A randomized trial of intracervical prostaglandin gel and intravenous oxytocin in prelabor rupture of membranes with unripe cervix at term

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Summary

In order to compare the efficacy of immediate intravenous oxytocin administration and intracervical prostaglandin E2 gel application in premature rupture of membranes with unfavorable cervices at term, 45 term pregnant patients with premature rupture of membranes were randomized into two groups. Twenty women received immediate intravenous oxytocin after cleansing enema while the rest were treated with intracervical prostaglandin E2 gel. Means of maternal age, gestational age, Bishop score at admission and the rates of nulliparity did not show any significant differences between the two groups ($p>0.05$). The mean rupture to delivery time was 12.6±4.4 hours in the oxytocin group and 16.5±4.5 hours in the prostaglandin group ($p<0.01$). Mean birth weights and Apgar scores were insignificant. Cesarean section rates were 24% in the oxytocin group and 5% in the other ($p<0.05$). No infectious morbidity was seen in any case. In conclusion, although delivery is delayed with the intracervical prostaglandin approach, cesarean section rate is lowered without an increase in infectious morbidity.

Key words: Premature rupture of membranes; Labor induction; Oxytocin; Prostaglandins.

Introduction

The management of premature rupture of membranes (PROM) at term remains controversial [1-4]. Most obstetricians prefer to induce labor immediately with intravenous oxytocin with the hope of avoiding increased risk of infection. In women with favorable cervices, oxytocin induction is generally successful. In women with unfavourable cervices, this policy has been associated with a higher cesarean rate. In contrast, some authors suggest a conservative approach, especially in multiparas, since spontaneous labor will commence within 24 hours [5]. They reported a relatively low cesarean section rate without an increase in infectious morbidity. In previous studies, intracervical application of prostaglandin E2 gel has been found to be quite effective in cervical priming of women with intact membranes [6]. More recently, intravaginal administration of prostaglandin E2 (PG E2) is used satisfactorily for cervical priming in patients with PROM [7-9].

This study is designed to compare the immediate intravenous oxytocin and intracervical PG E2 (Cerviprost; Organon, Netherlands) gel in women with unfavorable cervices and PROM at term.

Materials and Methods

Forty-five women with spontaneous PROM at term were enrolled in the study. Patients with gestational age lower than 36 weeks, confirmed either by menstrual dates, periodical examinations or ultrasonography, cervical effacement greater than 50% and cervical dilatation greater than 1 cm were excluded. Patients with multiple pregnancies, hypertensive disorders, malpresentation, or previous cesarean section were also excluded.

Diagnosis was confirmed by sterile speculum examination and fern test at the time of admission. A single digital examination was performed to evaluate cervical effacement and dilatation and to exclude the cord prolapsus. Absence of contractions and fetal distress were determined by recording external cardiotocographic traces for at least 30 minutes.

Cleansing enema was performed in all patients after necessary examinations and observation period. The patients were randomized into two groups according to the last digit of their file numbers. The first group (n=25) was managed by immediate low dose oxytocin infusion. In the second group (n=20), 0.5 mg PG E2 gel was administered into the cervical canal. Bishop scores were evaluated after 6 hours and a second dose of PG E2 was then applied if there was no progression of cervical dilatation and effacement or if labor did not start. Oxytocin infusion was started after the second 6 hours if labor had not yet started.

No antibiotics were given to any women except single dose prophylactic antibiotics when cesarean section had to be performed. All neonates received prophylactic antibiotics.

Results

There were no significant differences in the means of gestational ages, ages of patients and Bishop scores at the time of admission between the two groups (Table 1). There were 10 multiparas out of 25 patients (40%) in the oxytocin group, whereas there were 7 multiparas out of 20 patients (35%) in the PG E2 group ($p>0.05$). In the PG E2 group the gel was applied twice to 4 women and in two I. V. oxytocin infusion was started later on for inadequate contractions.

