



2023

Section: Obstetrics and Gynecology

Potency of Intravenous Dexamethasone on Preparing the Cervix and Labor Induction

Madiha Mohamed Hanafy

Department of Obstetrics and Gynecology, Faculty of Medicine for girls, Al-Azhar University, Cairo, Egypt

Hanan Abd El-Monem Mohamed

Department of Obstetrics and Gynecology, Faculty of Medicine for girls, Al-Azhar University, Cairo, Egypt

Hend Atif Mohamed Mesalam Abd Al-Hady

Department of Obstetrics and Gynecology, Faculty of Medicine for girls, Al-Azhar University, Cairo, Egypt,
hanodaatif@gmail.com

Follow this and additional works at: <https://aimj.researchcommons.org/journal>



Part of the [Medical Sciences Commons](#), [Obstetrics and Gynecology Commons](#), and the [Surgery Commons](#)

How to Cite This Article

Hanafy, Madiha Mohamed; Mohamed, Hanan Abd El-Monem; and Al-Hady, Hend Atif Mohamed Mesalam Abd (2023) "Potency of Intravenous Dexamethasone on Preparing the Cervix and Labor Induction," *Al-Azhar International Medical Journal*: Vol. 4: Iss. 9, Article 22.

DOI: <https://doi.org/10.58675/2682-339X.2026>

This Original Article is brought to you for free and open access by Al-Azhar International Medical Journal. It has been accepted for inclusion in Al-Azhar International Medical Journal by an authorized editor of Al-Azhar International Medical Journal. For more information, please contact dryasserhelmy@gmail.com.

Potency of Intravenous Dexamethasone on Preparing the Cervix and Labor Induction

Madiha Mohamed Hanafy, Hanan Abd El-Monem Mohamed,
Hend Atif Mohamed Mesalam Abd Al-Hady*

Department of Obstetrics and Gynecology, Faculty of Medicine for Girls, Al-Azhar University, Cairo, Egypt

Abstract

Background: Corticosteroids are one strategy for accelerating labor (labor induction). Animal studies show that sheep fetuses and other fetuses secrete cortisol to trigger labor. Extra-amniotic and intravenous (IV) corticosteroids both work. Cortisol and DHEA-S seem to affect the myometrium indirectly via promoting the synthesis of membrane prostaglandins. Elevated levels of estrogen alter the ratio of estrogen to progesterone, which disrupts the fetus' static state and induces myometrium contraction.

Aim: This study's objective is to evaluate the effectiveness of intravenous dexamethasone for cervix preparation and labor induction.

Subject and methods: At Al-Zahraa University Hospital and Sayed Galal University Hospital's obstetrics and gynecology departments, the research was conducted. There are 100 patients in the study population.

Results: There is no statistically substantial between Steroid and Saline received pregnant females as regard age, GA and type of labor. The duration of 1st of Induction—Active stage and Induction - second Stage was statistically substantial lower in pregnant female who got steroid than those who got saline.

Conclusion: Dexamethasone administered intravenously induces the cervix to soften and lowers the period between labor induction and the starting of the active phase of labor by raising the cervix's bishop score.

Keywords: Cervix, Dexamethasone, Labor induction, Labor

1. Introduction

The axis of the hypothalamus, pituitary, and adrenal glands is where the birthing process begins. The placenta and membranes are affected by the steroid chemicals generated in the human fetus's adrenal glands, which also cause the myometrium to change from a static to a contractile condition. Since the placenta generates a lot of CRH (Corticotrophin-releasing hormone), it may be involved in this process.¹

The third trimester is when the fetus's adrenal glands start to release a significant quantity of cortisol. The fetus's cortisol and DHEA-S (Dehydroepiandrosterone Sulfate) levels rise in the latter weeks of pregnancy, which causes a rise in maternal

estrogens, a specific sterol. There is no negative feedback from cortisol on placental CRH.²

According to various investigations, the release of steroid chemicals from the adrenal glands of human fetuses induces the myometrium to go from a static to a contractile state and influences the baby and membranes through CRH. These studies have shown that cortisol induces the adrenal glands to generate a feed-forward endocrine cascade, and that the CRH obtained from the placenta is a significant role in raising maternal estrogens (particularly sterol) in the last phases of gestation.³

Because cortisol and DHEA-S encourage the membranes to create more prostaglandins, it seems that these chemicals indirectly alter the myometrium. Additionally, the rise in estrogen that results in change the ratio of estrogen to progesterone,

Accepted 20 February 2023.
Available online 30 December 2023

* Corresponding author at: Resident of Obstetrics and Gynecology, at Al Ahrar Zagazig Teaching Hospital, Egypt.
E-mail address: hanodaatif@gmail.com (H.A.M. Mesalam Abd Al-Hady).

