Original Article

Investigating the Effect of Hyoscine and Dexamethasone on Cervical Preparation in Primigravid Women with Term Pregnancy: A Double-blind Randomized Clinical Trial

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ABSTRACT

Objective: Pregnancy outcomes are an important factor in women's quality of life, and negative experiences have adverse effects on the overall health of the mother and the family. This study was designed and implemented to compare the effects of two drugs, hyoscine and dexamethasone, on cervical ripening and effacement during childbirth. **Methods:** This study was a double-blind randomized clinical trial of 150 patients divided into three groups. The researchers, in the early stage (latent) of labor, gave 8 mg of dexamethasone intravenously to the first group, 20 mg of hyoscine butyl bromide to the second group, and 8 mg of dexamethasone along with 20 mg of hyoscine butyl bromide to the third group. **Findings:** Among the quantitative variables studied (length of labor induction, duration of active stage, first stage and second stage of labor, placental expulsion time, 5- and 10-min Apgar and Bishop score), active stage duration (P = 0.000) and 5-min Apgar (P = 0.042) had statistical differences among the three groups. In addition, the type of delivery (P = 0.003) and the percentage of fetal distress (P = 0.001) in the studied groups had a statistically significant difference, and also, in the third group, the cesarean rate was less than the other two groups. **Conclusion:** Simultaneous injection of hyoscine and dexamethasone in primiparous women can reduce the duration of the active stage of labor without obstetric complications, so its use in the latent stage is suggested.

KEYWORDS: *Cervical ripening, Dexamethasone, effacement, Hyoscine, women obstetrics*

INTRODUCTION

The best way to give birth is natural, but sadly, the popularity of cesarean sections has increased in recent years, making natural delivery less common. This is now one of the major public health concerns.[1-3] The World Health Organization states that no more than 15% of pregnancies should result in a cesarean section.[4,5] The fetus is expelled during birthing as a result of the uterus's smooth muscular contractions. When compared to other muscles, these contractions are incredibly painful.[6] With a standard deviation of 3.4 h, the typical labor period for women experiencing their first pregnancy is approximately 4.9 h, which is a noteworthy duration.[7,8] One of the variables influencing pregnancy outcomes and difficulties for both the mother and the fetus is the length of labor.[9] Conventionally, medications such as mifepristone and dinoprostone were used for cervical ripening.[10]

Hyoscine n-butyl bromide is one medication that some doctors are testing to see if it can improve cervical dilatation, shorten the duration and intensity of pain, and accelerate the active stage of labor.[11] Hyoscine is a sedative, anticholinergic, antispasmodic, and analgesic that directly relaxes the smooth muscles in the genitourinary and digestive tracts. It also gradually

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and persistently sedates the brain.[12] Moreover, it induces amnesia of the occurrences during surgery or labor.[13] Another class of drugs that helps with labor is corticosteroids, including dexamethasone.[14] Corticosteroids have been used in clinical studies in different extra-amniotic, intramuscular, and intravenous ways, and both types have been effective in some studies.[15,16] Numerous investigations have demonstrated that the fetus's adrenal glands produce steroids, which influence the fetus and its membranes through corticotropin-releasing hormone (CRH) and induce the myometrium to change from a static to a contractile state. According to these researches, cortisol stimulates the adrenal glands to produce a feed-forward endocrine cascade, and the placenta-derived CRH plays a significant role in raising maternal estrogens (particularly sterol) in the latter stages of pregnancy.[16]

Considering the different results regarding the effect of two drugs hyoscine and dexamethasone, on the labor process and the need to conduct more comprehensive studies, the present study was designed and implemented to compare the effect of hyoscine and dexamethasone on cervical ripening during childbirth.

Methods

The present study was a double-blind, randomized parallel clinical trial study on primigravid women referred to Hajar Hospital in Shahrekord, Iran, from January 2021 to January 2022.

The inclusion criteria were as follows: mother's chronological age between 18 and 35 years old, first pregnancy, term pregnancy-cephalic view and intact membrane, unfavorable cervix with Bishop score of ≤4, live singleton embryo, has obstetric indications for pregnancy termination, such as a decrease in amniotic fluid or a decrease in fetal movement, low-risk pregnancy, without intrauterine adhesion of the placenta, having informed consent to participate in the study. Patients with the following criteria were excluded from the study: Having a history of infertility, having a history of underlying diseases (anemia or blood disorders, heart diseases, lung disease, connective tissue, and smooth muscle problems), history of surgery on the uterus, fetal macrosomia, the presence of contraindications for natural childbirth, the occurrence of fetal heart rate disorders, the occurrence of placental abruption, noncooperation of the patient, diagnosing the incompatibility of the fetal head with the mother's pelvis based on the gynecologist opinion, cases that are stained with meconium.