The mean lengths of time from PROM to admission,

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Table 1. — *Patient characteristics of the oxytocin and prostaglandin groups*

	Oxytocin n = 25	Prostaglandin n = 20	p
Maternal age	24.5±4.7	25.4±4.5	p>0.05
Gestational age	38.3±1.5	39.1±1.6	p>0.05
Bishop score at admission	3.1±1.1	3.0±1.6	p>0.05
Nulliparity rate (%)	60	65	p>0.05
Cesarean rate (%)	24	5	p<0.05

Mean±SD

from PROM to onset of labor, from PROM until delivery, from admission to the hospital until delivery and the mean length of labor of each group are shown in Table 2. The mean lengths of time from PROM to admission and from PROM to administration of the agents were not significant (p>0.05). The mean periods from PROM to onset of labor and from PROM to delivery were significantly longer in the PG E2 group (p<0.05 and p<0.01, respectively).

As seen in Table 3, there were no significant differences between the mean birth weights, the mean Apgar scores and the rates of infants born with an Apgar score less than 7. Nineteen of the patients in the PG E2 group had vaginal delivery. Cesarean section was performed an only one patient (5%) because of acute fetal distress. In the oxytocin group, cesarean section was performed on six women (24%). The indications for cesarean section were acute fetal distress in three women and failure to progress in the other three. There were significant differences among cesarean ratios (p<0.05). We observed neither chorioamnionitis nor neonatal sepsis. All workup for sepsis in the neonates was negative.

Table 2. — *Some important time periods of the oxytocin and prostaglandin groups*

	Oxytocin n = 25	Prostaglandin n = 20	p
PROM to admission (h)	4.6±3.1	5.6±2.7	p>0.05
PROM to the beginning of labor (h)	5.3±3.1	7.1±2.7	p<0.05
Average labor time (h)	8.5±3.5	10.3±3.4	p>0.05
PROM to delivery (h)	12.6±4.4	16.5±4.5	p<0.01
Admission to delivery (h)	8.6±3.7	11.2±2.8	p<0.05
PROM to medical administration (h)	6.7±2.7	6.9±2.8	p>0.05

Mean±SD

Table 3. — *Newborn characteristics of the oxytocin and prostaglandin groups*

	Oxytocin n = 25	Prostaglandin n = 20	p
Birth weight (g)	3100±427	3130±607	p>0.05
Apgar score	8.0±1.5	7.6±1.3	p>0.05
Rate under Apgar 7 (%)	12	15	p>0.05

Mean±SD

Discussion

Maternal and neonatal morbidities of PROM are a serious problem, but an appropriate approach still remains controversial. Sixty to 80 percent of PROM cases occur in patients at greater than or equal to 37 weeks of gestation and most authors recommend induction of labor as the best management [10]. Increased maternal and neonatal infectious morbidity was reported when delivery was delayed. Up to 24% of women with PROM more than 24 hours became infected and overall perinatal mortality in infants born to women with amnionitis was 16% in earlier reports [11]. In order to lower these complications immediate induction of labor is preferred. Conservative approaches have regained interest after recent developments in neonatal intensive care units, newer antimicrobials especially effective against certain gram negative bacilli and anaerobic microorganisms.

Intravenous oxytocin induction applied to patients with low Bishop scores causes high cesarean section rates [12]. In a prospective non-randomized study, lower cesarean section rates in a conservative group when compared to an oxytocin group were reported [5]. Induction applied to patients after a long period of observation has not lowered cesarean section rates [13]. On the other hand, large retrospective studies have shown that the incidence of maternal and neonatal infectious morbidities would rise if the limits of a conservative approach were too broad [13].

Topical administration of PG E2 into the cervical canal is preferred in patients with intact membranes [6]. Some cervically administered PG E2 may leak into the amniotic fluid. However, intravaginal administration has been reported to be quite effective in the majority of studies but some gastrointestinal side-effects may be seen [14]. Intravaginal PG E2 application lowers cesarean section rates with minimal side-effects [9, 15]. It has been reported that the use of intravaginal PG E2 followed by oxytocin infusion did not confer any benefit over the use of intravenous oxytocin, since the first approach did not lower cesarean rates [13]. However, the majority of the papers involving this topic suggest lower cesarean rates without an increase in infectious morbidity. Mahmood *et al.* reported no significant advantages of intravaginal PG E2 over a conservative approach and if necessary intravenous oxytocin [16].

Conclusion

PG E2 lowers cesarean section rates without an increase in infectious morbidity in patients with PROM. The prolongation of PROM to delivery time does not seem to oppose these beneficial effects.

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