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ORIGINAL ARTICLE

Role of dexamethazone on cervical ripening and induction of labor in term pregnancy

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ABSTRACT

Background: labor induction between 41 and 42 weeks of gestation reduce the adverse perinatal risks. **Aim of work**: to determine the effect of intravenous dexamethazone administration on preparing the cervix and duration of labor induction in term pregnancy. **Patients and Methods:** this randomized Case control study on 52 women who were primparous, with a gestational age (40- 42)weeks and had Bishop Score 4 or less, who were admitted to obstetrics and gynecology department, zagazig university hospital during period from (April 2018 – April 2019) for the termination of their pregnancy. 6 hours before induction, experimental group (26 participants) was given 8mg intravenous dexamethasone while control group (26 participants) was given 2 ml saline intravenously. Six hours after the injection, the Bishop Score of participant was measured, and labor induction done by using oxytocin. Interval between induction initiation and starting of the active labor phase, duration of first and second stage of labor and the neonatal outcome of two groups were compared. **Results:** Bishop Score statistically differ between the studied groups after 6 hours of dexamethasone injection (5.88±1.18, vs. 5.19±0.85 respectively). The interval between induction initiation and beginning of active labor phase was shorter in the dexamethasone group compared to control group (90±26.3 minutes vs. 112.88±48.87 minutes). Dexamethasone group has shorter duration of first stage and second stage of labor than control group. **Conclusions:** The administration of dexamethasone can play a role in cervical ripening and progress of labor.

Keywords: Dexamethason; Bishop Score; Induction of labor; stages of labor; Cervical ripening.

INTRODUCTION

Annually more than 213 million women become pregnant. [(1)] For that reason, improvement of the pregnancy outcome is considered a substantial field of action for those concerned with improvement of pregnant women's health. [(2)]

About ten percent of pregnancies may be prolonged. Thus, most obstetricians offer routine labor induction between (41 – 42) weeks of gestation to reduce the maternal and neonatal complications. [(3)]

In modern obstetrics, Labor Induction is the widespread procedure implemented. It is a procedure used to induce the contractions of the uterus during pregnancy before the start of the labor. [(4)]

The status of the cervix, its position, consistency, effacement and dilatation has a significant impact on the prognosis of labor induction. [(5)] Different methods are used to prepare the cervix, which includes mechanical and pharmacological methods. Mechanical methods comprise membrane stripping and amniotomy. Pharmacological methods comprise using prostaglandin or oxytocin. [(6)]

The employment of corticosteroids for strengthening and accelerating labor process was proposed, after recognition of receptors of glucocorticoid on fetal amnion. Moreover many studies have been made on the role of

corticosteroid in improving the cervical ripening and accelerating labor induction. [7]

PATIENTS AND METHODS

This Prospective single-blind clinical interventional randomized case-controlled trial was carried out in emergency unit of obstetrics and gynecology department, zagazig university hospital during period from (April 2018 – April 2019).

Study population comprised fifty two women (26 in each group) using open EPI at power 80% and C.I 95%, These women who were primparous, with a gestational age (40-42) weeks based on last menstrual period and confirmed by first-trimester ultrasound, single fetus, cephalic presentation, Bishop score 4 or less, intact fetal membrane, not in labor and vaginal delivery not contraindication.

Written informed consent was obtained from all participants and the study was approved by the research ethical committee of Faculty of Medicine, Zagazig University. The work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans

Our exclusion criteria were Multiparous women and who already in active labor, preterm labor, malpresentation of fetus, multiple pregnancy. Moreover, maternal disorders as diabetes mellitus, severe pre-eclampsia, placenta previa or over distended abdomen. As well as history of surgery on uterus and rupture of fetal membranes are excluded from this study.

Computer list used to randomization of participants into study Group (I) and control Group (II).

After detailed explanation of procedure, a written consent was obtained from each participant.

Approval of the study was obtained from health ethical committee in zagazig university hospital.

Study design:

Women in the study group (I) were administrated eight mg (2cc) of dexamethasone sodium phosphate (produced by: AMRIYA for pharmaceutical industries – EGYPT) intravenous. While, women in the control group (II) were received (2cc) saline as (placebo) intravenously. 6 hours later vaginal examination was done to evaluate cervix and labor was induced by oxytocin for both groups.

Labor induction:

The oxytocin (5 IU) added up to 500ml of a sodium chloride (0.9%) solution. The initial infusion rate was set at 0.5-2 milliunits/minute and gradually increased within 20 minutes with maximum infusion rate is 20 milliunits/minute (40 drops/minute); until active labor started (3 regular uterine contractions per 10 minutes last for 40-60 Sec). [8, 9]

Primary and secondary outcomes were assessed including: interval between induction initiation and starting of the active labor, Bishop score before and after intervention and assessment of duration of first and second stage of labor. The neonatal outcome was recorded by first and five APGAR scores.

