

EFFICACY OF PROPHYLACTIC CORTICOSTEROIDS PRIOR TO CESAREAN SECTION TO PREVENT RESPIRATORY COMPLICATION

By

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ABSTRACT

Background: Cesarean section (CS) is a risk factor for the development of neonatal respiratory complications, mostly respiratory distress syndrome (RDS) and transient tachypnea of the new-born, both in term and preterm infants. Infants born at term by elective cesarean delivery are more likely to develop respiratory morbidity than infants born vaginally.

Objective: To assess the effect of prophylactic corticosteroid administration before elective cesarean section at term, as compared to usual management without corticosteroids, in reducing neonatal respiratory morbidity and admission to special care with respiratory complications.

Patients and methods: This was a prospective study that was conducted on 200 women from the Out-Patient Clinic at Al-Hussein Hospital, Al-Azhar University from September 2018 to November 2019. Randomized controlled trials comparing prophylactic antenatal corticosteroid administration (dexamethasone) with placebo or with no treatment, given before elective cesarean section at term (at or after 37 weeks of gestation).

Results: PG represented 60% of 1st group while represented 50% of 2nd group without significant difference between them. There was no significant difference between groups as regard co-morbidity. There was no significant difference between groups regard causes of CS, and the major causes were previous CS and placenta previa. There was no significant difference between groups as regard postpartum hemorrhage or maternal complication in general. APGAR1 was significantly higher among corticosteroid group. Overall respiratory complication was significantly lower among corticosteroid group, respiratory distress (RD), need of neonatal intensive care unit (NICU) and mechanical ventilation and mortality were lower among the same group than control but not significantly.

Conclusion: A single course of corticosteroids (four 6mg doses of dexamethasone administered intramuscular every 12 hours) should be considered for women undergoing planned cesarean at 37 or more weeks' gestation.

Keywords: Corticosteroids, Cesarean Section, Respiratory Complication.

INTRODUCTION

Cesarean section rate has been increasing. It represents 30%-40% of births delivering methods, approximately half of which are elective cesarean

delivery. This may be due to changing practice in the management of previous caesarean and breech presentation as well as increased choice of women. Improved techniques of control of hemorrhage,

infection, and thromboembolism have increased safety of the procedure. As a result obstetricians and pregnant women have reduced threshold for choosing it. However although maternal risks have decreased, the effect of surgical delivery on the baby before due date continues to be debated (*Martin et al., 2015* and *Nada et al., 2016*).

Prophylactic corticosteroids in preterm pregnancies accelerate lung maturation and reduce the incidence of respiratory morbidity. Cesarean section is a risk factor for the development of neonatal respiratory complications, mostly respiratory distress syndrome (RDS) and transient tachypnoea of the new-born, both in term and preterm infants (*Roberts et al., 2017*).

Infants born at term by cesarean delivery are more likely to develop respiratory morbidity than infants born vaginally, and this risk increases furthermore for the subgroup of children born after elective cesarean section, i.e. before onset of labor, with potentially severe implications (*Ahmed et al., 2015*).

The risk is decreasing with advancing gestational age, and infants born between 37+0 and 37+6 weeks are at 1.7 times more risk for respiratory complications than those born between 38+0 and 38+6 weeks, which in turn are at 2.4 times more risk than the infants born between 39+0 and 39+6 weeks (*Shamseer et al., 2015*).

If women were given two intramuscular injections of 12 mg of dexamethasone, two doses for 48 hrs., the rates of admissions were at 37 weeks, 2.8% at 38 weeks, and 0.6% at 39 weeks. Although none of the babies in the control group died admission increase parental

anxiety, the cost to nursery unit and invasive procedures including artificial ventilation giving mothers dexamethasone, two doses before elective section halved neonatal morbidity (*Prefumo et al., 2016*).

In view of this evidence, it is currently recommended that elective cesarean section should be deferred to 39 weeks. However approximately 10%-15% of woman planed for C/S may deliver before 38 weeks, and there may be concern on waiting in the presence of specific indications or previous history. Respiratory morbidity in cases of term elective cesarean birth appears to have a different pathophysiology than in preterm birth, and retention in the lungs being the most likely cause (*Ceriani, 2015*).

The aim of this study was to assess the effect of prophylactic corticosteroid administration before elective cesarean section at term, as compared to usual management without corticosteroids, in reducing neonatal respiratory morbidity and admission to special care with respiratory complications.