After randomization (using a random number generator app and concealed envelope for concealment), the Bishop score (to measure the readiness of the uterus for labor before the intervention) was measured and recorded by vaginal examination by a gynecology resident (Our analyzer generated the random allocation sequence, researcher enrolled participants and assigned participants to interventions. Participants and those assessing outcomes were blinded).

The length of different stages of labor was also recorded by the female assistant on a minute basis. Furthermore, the intensity of labor pain during uterine contractions was measured and recorded using a 10 cm visual analog scale score. In this scale, very intense pain was assigned to numbers 9 and 10, severe pain to numbers 6–8, moderate pain to numbers 4–5, mild pain to 1–3, and zero to no pain. After that, medication was prepared in three groups by the project manager, and pregnant mothers were entered into one of the three study groups based on a random number generator, and the necessary medicine was prescribed by the relevant midwife, and 6 h later, the gynecological assistant calculated the Bishop score again, and if it was not appropriate (the Bishop score was not 9), the second dose of medicine was prescribed. To carry out the intervention, in the first group, 8 mg (equivalent to 2 cc) of dexamethasone (manufactured by Iran Hormone Company/Iran); in the second group, 20 mg of hyoscine butyl bromide (manufactured by Jalinous Company/Iran), and in the third group, 8 mg (equivalent to 2 cc) of intravenous dexamethasone along with 20 mg of hyoscine butyl bromide were injected intravenously, 6 h before induction. The secondary findings, maternal blood pressure and pulse, fetal heart rate and 1 and 5-min Apgar of newborns, the occurrence of the meconium-stained amniotic fluid, and delivery method were also recorded. Fetal heart monitoring was done continuously in the form of Doppler auscultation every 30 min in the active stage and every 15 min in the second stage of labor.

This study was approved by the Shahrekord University of Medical Science ethics committee (IR.SKUMS.MED.REC.1401.036) and the Iranian Registry of Clinical Trials (IRCT20240222061084N1).

Analytical and descriptive analysis were used to analyze the data, and nonparametric tests were used in the analytical statistics due to the non-normality of the data. The collected data were entered into SPSS software version 16 and then described using dispersion indices such as mean and standard deviation, and statistical analysis was performed using the Kruskal–Wallis nonparametric test, Tukey's *post hoc* test, and Chi-square test. The significance level was considered <0.05.

Results

One hundred and fifty primiparous pregnant women participated in this study and were randomly divided

into three groups. To analyze the data, in the first step, the distribution of quantitative variables was checked using the Kolmogorov–Smirnov test. The results of this test showed that the majority of quantitative variables do not have a normal distribution in terms of dispersion, and nonparametric tests should be used for analysis.

To investigate the research questions, the studied variables were compared in three groups. The Kruskal–Wallis non-parametric test was used to compare quantitative variables. The findings of this section show that among the quantitative variables studied (the need for labor induction, the duration of the active stage, the duration of the first stage, the duration of the second stage, placental discharge time, 5-min Apgar, 10-min Apgar, and Bishop score), variables of active stage duration ($P < 0.001$) and Apgar 5 min ($P = 0.042$) were statistically different among the three groups, and no statistically significant differences were observed for other variables in the three groups.

Tukey's *post hoc* test was used to investigate and compare the variables of active stage duration and 5-min Apgar, which had statistically significant differences according to the results of the Kruskal–Wallis test. According to the findings of this section, the 5-min Apgar scores of babies born to mothers who received dexamethasone injections were significantly different from babies born to mothers who received hyoscine and dexamethasone injections at the same time ($P = 0.033$). It should be pointed out that the observed difference is not so big in terms of numbers so the average 5-min Apgar in the babies of the first group is 9 and in the babies of the third group is 8.89. The difference in the mean of this variable between the second and first groups as well as the second and third groups was not statistically significant.

The duration of the active stage in the first group has a statistically significant difference with the second group ($P = 0.024$) and the third group ($P < 0.001$), so in the first group, the duration of the first stage is 606 min. It was 424 min in the second group and 264 min in the third group. These findings show that the simultaneous injection of dexamethasone and hyoscine significantly reduces the duration of the active stage of labor. Furthermore, hyoscine is more effective than. No significant statistical difference was observed between the second and third groups.

The Chi-square test was used to compare the qualitative variables. The results of this test showed that the type of delivery ($P = 0.003$) and the percentage of fetal distress ($P = 0.001$) in the studied groups had statistically significant differences, so that in the third group, the rate of cesarean section was lower than the other two groups, but the rate of fetal distress was more. These results also showed that in the group that received hyoscine, the percentage of cesarean section was lower than in the dexamethasone group, but the percentage of fetal distress was higher. The variables of pain and the presence of meconium in the ammonium liquid were not significantly different among the three groups. These findings are presented in Table 1.