<https://doi.org/10.58675/2682-339X.2026>

2682-339X/© 2023 The author. Published by Al-Azhar University, Faculty of Medicine. This is an open access article under the CC BY-SA 4.0 license (<https://creativecommons.org/licenses/by-sa/4.0/>).

which triggers the production of proteins necessary for myometrium contraction and ends the fetus' static condition.⁴

This study's objective was to evaluate the effectiveness of intravenous Dexamethasone for cervix preparation and labor induction.

2. Patients and methods

This was a clinical interventional Randomized case-control trial.

All women were given a written consent before the start. The study population consists of 100 patients. The study took place at obstetrics and gynecology department at Al-Zahraa University Hospital and Sayed Galal university hospital.

Time frame: ranged from December 2021 to June 2022.

The study's female participants were split into two groups: **Group (A) (study group):** Dexamethasone 8 mg ampoule IV infusion was administered to 50 women 4 h prior to labor induction. **Group (B) (control group):** 4 h prior to starting of labor induction, distilled water was administered intravenously to 50 women.

Inclusion criteria: Primigravida, singleton pregnancy, 40th week of gestation and with Bishop scores (B.S.s) ≥ 4 .

Exclusion criteria: multi-gravida, medical disorders (high risk pregnancy): Diabetes, multifetal pregnancy, preeclampsia, rupture of the membrane (ROM), malpresentation, macrosomia, unfavorable pelvis, active labor, fetal distress.

2.1. Operative design

All patients were subjected to: Each patient signed a written permission after being fully informed. The patient's personal history, any complaints, obstetric history, menstrual history, prior medical and surgical history, and family history were all carefully and thoroughly recorded. **Complete physical examination:** Vital signs: Temperature, pulse rate, blood pressure, and respiration rate. **Abdominal evaluation:** Inspection, palpation and auscultation. **Vaginal evaluation to assess:** Cervical dilatation, consistency, effacement, position, position of fetal head, station of fetal head, state of fetal membranes, pelvic adequacy. **Laboratory tests:** A complete blood count, Rh type, coagulation profile (Partial thromboplastin time and prothrombin time), liver and renal function tests, **Monitoring of fetal well-being:** Before beginning any intervention, apply CTG to all participants for 30 min. Ultrasound scan was performed using Medison - Sonoace x6 (in El-sayed Galal University

hospital) and Medison- Sonoace R3 (abdominal probe) (in Al-Zahraa University hospital) to: to confirm viability, gauge gestational age, identify any congenital defects in the fetus, assess the placenta's location, gauge the quantity of amniotic fluid around the child, and establish if there are several pregnancies, macrosomia.

Drug Administration: The two milliliters of Dexamethasone and distilled water were given to the study's coordinator in syringes labeled A or B for drip infusion.

Throughout the whole research, this individual was not aware of what was in the syringes.

Four hours following the injections, the patients were reassessed to determine their Bishop scores (B.S.s), and oxytocin was administered to induce birth.

Checklists A and B included the pertinent information.

Last but not least, the patients' crevices were inspected to see whether they had improved during the average intervals from the start of induction to the start of the active stage and from the start of the active stage to the commencement of the second stage of labor.

2.2. Statistical analysis design

The gathered data were examined and coded. These numerical codes were entered into the Statistic Package for Social Science Version 22 computer, which performed statistical analysis (SPSS 22). Statistically descriptive data The means and standard deviations (mean \pm SD) of the quantitative data were reported and Qualitative data were presented as percentages and figures.

Statistical analysis Group comparisons were made utilizing: Chi square (X²) test: used to compare qualitative data. To compare quantitative data from two independent samples with normal distribution and homogeneous variance, use the Student's 't' test. Pearson correlation is used to examine the connection between variables, whereas the Mann Whitney test is utilized to compare quantitative data from two independent samples with non-normally distributed variables. 95 % of the coefficient interval was chosen. The significance level was determined using the following probability (P) values: Statistics were judged significant at $P < 0.05$.

3. Results

In the present research, 100 pregnant women were included; their ages varied from 18 to 32 years,

Table 1. Maternal age, GA and type of labor of the studied patients.