Statistical analysis

Investigative report form was used to register all demographic and clinical data, and these data was analyzed by IBM computer using Statistical program for social science version 12. (Level of significance): significant when ($p<0.05$), highly significant when ($P<0.001$).

RESULTS

Our study showed that there was no statistical significant difference between the studied groups regarding age, BMI or gestational age **(Table 1)**. Our results revealed that there was statistically non-significant difference between the studied groups regarding to Bishop score before intervention. Meanwhile, there was a significant increase in Bishop sore six hours after intervention in dexamethasone group compared to control one **(Table 2)**. There was a statistical significant difference regarding interval between labor induction and starting of active labor phase between the studied group **(Table 3)**. Our results showed that there was a statistically significant difference in the duration of the 1st labor stage in which dexamethasone group revealed a shorter duration. compared to control group **(Table 4)**. Moreover, our study revealed a significant difference in the duration of the 2nd stage in which dexamethasone group showed a shorter

duration compared to control group **(Table 5)**. The results regard APGAR score showed non-significant difference statistically between the studied groups regarding APGAR score at one and five minutes **(Table 6)**.

Table (1) comparison between the studied groups regarding age, BMI and Gestational age

	Dexamethasone group	Control group	t	p
Age: (years) **Mean ± SD** **Range**	21.35 ± 2.33 18 - 26	21.35 ± 2.33 18 - 26	0	1
BMI: (kg/m2) **Mean ± SD** **Range**	22.99 ± 1.15 21.2 - 25	23.28 ± 1.63 21.05 - 28	0.725	0.472
Gestational age(weeks) **Mean ± SD** **Range**	41.07 ± 0.36 40 - 42	41.12 ± 0.42 40.32 - 42	0.438	0.663

Table (2): Comparison between the studied groups regarding Bishop score before and after intervention:

	Dexamethasone group	Control group	t	p
Before intervention: **Mean ± SD** **Range**	3.5 ± 0.71 2 - 4	3.58 ± 0.64 2 - 4	0.410	0.683
After 6 hours: **Mean ± SD** **Range**	5.88 ± 1.18 4 - 8	5.19 ± 0.85 3 - 6	-2.432	0.019*
p	<0.001**	<0.001**		

Table (3): Statistical comparison between the two studied groups as regards duration between induction of labor and active phase

	Dexamethasone group	Control group	t	p
Period from injection to active phase (min) **Mean ± SD** **Range**	90±26.3 50 - 135	112.88±48.87 60 - 230	3.163	0.003*

Table (4): Statistical comparison between the two studied groups as regards duration of 1st stage of labor

	Dexamethasone group	Control group	t	p
Duration of first stage of labor (hr) **Mean ± SD** **Range**	7.38 ± 0.7 6.33 – 8.5	8.38 ± 0.93 7 – 9.83	4.01	<0.001**

Table (5): Statistical comparison between the two studied groups as regards duration of 2nd stage of labor

	Dexamethasone group	Control group	t	p
Duration of the second stage of labor (minute) **Mean ± SD** **Range**	21 ± 5.64 15 - 30	24.9 ± 6.53 15 - 38	3.083	0.004*

Table (6) Comparison between the studied groups regarding APGAR score at one and five minutes

	Dexamethasone group	Control group	t	p
At 1 minute: **Mean ± SD** **Range**	7.82 ± 0.5 7 - 9	7.62 ± 0.59 7 - 9	-1.195	0.239
At 5 minute: **Mean ± SD** **Range**	9.27 ± 0.55 8 - 10	9.38 ± 0.5 9 - 10	0.675	0.503
p	<0.001**	<0.001**		

DISCUSSION

The human placenta produces (CRH) corticotrophin-releasing hormone, the timing of starting of birth and an increment in plasma CRH concentration that occurs in maternal plasma are correlated. [10] Consequently, glucocorticoid has a significant role in process of human parturition. Within fetal membrane, the glucocorticoids action are augmented by steroid dehydrogenase type I (11β-HSD1) effect which is able to convert the inactive cortisone form to active cortisol biologically thus growing the local active form of glucocorticoids levels. Initiation of these flow events by glucocorticoids may act as the positive forward mechanisms. [11] Therefore, this study intended for evaluating the role of dexamethazone on ripening of the cervix and progress of labor.