Discussion

The findings of this study showed the need for labor induction, the duration of the first stage, the duration of the second stage, placental discharge time, 10-min Apgar, Bishop score, pain intensity, and the presence of meconium in ammonium fluid among women who received either Hyoscine or dexamethasone or both, have no significant difference, and regarding mentioned factors, the effect of these two drugs separately and simultaneously is the same. On the other hand, the average duration of the active stage in the group that received both hyoscine and dexamethasone at the same time was significantly lower than the other two groups. Furthermore, the average duration of the active stage in women who were injected with hyoscine was less than in women who received dexamethasone.

In this regard, the findings of a review study by Mohaghegh *et al*. showed that dexamethasone injection can significantly reduce the length of the first stage and the active stage of labor but lacks a significant effect on fetal and maternal outcomes.[14] Pahlavani-Sheikhi *et al.* (2017) also reported that hyoscine-n-butyl bromide is effective in speeding up the first stage of labor, but it does not affect the second and third stages, as well as the rate of cervical tears and postpartum bleeding.[17] The findings of Barau *et al*.'s study showed the opposite result that hyoscine does not shorten the duration of labor in spontaneous labor and it also does not change feto-maternal outcomes.[18] Another meta-analysis by Larki *et al*. (2024) found that hyoscine rectal administration shortened the active labor phase and second stage and increased the rate of cervix dilatation.[19] The results of Nagi *et al*.'s study showed that the duration of the first stage of labor was significantly shortened in women who received hyoscine butyl bromide intravenously. The average duration of the first stage of labor in the hyoscine butyl bromide group was 186 min, while it was 268 min in the placebo group. Furthermore, the findings of this study showed that there was no significant difference regarding the mode of delivery or the health of the baby and the Apgar score.[20] The findings of the mentioned studies are in line with the results of this study and show that hyoscine alone, as well as together

Table 1: The results of the Chi-square test to compare the main variables between the studied groups

Variable	First group (dexamethasone)	Second group (hyoscine)	Third group (dexamethasone and hyoscine)	*P*
Age (years)	22.6±1.12	23.5±2.8	23.3±2.1	0.88
BMI	25.8±3.14	26.3±3.4	25.8±2.7	0.65
Intensity of pain (during the active stage)				
Mild	35 (70)	33 (66)	35 (70)	0.713
Moderate	15 (30)	16 (32)	15 (30)	
Severe	0	1 (2)	0	
Presence of meconium in ammonium liquid				
Yes	10 (20)	8 (16)	5 (10)	0.377
No	40 (80)	42 (84)	45 (90)	
Fetal distress				
Yes	1 (2)	4 (8)	10 (20)	0.001
No	49 (98)	46 (92)	40 (80)	
Average duration (h) of the first stage	9.8	7.74	5.5	0.003
Average duration (h) of the second stage	0.9	0.635	0.4	<0.001
Average duration (h) of placental discharge	1.9	1.3	0.9	<0.001
Average 5-min Apgar score	9	8.96	8.89	<0.001
Average 10-min Apgar score	10	10	10	-
The average need for induction	9.2	8.48	8.8	0.002
Average duration (h) of the active stage	7.4	6.08	4.04	<0.001
Average Bishop score	4.8	4.92	4.96	<0.001

Data are presented as mean±SD, or *n* (%) of the participants. BMI=Body mass index, SD=Standard deviation

with dexamethasone, can accelerate and help the labor process. In most of the studies, the effectiveness of hyoscine was investigated, but in the current study, the effectiveness of dexamethasone was also investigated by researchers; in this aspect, the current study is different from the other studies mentioned, and the findings of this study confirm the need for further study regarding the effectiveness of dexamethasone on the process.

Our study had several limitations. The most important one was our short-term follow-up, which made us unable to evaluate the long-term effects.

The findings of this study showed the need for labor induction, the duration of the first stage, the duration of the second stage, placental discharge time, 10-min Apgar, Bishop score, pain intensity, and the presence of meconium in ammonium fluid among women who received either Hyoscine or dexamethasone or both, have no significant difference, and regarding mentioned factors, the effect of these two drugs separately and simultaneously is the same. On the other hand, the average duration of the active stage in the group that received both hyoscine and dexamethasone at the same time was significantly lower than the other two groups. Furthermore, the average duration of the active stage in women who were injected with hyoscine was less than in women who received dexamethasone. Hence, its use in appropriate doses is recommended.

Authors' Contribution

All authors contributed to the study conception and design. Data collection and analysis were performed by [Saba Najafi]. The first draft of the manuscript was written by [Sheida Shabanian]. the Scientific editing was done by [Azar Danesh] and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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Conflicts of interest

There are no conflicts of interest.

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