	Number = 100
Maternal age (years)	
Mean \pm SD	22.750 \pm 2.986
Range	18–32
Median [IQR]	23 [14]
GA (weeks)	
Mean \pm SD	39.210 \pm 0.433
Range	38–40
Median [IQR]	39 [0]
Type of labor	
NVD	83 (83 %)
CS	17 (17 %)

Table 2. Comparison of Maternal age, GA and type of labor of the study groups.

	Steroid intake Number = 50	Saline intake Number = 50	t	P value	Sig.
Age (year)					
Range	18–28	18–32	–1.976	0.051	NS
Mean \pm SD	22.160 \pm 2.852	23.340 \pm 3.028			
GA (weeks)					
Range	38–40	39–40	–1.629	0.107	NS
Mean \pm SD	39.140 \pm 0.404	39.280 \pm 0.453			
Type of labor					
NVD	42 (84 %)	41 (82 %)	0.071	0.790	NS
CS	8 (16 %)	9 (18 %)			

P value > 0.05: Non substantial (NS); P value < 0.05: substantial (S); P value < 0.01: highly substantial (HS).

•: independent student *t*-test, Chi square test.

Table 3. Comparison of Bishop score of the studied groups.

	Steroid intake Number = 50	Saline intake Number = 50	t/x ²	P value	Sig.
The Bishop score at time of 1st assessment					
Range	2–4	2–4	1.084	0.281	NS
Mean \pm SD	2.940 \pm 0.767	2.780 \pm 0.708			
Bishop score at time of induction					
Range	5–8	4–7	7.425	<0.0001	HS
Mean \pm SD	5.800 \pm 0.857	4.600 \pm 0.456			

P value > 0.05: Non substantial (NS); P value < 0.05: substantial (S); P value < 0.01: highly substantial (HS).

•: independent student *t*-test.

Table 4. Comparison of the duration of normal labor stages in the studied groups.

	Steroid intake Number = 42	Saline intake Number = 41	t/x ²	P value	Sig.
Beginning of Induction of labor to Active stage of labor interval					
Range	1.5–5	2–7	–5.617	<0.0001	HS
Mean \pm SD	2.752 \pm 0.798	3.983 \pm 1.017			
Active phase of labor to Second Stage of labor interval					
Range	2–5	1.5–5.5	–0.593	0.557	NS
Mean \pm SD	3.581 \pm 0.716	3.695 \pm 1.017			
Beginning of Induction of labor to Second Stage of labor interval					
Range	3.7–6.5	0.15–12	–3.045	0.004	HS
Mean \pm SD	6.371 \pm 1.255	7.555 \pm 2.175			

P value > 0.05: Non substantial (NS); P value < 0.05: substantial (S); P value < 0.01: highly substantial (HS).

•: independent student *t*-test, Mann Whitney test.

Table 5. Comparison of APGAR score of infants of the studied groups.

	Steroid intake Number = 50	Saline intake Number = 50	t	P value	Sig.
APGAR score 1st min					
Range	6–9	6–8	1.354	0.179	NS
Mean \pm SD	7.440 \pm 0.840	7.240 \pm 0.624			
APGAR score 5th min					
Range	7–10	8–9	–0.652	0.516	NS
Mean \pm SD	8.600 \pm 0.728	8.680 \pm 0.471			

P value > 0.05: Non substantial (NS); P value < 0.05: substantial (S); P value < 0.01: highly substantial (HS).

•: independent student *t*-test, Mann Whitney test.

•: chi square test.

with a mean of 22.750 \pm 2.986 years. The gestational age ranged between 38 and 40 weeks. Most of them were delivered by NVD (83 %) Tables 1 and 2.

There is no statistically substantial variation between Steroid and Saline received pregnant females as regard age, GA and type of labor Table 3.

Bishop score at time of induction was higher statistically substantial difference in pregnant female who received steroid than those who received saline Table 4.

The interval between beginning of labor Induction to Active stage of labor and interval between beginning of labor Induction to second Stage of labor were lower statistically significant difference

in pregnant female who received steroid than those who received saline [Table 5](#).

There is no statistically substantial variation in APGAR score 1st and 5th min between pregnant female who received steroid and those who received saline.

