

Glucocorticoids Shorten and Speed Up the misoprostol-Induced Labour in Postdate Pregnancy

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Abstract:

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Background: Postdate pregnancies are difficult pregnancies to carry to term because of increased chance of complications. Misoprostol is an efficient induction strategy. There is a lot of interest in the effects of corticosteroids on cervical ripening and shortening physiological phase of labor. **Aim:** To assess how intramuscular dexamethasone affected length of labor brought on by vaginal misoprostol in cases of postdate pregnancy. **Patients and methods:** 100 women with postdate pregnancies were randomized in two groups: Group1 (n= 50) received single dose of 8 mg dexamethazone in 2 mL solution intramuscular and group 2 (n=50) received 2 ml isotonic saline (placebo group). Dexamethasone and placebo groups saw withdrawal of 10 and 11 individuals. Misoprostol (50 µg) at 6-hour intervals was given after proper monitoring. **Results:** In dexamethazone group, 77.5 % of women gave birth within 12 hours, as opposed to 35.9 % in the placebo group ($p < 0.05$). When compared to placebo group, dexamethasone group's induction to delivery time was quicker (680.1 ± 55.4 min versus 766.1 ± 58.3 min., $p < 0.001$). Additionally, time from start of labor induction and start of active phase of labor was shorter in the dexamethazone group as compared to placebo group (253.9 ± 47.4 min versus 306.1 ± 37.2 min., $p < 0.001$). Additionally, patients in dexamethazone group experienced active phase of labor that was shorter (394.6 ± 36.9 compared 419.1 ± 31.3 min., $p = 0.000$) and second stage of labor that was much shorter (19.1 ± 2.8 versus 28.7 ± 3.0 min). **Conclusions:** In postdate pregnancy, intramuscular dexamethasone and vaginal misoprostol reduced interval between labor induction and beginning of active phase of labor.

Interval between active stage and second stage of labor also was shorter.

Key words: Misoprostol; induced labor; postdate pregnancy.

Introduction

Postdate pregnancies are difficult pregnancies to carry to term because of the increased chance of psychological complications, shoulder dystocia, macrosomia, meconium aspiration, and cesarean section delivery⁽¹⁾.

Misoprostol, taken orally or vaginally, is an efficient induction strategy; nonetheless, it is important to strike a balance between inducing labor as quickly as possible and minimizing any negative side effects. Oral misoprostol increased the number of vaginal deliveries and decreased the number of cesarean sections in the first 24 hours of labor compared to balloon catheters, with no increase in hyperstimulation episodes. When used in conjunction with a balloon catheter, misoprostol administered vaginally was more effective⁽²⁾.

Prostaglandin and oxytocin have frequently been used to induce childbirth. However, there is a lot of interest in the effects of corticosteroids on cervical ripening and shortening the physiological phase of labor now⁽³⁾. Both gestational hyperglycemia and hypertension may be traced back to the stress hormone cortisol produced by the adrenal glands⁽⁴⁾.

This contribution was demonstrated by a study that discovered enhanced glucocorticoid receptor expression in the uterine cervix prior to the start of labour. This finding might explain why dexamethasone parenteral administration causes the cervical effacement to increase⁽⁵⁾.

A research with 120 women found that intramuscular dexamethasone shortened labor by shortening the time between induction and the start of active labor⁽⁶⁾.

The current study's objective was to assess the impact of a single intramuscular dosage of dexamethasone on the length of labor induced by misoprostol for postdate pregnancy termination.

Patients and Methods

The current study is a clinical trial that was carried out from January 2018 to December 2020 at the Department of Obstetrics and

Gynecology, Mansoura University Hospital, Egypt. The Institutional Research Board (IRB), Faculty of Medicine, Mansoura University, Egypt, gave its approval to the study protocol (Approval Number: R/15.10.12, Date: 9/12/2015). We used dexamethazone in a 2 mL solution intramuscular (Epidron® 8 mg, 2 mL solution, Eipico pharmaceuticals, Cairo, Egypt) to the dexamethazone group.

Participants in the study included 100 women who had postdate pregnancies (confirmed by dating and early ultrasonography). Postdate pregnancy is defined as pregnancy that has been extended to or more than 42 weeks of gestation (294 days), or the estimated date of delivery (EDD) + 14 days⁽⁷⁾.