PATIENTS AND METHODS

This was a prospective study conducted on 200 women from the Out-Patient Clinic at Al-Hussein Hospital, Al-Azhar University from September 2018 to November 2019.

Randomized controlled trial compared prophylactic antenatal corticosteroid administration (dexamethasone) with placebo or with no treatment, given before elective cesarean section at term (at or after 37 weeks of gestation).

The record of all (200) women were divided into two equal groups:

Group A had received two doses of prophylactic corticosteroid prior to delivery and **Group B** had not received it.

Inclusion criteria:

Women with singleton pregnancies at term (complete 37+0- 39 weeks), age from 18 years to 35 years, patients under regional anesthesia, and women with confirmed dates (early ultrasound scan 1st and 2nd trimester, or sure about LMP).

Exclusion criteria:

Women with DM, age more than 36 years old, women with congenital malformed babies, IUGR fetuses, women less than 37 weeks, multiple pregnancies, and women received dexamethasone, two doses during pregnancy due to other causes and women refused this intervention.

An approval of the study was obtained from Al- Azhar University academic and ethical committee. Every patient signed an informed written consent for acceptance of the operation.

All patients were subjected to complete medical history taking and clinical examination. Investigations included: Complete blood picture, obstetrics ultrasound to confirm gestational age, urine analysis, random blood sugar, coagulation profile, liver functions tests

and kidney function tests. All women delivered by Elective CS between 37weeks to 39 weeks of pregnancy, and follow-up for the patient and neonates.

Maternal and neonatal medical records were reviewed and all required information was documented whose primary outcome measure was to see the number of babies with respiratory complications in each group and secondary outcome measure was to compare difference in nursery admission and total hospital stay in both groups.

Statistical analysis:

Data collected throughout history, basic clinical examination, laboratory investigations and outcome measures coded, entered and analyzed using Microsoft Excel software. Data were then imported into Statistical Package for the Social Sciences (SPSS version 20.0) software was represented for analysis. According to the type of data qualitative were represented can as number and percentage, quantitative continues group were represented by Mean \pm SD. The following tests were used to test differences for significance; difference and association of qualitative variable by Chi square test (X^2). Differences between quantitative independent groups by t test. P value was set at <0.05 for significant results.

RESULTS

Age was distributed as 27.0 ± 2.71 and 26.6 ± 3.85 respectively without significant difference between groups and gestational age (GA) was distributed as 35.95 ± 1.3 and 36.02 ± 1.12 respectively between groups without significant difference (Table 1).

Table (1): Age and GA distribution between studied groups

Parameters \ Groups	Corticosteroid Group (100)	Control Group (100)	P
Age	27.0 ± 2.71	26.6 ± 3.85	0.4
GA	35.95 ± 1.3	36.02 ± 1.12	0.684

PG represent 60% of 1st group while represent 50% of 2nd group without significant difference between them (Table 2).

Table (2): Parity distribution between studied groups

Parity \ Groups	Corticosteroid Group (100)	Control Group (100)	Total	P	
PG	N	60	50	110	0.155
	%	60.0%	50.0%	55.0%	
Multi	N	40	50	90	
	%	40.0%	50.0%	45.0%	
Total	N	100	100	200	
	%	100.0%	100.0%	100.0%	

There was no significant difference between groups regard co morbidity (Table 3).

Table (3): Co morbidity distribution between studied groups

Co-morbidity \ Groups	Corticosteroid Group (100)	Control Group (100)	Total	P	
-VE	N	85	90	175	0.285
	%	85.0%	90.0%	87.5%	
+VE	N	15	10	25	
	%	15.0%	10.0%	12.5%	
Total	N	100	100	200	
	%	100.0%	100.0%	100.0%	

There was no significant difference between groups regard causes of CS and the major causes were previous CS and placenta previa (Table 4).

Table (4): Cause of CS distribution between studied groups

Causes of CS	Groups		Corticosteroid Group (100)	Control Group (100)	Total	P
	N	%				
Previous C.S	N		35	30	65	0.816
	%		35.0%	30.0%	32.5%	
Placenta previa	N		35	35	70	
	%		35.0%	35.0%	35.0%	
Cephalopelvic disproportion	N		20	25	45	
	%		20.0%	25.0%	22.5%	
Malpresentation	N		10	10	20	
	%		10.0%	10.0%	10.0%	
Total	N		100	100	200	
	%		100.0%	100.0%	100.0%	

There was no significant difference between groups regards postpartum Hg or maternal complication in general (Table 5).