4. Discussion

Induction of labor, which may occur with or without a ruptured membrane, is the procedure of inducing contractions prior to the commencement of labor on its own. When the advantages of an early birth outweigh the hazards of continuing the pregnancy, either for the mother or the baby, labor induction might be thought of as a therapeutic intervention.⁵

According to certain research, dexamethasone and other glucocorticoids may aid in cervical ripening.⁶ There is evidence that glucocorticosteroid receptors are present in the fetal membranes during the start of labor, even if the exact function of glucocorticoids in the onset of labor is yet unclear.⁷

At Al-Zahraa University Hospital and Sayed Galal University Hospital, the obstetrics and gynecology departments performed this clinical interventional randomized case-controlled study. 100 women participated in this research. Each patient was split into two groups: Group(A) (study group): Dexamethasone 8 mg ampoule IV infusion was administered to 50 women 4 h prior to labor induction. Group (B) (control group): 4 h prior to starting of labor induction, distilled water was administered intravenously to 50 women.

In the current study we found that the age of the studied women ranged from 18 years to 32 years with mean value of 22.750 ± 2.986 years. The gestational age ranged between 38 and 40 weeks. Most of them were delivered by NVD (83 %). Regarding age, GA, and the nature of the job, there was no statistically substantial variation between the Steroid and Saline groups.

The current study was supported by Hussain *et al.*,⁸ who aimed to determine the impact of dexamethasone intravenously on the time between induction and delivery in term patients with pre-labor membrane rupture who are having labor induced. The study enrolled 40 cases received dexamethasone and 40 cases saline as controls, the study reported that there was no statistically substantial variation between dexamethasone and Saline groups as regard age, GA and type of labor.

As well, Saleh *et al.*,⁹ aimed to ascertain how intravenous dexamethasone treatment affects the cervix's preparation and the length of labor

induction in term pregnancy. There were 26 patients in the dexamethasone group and 26 cases in the control group in this case-controlled trial research. The research found no statistically substantial variation in age or gestational age between the tested groups.

Also, Ahmed *et al.*,¹⁰ aimed to determine if dexamethasone shortens the time between the start of labor induction and the start of the active phase of labor in post-term pregnancy, thus cutting the length of labor. There were 50 patients in the dexamethasone group and 50 cases in the control group in this case-controlled trial research. According to the research, there was no statistically substantial difference between the dexamethasone and Saline groups in terms of GA or age.

In addition, Shehata *et al.*,⁶ aimed to determine if dexamethasone contributes to the reduction of the time between the start of labor induction and the start of the active stage of labor in primigravida late-term pregnancy and to assess the impact of dexamethasone on labor outcomes. This study enrolled 60 cases in each group (dexamethasone and Saline). The groups were similar in base-line characteristics.

As well, Abdel Latif *et al.*,¹¹ aimed to determine if dexamethasone (8 mg) intramuscularly given as a single dose contributes to the reduction of the time between the start of labor induction and the start of the active phase of labor in primigravida with full-term pregnancies. In the research, there were 60 dexamethasone-treated subjects and 60 control cases. According to the research, there was no statistically substantial difference in age or GA between the dexamethasone and Saline groups.

Also, Laloha *et al.*,¹² aimed to investigate how intravenous dexamethasone affects labor's progression, how long it takes for the active phase to begin after labor induction, and how long it lasts overall. There were 86 instances in the dexamethasone group and 86 cases in the control group for the study. According to the research, there was no statistically substantial difference in age or GA between the dexamethasone and Saline groups.

In the current study, as regard Bishop Score, at time of 1st assessment it was ranged from 2 to 4 with mean value of 2.860 ± 0.738 and at time of induction Bishop Score ranged from 4 to 8 with mean value of 5.200 ± 1.005 . Regarding Primary Bishop Score, there was no statistically substantial change between the dexamethasone and Saline groups. Bishop score at time of induction was higher statistically significant in pregnant female who received steroid than those who received saline.

This was supported by Saleh *et al.*,⁹ who reported that with regards to the Bishop score prior to

intervention, there was a statistically insignificant variation between the examined groups. Bishop scores significantly increased in the dexamethasone group compared to the control group six hours after the intervention.

The current study showed that the interval between starting of labor Induction to starting of Active stage of labor and interval between starting of labor Induction to second Stage of labor were statistically significant in pregnant female who received steroid than those who received saline.

This was supported by Hussain *et al.*,⁸ who revealed that Dexamethasone group's Induction-Active phase length was noticeably shorter than Control group's. Dexamethasone group's active phase length was noticeably shorter than Control group's. The length of the second stage was not substantially shorter in the Dexamethasone group compared to the Control group. The length of the third stage was not substantially shorter in the Dexamethasone group compared to the Control group. Additionally, they said that the Dexamethasone group's total induction-delivery time was considerably shorter than the Control group's.

In the current study as regard APGAR score, at the 1st min it was ranged from 6 to 9 and at 5th min it was ranged from 7 to 10 indicating no evidence of perinatal asphyxia. There is no statistically substantial variation in APGAR score 1st and 5th min between pregnant female who received steroid and those who received saline.