In the present study, the mean maternal age (years), gestational age (GA in weeks) and (BMI) body mass index at the start of study in case and control groups did not differ significantly. Moreover, initial Bishop Score at assessment before intervention in case and control group (3.5±0.71 vs. 3.58±0.64)respectively which did not differ significantly but this score statistically

differed after 6 hours of dexamethasone injection in case group it was (5.88±1.18) and control (5.19±0.85) P =0.019

Our findings were compatible with a study that was performed by **Laloha et al**. [7] who evaluated the preparing of the cervix and labor duration after giving intravenous dexamethasone injection. They found that the Bishop Score at the start of study in case and control groups (2.95 ± 0.9 vs. 2.82 ±0.9) respectively which did not differ significantly and after dexamethasone injection it was (5.9 ±
1.57 vs. 4.6 ± 1.72) respectively which significantly differed (P=0.001). They concluded that the cervical preparation and acceleration of labor induction can be improved by administration of dexamethasone.

Also Our findings were compatible with a study that was performed by **Hajivandi et al.** [12] that evaluated I.M dexamethasone administration efficacy on cervical ripening and induction of labor. They found that Mean Bishop Score after dexamethasone injection significantly differed in case and control groups (7.23±1.32 vs. 2.98±0.89) respectively (P<0.0001).

In the present study, the interval between the labor induction initiation and the starting of the active labor phase was (90±26.3 minutes) in the dexamethasone group however it was (112.88±48.87minutes) in the control group, which was significantly different (p-value 0.003).This was compatible with a study that was performed by **Kashanian et al.** [13] who evaluate the effect of giving dexamethasone injection on labour duration. They found that the period from induction initiation till starting of the active phase was shorter interval in the case group compared to in the control group (3.09 ± 1.5hours vs. 4.21 ± 1.8hours, respectively P < 0.001).They concluded that the administration of dexamethasone was found to shorten the duration of labor induction.

Also, our findings were in agreement with those observed by **Ziaei et al.** [14] that intended to determine the dexamethasone effect when injected intramuscularly on induction of labor. dexamethasone group participants start the active phase faster than control group participants, and time interval between induction starting and onset of active phase was significantly shorter in this group than in control group (1.7±1.5 hours vs 4±1.7 hours p <0.0001). They reported that dexamethasone injection intra-muscular can reduce the time interval between the induction and the active phase of labor.

Also, our findings came in consistent with a study of **Zafarghandi and Baghaii.** [15] That evaluated the effect of corticosteroid in induction of labor by extra-amniotic injection. The mean values of time period from labor induction to the active labor phase (3.3±2.1 hours vs. 9±4.7 hours, p<0.01, respectively) and between labor induction to complete delivery were shorter interval significantly in the study group than that in control group (5.7±3.4 hours vs. 6.9±4.7 hours, p<0.01, respectively). They concluded that the extra-amniotic corticosteroids administration reducing the time interval from starting of induction to delivery.

Our findings came in consistent with a study of **Mansouri et al.** [16] which showed that the period from induction to starting the active phase among the dexamethzone group was shorter than that among control group. They deduced that the extra-amniotic corticosteroids administration reducing the period from induction to starting the active phase and from induction - delivery.

In the present study, the first stage among dexamethasone group has shorter interval compared with control group (7.38 ± 0.7 vs. 8.38 ± 0.93) (p <0.001). Our results were in disagreement with the findings of **Hajivandi et al.** [12] who found that the time period from the start of the active stage and the onset of the second stage of labor in case and control groups were (3.18 ±0.47 vs 3.56 ± 1.5) respectively which did not differ significantly (P<0.56). The reason of this disagreement could be due to the number of patients in their research was more than ours, they had employed 8 milligrams of dexamethasone injection intramuscular in single dose and had used intravenous oxytocin twelve hours after injection of dexamethazone.

The present study showed that the second stage of labor in dexamethasone group

has shorter interval compared to that in control group (21± 5.64 minutes vs. 24.9 ± 6.53 minutes) (p=0.004). Our results were in agreement with **Pahlavan et al. [17]** who valuated the impact of IM dexamethasone therapy on prolonged latent labor phase. They found that second stage of labor duration was (35.4 ± 11.6minutes) in case, whereas it was (49.2 ±16.9 minutes) in control groups with a significant difference (p <0.001). This agreed with findings of a study done by **Kashanian et al. [13]** who found that the second stage of labor in dexamethasone group had less duration than that for control group (22.23±16.09 minute versus 29.03± 15.32 minutes, P=0.01).

As shown in our study, the intravenous dexamethasone injection showed no statistical significant difference in the first and fifth minute Apgar score between case and control groups (P=0.239, P=0.503). This was compatible with the results of a study by **Laloha et al. [7]** who found that the first and fifth minute Apgar score for both case and control groups did not differ significantly(P<0.98, P<0.79).

CONCLUSION

Our study concluded that the intravascular dexamethasone administration has the ability to improve the ripening of cervix and acceleration of labor induction by shortening the duration intervals between labor induction initiation and starting of active labor phase, as well as shortening time of the first and second stages of labor.

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