Table (5): Maternal outcome and complication distribution between groups

Parameters	Groups		Corticosteroid Group (100)	Control Group (100)	Total	P
	N	%				
Postpartum hg	-VE	N	85	90	175	0.285
		%	85.0%	90.0%	87.5%	
	+VE	N	15	10	25	
		%	15.0%	10.0%	12.5%	
Maternal complication	-VE	N	80	70	150	0.127
		%	80.0%	70.0%	75.0%	
	+VE	N	20	30	50	
		%	20.0%	30.0%	25.0%	
Total	N		100	100	200	
	%		100.0%	100.0%	100.0%	

APGAR1 was significantly higher among corticosteroid group, overall respiratory complication was significantly lower among corticosteroid group, RD,

NEED OF NICU and MV and mortality were lower among the same group than control but not significantly (Table 6).

Table (6): Baby outcome and complication distribution between groups

Parameters		Groups		Corticosteroid Group (100)	Control Group (100)	P
APGAR1				7.2±0.75	6.65±0.72	0.001**
APGAR5				8.41±0.87	8.25±1.01	0.232
NICU	Not	N	91	83	0.093	
		%	91.0%	83.0%		
	Needed	N	9	17		
		%	9.0%	17.0%		
RD	-VE	N	93	89	0.323	
		%	93.0%	89.0%		
	+VE	N	7	11		
		%	7.0%	11.0%		
Respiratory comp	-VE	N	89	73	0.004*	
		%	89.0%	73.0%		
	+VE	N	11	27		
		%	11.0%	27.0%		
MV	-VE	N	95	88	0.08	
		%	95.0%	88.0%		
	+VE	N	5	12		
		%	5.0%	12.0%		
Neonatal mortality	-VE	N	98	92	0.052	
		%	98.0%	92.0%		
	+VE	N	2	8		
		%	2.0%	8.0%		
Total		N	100	100		
		%	100.0%	100.0%		

DISCUSSION

In the current study there was no statistically significant difference between the two studied groups as regards neonatal admission to NICU. Age and GA were distributed without significant difference between groups.

The present study agreed with *Sotiriadis et al. (2018)*, who found that there was no role of corticosteroid in elective section at term for reducing incidence of NICU admission with no statistically significant difference in the overall rate of admissions to NICU. *Roberts et al. (2017)* exhibited that treatment with antenatal corticosteroids at term was associated with less need to neonatal respiratory support; with a

reduction in the need for mechanical ventilation/ continuous positive airway pressure (CPAP), and less time requiring oxygen supplementation but with no statistically significant difference between the intervention and control groups.

Sotiriadis et al. (2018) have done a research on babies born at term by elective cesarean section. Prophylactic corticosteroids appeared to significantly decrease the risk of admission to the neonatal intensive care unit for respiratory morbidity, which may be explained by the fewer number of candidates included in this study, and their larger number of candidates might had the accentuation effect over the insignificant difference we noticed in this study.

In the current study, there was no statistically significant difference between the two studied groups as regards, incidence of RDS. In agreement with this result, *Sotiriadis et al. (2018)* conducted that no statistically significant reduction was found in the incidence of neonatal respiratory distress syndrome. *Ventolini et al. (2011)* found that, to some extent, the usage of antenatal dexamethasone in the intervention group had improved neonatal outcomes as regards the incidence of respiratory morbidity, but with no statistically significant difference, which support our results on term babies while they conducted their research on pre-term babies.

On the other hand, this does not agree with *Roberts et al. (2017)* who stated that treatment with antenatal corticosteroids is associated with an overall reduction in incidence of RDS.

In the current study, there was no statistically significant difference between the two studied groups as regards, incidence of transient tachypnea of the newborn. *Sotiriadis et al. (2018)* agreed with this study as they conducted that no statistically significant reduction was found in the incidence of transient tachypnea of the newborn.

In the current study, there was no statistically significant difference between the two studied groups as regards the need for mechanical ventilation. In agreement with results of the current study, *Sotiriadis et al. (2018)* concluded that no statistically significant reduction was found in the need for mechanical ventilation. *Gouyon et al. (2010)* agreed with the current study as the incidence of transient tachypnea of the newborn and RDS markedly dropped

from 10% at 37 weeks of gestation to 0% at 39 weeks of gestation.