Exclusion criteria included patients who came with non-vertex, had macrosomia that was likely, experienced vaginal bleeding, cephalo-pelvic disproportion, a scarred uterus, or had a history of maternal prostaglandin hypersensitivity were rejected. The ethical consent was taken from patients before the delivery. We took the IRB approval to conduct this study from Mansoura university (no: R/15.10.12). We selected our sample size based on previous literature which reported similar outcomes and setting⁽⁶⁾.

A single dosage of 8 mg dexamethazone in a 2 mL solution intramuscular (Epidron® 8 mg, 2 mL solution, Eipico pharmaceuticals, Cairo, Egypt) was administered to the dexamethazone group (n=50) 6 hours before the induction of labor, while the placebo group (n=50) got 2 mL isotonic saline as the control. Using computer-generated random numbers and the sealed envelope approach, randomization was accomplished.

To start labour, 50 microgram misoprostol (1/4 misotac tablet supplied by sigma company) was inserted high into the posterior fornix. The subsequent misoprostol dosages, which were given at 6-hour intervals (maximum 3 doses), were only given after careful monitoring of vital signs, uterine contractions, and the rate of cervical dilatation. The duration from the beginning

of misoprostol administration to the birth of the fetus and placenta, as well as maternal features and the lengths of the active phase, second, and third phases of labor, were all recorded. The primary outcome measure was the interval between the beginning of labor induction and the beginning of the active phase of labor (a cervical dilatation of 3-4 cm plus 3-5 forceful contractions over a 10-minutes span).

Statistical Analysis

The Statistical Package for Social Scientists was used to conduct the statistical analysis (SPSS 25). (USA, IBM) Numerical data were provided as mean and standard deviation (SD) and compared using t test, whilst categorical data were presented as number and percent and compared using chi-square test. Statistics were judged significant at $p \leq 0.05$.

Results

Hundred individuals were enrolled in the current trial, 50 of them were randomly assigned to either dexamethasone or a placebo (n=50). However, the dexamethasone and placebo groups of the trial saw the withdrawal of 10 and 11 individuals, respectively. Table (1) displays the demographic characteristics of both groups. The dexamethasone and placebo

groups did not significantly vary in terms of baseline age, body mass index, gestational age, parity, or modified Bishop Scores.

There is no statistically significant difference between dexamethazone group and placebo group in terms of maternal age which was 29.0 ± 2.4 years in contrast to 30 ± 5.4 years of placebo group. No statistically significant difference was found between the two groups regarding BMI, gestational age, parity or Bishop Score (Table. 1).

In the dexamethazone group, 77.5 % of women gave birth within 12 hours, compared to 35.9 % in the placebo group ($p < 0.05$), according to table, 2. All of the deliveries took place within a day.

Table 2 showed a statistically significant difference between both groups in the induction delivery interval ($p < 0.05$). 31 patients from 40 patients in the dexamethasone group reached the delivery before 12 hours from the induction. However, only 14 patients from 39 patients in the placebo group reached the delivery before 12 hours from the induction. The delivery was achieved in the duration between 12 and 24 hours in nine patients in the dexamethasone group while it was achieved in 25 patients in the placebo group.

Table (1): the demographic characteristics of both studied groups.

	Misoprostol-dexamethazone n=40	Misoprostol—placebo n=39	*p value
Maternal age (years)	29.0 ± 2.4	30 ± 5.4	>0.05
Body mass index (Kg/m ²)	32.9 ± 5.7	31.9 ± 5.3	>0.05
Gestational age (weeks)	39.9 ± 5.7	40.7 ± 6.1	>0.05
Parity (n)	2.1 ± 0.7	1.9 ± 0.63	>0.05
Bishop score	8.1 ± 0.6	7.6 ± 0.69	>0.05

*p value>0.05= statistically insignificant

Table (2): duration of induction to delivery intervals in both studied groups.