This was supported by Hussain *et al.*,⁸ who revealed that there is no statistically substantial variation in APGAR score 1st and 5th min and NICU admission between pregnant female who received steroid than those who received saline.

Also, Saleh *et al.*,⁹ reported that in terms of the APGAR score at one and five minutes, there was no statistically substantial variation between the examined groups.

In line with the current research Ahmed *et al.*,¹⁰ revealed that regarding the APGAR score at one and five minutes, there was no substantial variation between the dexamethasone and saline groups.

Furthermore, Shehata *et al.*,⁶ revealed that the two study groups did not vary statistically significantly in terms of birth weight, Apgar scores at 1 and 5 min, or NICU hospitalization.

As well, Abdel Latif *et al.*,¹¹ reported that Regarding birth weight, fetal heart rate disruption, Apgar score at 1 min and at 5 min, and admission to the NICU, there was no statistically substantial variation between the two groups under study.

4.1. Conclusion

The present research came to the conclusion that intravascular dexamethasone injection has the capacity to speed up labor induction by reducing the time between the first stage of induction, which is the active stage, and the second stage, which is the passive stage. Dexamethasone treatment induces the cervix to soften, which shortens the period between labor induction and delivery and considerably raises the bishop score of the cervix. Administration of dexamethasone has no impact on the fetal outcome. The requirement for NICU hospitalization and the occurrence of postpartum complications such as postpartum hemorrhage or postpartum endometritis were not affected by the use of dexamethasone.

Disclosure

The authors have no financial interest to declare in relation to the content of this article.

Authorship

All authors have a substantial contribution to the article.

Sources of funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflicts of interest

The authors declared that there were NO conflicts of Interest.

References

1. Wang W, Chen ZJ, Myatt L, Sun K. 11 β -HSD1 in human fetal membranes as a potential therapeutic target for preterm birth. *Endocr Rev.* 2018;39:241–260.
2. Azzola A, Eastabrook G, Matsui D, et al. Adrenal Cushing syndrome diagnosed during pregnancy: successful medical management with metyrapone. *J Endocr Soc.* 2021;5:bvaa167.
3. Chatuphonprasert W, Jarukamjorn K, Ellinger I. Physiology and pathophysiology of steroid biosynthesis, transport and metabolism in the human placenta. *Front Pharmacol.* 2018;9:1–29.
4. Seravalli V, Di Tommaso M, Challis J, Petraglia F. Endocrinology of maternal-placental axis. In: *Female Reproductive Dysfunction.* 2020:397–410.
5. Cunningham FGGN, Leveno KJ, Gilstrap LCIII, Hauth JC, Wenstrom KD. *Williams Obstetrics.* 23rd ed. New York: McGraw-Hill professional; 2018:1–277, 978-0-07–170285-0. ISBN.

6. Shehata EE, Zaitoun MM, Azzam MN, Radwan ME. Effect of intramuscular administration of Dexamethasone on labour outcome in induction of Primigravida at late-term pregnancy. *Egypt J Hosp Med.* 2019;74:184–192.
7. Meyer EJ, Nenke MA, Rankin W, Lewis JG, Torpy DJ. Corticosteroid-binding globulin: a review of basic and clinical advances. *Horm Metab Res.* 2016;48:359–371.
8. Hussain SH, Amro S, Wafaa O, Mohamed S, Sarah S. Use of intravenous Dexamethasone for cervical ripening and labor induction in term pregnancies with pre-labour rupture of membranes: randomized control trial. *J Women Health Care Issues.* 2021;4:2.
9. Saleh Zaher TA, Gharib MA, El Saied AA, Amin AI. Role of dexamethazone on cervical ripening and induction of labor in term pregnancy. *Zagazig Univ Med J.* 2021;27:1518–1523.
10. Ahmed AEM, Deif OM, El-Saftawy MA. Potency of dexamethasone in labor induction. *Egypt J Hosp Med.* 2019;74:1544–1551.
11. Abdel Latif EM, Taha WS, Ahmed AARA. Effect of intramuscular administration of Dexamethasone on the duration of induction of labor in Primigravida Full-Term Pregnancy. *Egypt J Hosp Med.* 2018;73:6973–6982.
12. Laloha F, Asiabar NM, Barikani A, Movahed F. Effect of intravenous dexamethasone on preparing the cervix and labor induction. In: *Acta Medica Iranica.* 2015:568–572.