PG represented 60% of 1st group, while represented 50% of 2nd group without significant difference between them. There was no significant difference between groups regard co morbidity. There was no significant difference between groups as regard causes of CS, and the major causes were previous CS and placenta previa.

There was no significant difference between groups as regards postpartum hemorrhage or maternal complication in general. APGAR1 was significantly higher among corticosteroid group. Overall respiratory complication was significantly lower among corticosteroid group, RD, need of NICU and MV, and mortality were lower among the same group than control but not significantly.

Balci et al. (2010) APGAR score at 1 minute was 7.408 ± 0.85 and 7.86 ± 0.78 . APGAR score at 5 minutes was 7.98 ± 0.74 and 8.60 ± 0.75 for group I and group II.

Regarding the post-delivery foetal complication: neonates require resuscitation in group I 14% while in group II 32%. RDS in group I 4% while in group II 16%.

There was a statistical significant difference between the two studied groups regarding the post-delivery foetal complication.

Porto et al. (2011) stated that treatment with corticosteroids failed to reduce the risk of any respiratory morbidity. Necessity for ventilatory support was also similar. Antenatal treatment with corticosteroid in women at 34-36 weeks of

pregnancy at risk of imminent premature delivery is ineffective in reducing respiratory disorders in the babies.

Shanks et al. (2010) concluded that a single course of intramuscular glucocorticoids after 34 weeks in pregnancies with documented fetal lung immaturity significantly increases fetal lung maturity and decrease the neonatal morbidity.

CONCLUSION

A single course of corticosteroids (four 6mg doses dexamethasone administered intramuscular every 12 hours) should be considered for women undergoing planned cesarean at 37 or more week's gestation. Incidence of respiratory problems increases in preterm infants.

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دور الكورتيزون الوقائي قبل الجراحة القيصرية الاختيارية فى الجنين الكامل على الوقاية من أمراض الجهاز التنفسى عند حديثى الولادة

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خلفية البحث: الولادة القيصرية هي عامل خطر لتطور المضاعفات التنفسية الوليدية، ومعظمها متلازمة الضائقة التنفسية وصعوبة التنفس للمولود الجديد، سواء في الرضع حديثي الولادة والخدج. وتعمل ديكساميثازون الوقائية في حالات الولاده المبكره على تسريع نضوج الرئة وتقليل حدوث المراضة التنفسية.

الهدف من البحث: تقييم تأثير إعطاء ديكساميثازون الوقائية قبل الولادة القيصرية الاختيارية، مقارنة بدون إعطائها في الحد من الأمراض التنفسية الوليدية والدخول بالرعاية الخاصة بمضاعفات الجهاز التنفسي.

المرضى وطرق البحث: هذه دراسة استطلاعية أجريت على المرضى من عيادة المرضى الخارجيين قسم النساء والتوليد بمستشفى الحسين الجامعي بجامعة الأزهر في الفتره من شهر سبتمبر 2019 الي شهر نوفمبر 2019. وخضع جميع المرضى لهذه الدراسة بعد أن تم اخذ الموافقة الخطية منهم لما يلي: الإستعلام عن التاريخ المرضى, والفحص السريري الكامل, والإختبارات المعملية والتي شملت: صورته دم وتحليل بول وسكر الدم العشوائى ووقت البروثرومبين ووقت التخثر وقت النزيف ووظائف الكبد ووظائف الكلى وموجات فوق صوتيه علي الحمل.

نتائج البحث: لا يوجد إختلاف جذري بين المجموعتين فيما يتعلق بالأسباب المتعلقة للولادة القيصرية. لا يوجد إختلاف جذري بين المجموعتين فيما يتعلق بالنزيف بعد الولادة ومضاعفاتها. ويوجد إختلاف جذري بين المجموعتين فيما يتعلق بمضاعفات الجهاز التنفسي الوليديه والدخول للرعاية والحاجة للتنفس الصناعي حيث كانت نسبتها أقل فى المجموعة التي أعطيت كورتيزون وكانت الوفيات أقل فى نفس المجموعه مقارنة بالمجموعة الضابطة.

الإستنتاج: نوصي بإعطاء جرعات الكورتيزون قبل إجراء الولادة القيصرية الاختيارية.

الكلمات الدالة : الكورتيزون الوقائى- الجراحة القيصرية – أمراض الجهاز التنفسى .