Induction-delivery interval	Misoprostol-dexamethazone n=40		Misoprostol—placebo n=39		*p value
	number	%	number	%	
< 12 hours	31/40	77.5	14/39	35.9	< 0.05
12-24 hours	9/40	22.5	25/39	64.1	< 0.01

*p value>0.05= statistically insignificant

Induction to delivery was quicker in the dexamethazone group compared to the placebo group (680.1 ±55.4 versus 766.1 ±58.3 min., $p < 0.001$). Additionally, the time from the start of labour induction and the start of the active phase of labour was considerably shorter in the dexamethazone group as compared to the placebo group (253.9±47.4 versus 306.1±37.2 min., $p < 0.001$). Additionally, patients in the dexamethazone group experienced active phase of labour that was considerably shorter (394.6 ± 36.9 compared 419.1 ± 31.3 min., $p < 0.000$) and second stage of labour that was

much shorter (19.1 ± 2.8 versus 28.7 ± 3.0 min.). However, there were no discernible variations in the length of the third stage of labour (12.5 ±2.6 versus 12.2±2.9 min., $p=0.89$) between the two groups (Table. 3). Table 3 showed that placebo group had longer time from induction to active phase, as well as longer duration of active phase, second stage, and delivery interval than dexamethasone group. This difference was statistically significant ($p < 0.05$). There was no statistically significant difference between both groups in the duration of the third stage ($p > 0.05$).

Table (3): obstetric variables in third trimester deliveries.

	Misoprostol-dexamethazone n=40	Misoprostol—placebo n=39	* p value
Time from induction to active phase (min)	253.9 ± 47.4	306.1 ± 37.2	< 0.000
Duration of active phase (min)	394.6 ± 36.9	419.1 ± 31.3	< 0.002
Duration of second stage (min)	19.1 ± 2.8	28.7 ± 3.0	< 0.000
Duration of third stage (min)	12.5 ± 2.6	12.2 ± 2.9	> 0.885
Induction to delivery interval (min)	680.1 ± 55.4	766.1 ± 58.3	< 0.000

* p value>0.05= statistically insignificant

Discussion

Prostaglandins increase the levels of inflammatory mediators and stimulate cervical remodeling, and play a significant role in facilitating cervical maturation. Myometrial contraction and other related processes are influenced in different ways by prostaglandins E1 (PGE1) and E2 (PGE2) (8).

The current study demonstrates that a single intramuscular dexamethasone injection reduced the time between the start of labour induction and the start of the active phase by about 52 minutes and reduced the time between the beginning of the active phase and the end of the active phase by about 24 minutes. Many studies performed on animals, especially sheep (6,9), have suggested that corticosteroids shortened the duration of labor.

Only two randomized controlled trials evaluating the use of injectable dexamethasone to decrease the length of labour induced by oxytocin have been done, according to a review of the literature (9,10). In one study, the latent phase of labor's

duration was significantly shortened after receiving two intramuscular injections of 10 mg dexamethasone (9). Another study examined the effects of a single 8mg IM dexamethasone injection on labour duration. Results revealed that the latent period of labour was reduced in length by roughly 60 minutes (10). Dexamethasone use was not linked to an increase in maternal or fetal morbidities in either study. However, both studied methods for labour induction employed larger amounts of oxytocin (10).

When compared to the placebo group, the dexamethazone group's mean induction-to-delivery time was significantly shorter, according to the results of the current study. In addition, we discovered that the dexamethazone group's time from induction to the start of the active phase of labour was much shorter than that of the placebo group. According to a prior study by Kashanian et al., the dexamethazone group's second stage of labour duration was similarly noticeably shorter (10).

In our trial, 77.5 percent of deliveries took place within 12 hours in the dexamethazone group, compared to 34.9 percent in the placebo group. This result demonstrated a noteworthy distinction between the two groups. This agrees with Hemmatezdah et al., who reported that the use of dexamethasone to hasten labor by softening the cervical mucus and increasing the Bishop Score has been shown to decrease the time between induction and delivery⁽¹¹⁾.

Conclusion:

It seems that injectable dexamethasone and misoprostol may speed up labor in cases of postdate pregnancy, as shown by our study. This is accomplished by decreasing the period between inducing labor and the onset of active labor, as well as the time between the onset of active labor and the onset of the second stage of labor.

Conflict of interest:

None of the contributors declared any conflict of interest.

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