture of membranes at term<sup>22</sup>.

Planned management (with methods such as oxytocin or prostaglandins) reduces the risk of maternal infectious morbidity<sup>23,24,25</sup>, patients go into labour sooner<sup>26</sup>, have less digital vaginal examinations, have shorter interval between membrane rupture and delivery and spend less time in the hospital before delivery<sup>27</sup>. The conventional method of induction of labour is with intravenous oxytocin. More recently, induction of labour with prostaglandins, has been used<sup>28</sup>. Induction of labour

with prostaglandins appears to decrease the risk of maternal infection (chorioamnionitis), admission to neonatal intensive care unit (NICU) and does not appear to increase the rate of caesarean section although it is associated with more frequent maternal diarrhea and pain relief<sup>29</sup>. The most common drugs used in our setup are oxytocin and PGE2. These drugs are easily available and easy to administer.

Out of 120 patients presented with prelabour rupture of membranes at term, 92 patients (76%) were reported between the ages 21-30 years and 28 patients (23%) were between the ages 31-40 years. The result obtained is comparable to the study conducted by Ara J, Noorani M, Showing that 82.7% patients were between 20-30 years of age and 12.5% patients were between 30-35 years and 2.9% patients were more than 35 years of ages<sup>30</sup>.

Out of 120 patients, 40 patients (33.3%) were primigravida and 60 patients (50%) were gravida 2-3 and only 20 patients were gravida 4 and above that is 16.66% of the total patients. These results were close to the study conducted by Ara J, Noorani M, at civil hospital, Karachi which showed that 26.9% patients were primigravida and 57.7% were gravida 2-3 and 13.5% were gravida 4-5<sup>30</sup>. Granstrom L et al observed that 47.54% women were primigravida and 52.45% women were multigravida, who presented with PROM<sup>20</sup>.

In Group A, average induction to delivery interval was 12.94 hrs and in Group B average induction to delivery interval was 11.8 hours. This result is very close to the study conducted by Zeteroglu et al, showing that mean interval from induction to delivery was 11.57+1.19 hours for oxytocin<sup>31</sup>. It is also close to the results of the study conducted by Wing DA et al in America in the year 2005 showing that the average interval between the start of the induction to delivery was 771 minutes (12.85 hrs) for Oxytocin<sup>21</sup>. It was also close to the results by Butt KD, et al in America in 1999<sup>23</sup>. The result is also very close to the study by Saadia Munawar et al in Nishtar Hospital, Multan and Sir Ganga Ram hospital, Lahore which shows that induction to delivery interval was 10.5 hours for PGE2<sup>33</sup>. The result is comparable to the study conducted by Sifakis S et al in Greece in the year 2007 which shows that the mean interval from the institution of labour induction to delivery was 15.7+9.3 hours for PGE2<sup>34</sup>.

In this study it was observed that 30 patients in Group A, constituting 50% of the total patients induced with I/V oxytocin were delivered within 24 hours and 45 patients in Group B constituting 75% of the patients induced with vaginal PGE2 were delivered within 24 hours after induction of labour. This shows that PGE2 is effective in causing

significant number of deliveries within 24 hrs. The similar result is observed in the study conducted by Kelly AJ, Tan BP in 2001 which showed that rate of vaginal delivery is 72% with vaginal PGE2 and 48% with I/V oxytocin<sup>10</sup>. Similar results were also observed by Granstrom L et al in Sweden that rate of vaginal delivery was 67.21% for prostaglandin E2 vaginal tablet<sup>20</sup>. While it was contrary to the results by Denguezil W et al observed in 2007 in University hospital Fattouma Bourguiba that rate of vaginal delivery within 24 hours is 53.8% for PGE2. Wing DA, et al observed contrary results that rate of vaginal delivery is 78.1% for oxytocin<sup>21</sup> and Zeteroglu observed that rate of vaginal delivery is 87.7% for oxytocin<sup>31</sup>.

This study did not find induction of labour with oxytocin to be preferable and similar results were found by Gafni A et al in 1997 at Hamilton, Ont<sup>12</sup>. In our setup, where the facilities for maternal and fetal monitoring are deficient, drugs which are of proven value and with minimal side effects must be used.

Effectiveness of PGE2 to achieve cervical ripening and induction of labour is currently beyond doubt because it results in lower rates of failed induction and higher rates of delivery within reasonable time interval<sup>35</sup>. The PGE2 vaginal tablet is safe and easily applied<sup>9</sup> and is superior to oxytocin for induction of labour in case of unfavourable cervix<sup>36</sup>.

## CONCLUSION

Vaginal PGE2 tablet was found very effective for labour induction in patients with PROM at term and delivering the patients within 24 hours when compared to intravenous oxytocin. However a multi-centre trial is required to determine efficacy, safety and cost effectiveness of vaginal prostaglandin E2.

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