

Dexamethasone in prevention of respiratory morbidity in elective caesarean section in term fetus. A randomized control trial

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Abstract: Introduction: Babies born at term by elective caesarean section (CS) and before onset of labor are more likely to develop respiratory complications than babies born vaginally. In developing countries resources are scarce and it is difficult to provide expensive treatments as neonatal care. **Aim of the Work:** To assess the effect of prophylactic dexamethasone administration before elective cesarean section at term in reducing neonatal respiratory complications. **Patients and methods:** 600 women were included in the study and were planned to have elective caesarean section. 300 received dexamethasone 12 mg twice, 12 hours apart 48 hours before delivery. 300 patients were the control group. The outcomes were: incidence of admission to neonatal intensive care unit (NICU), incidence of transient tachypnea of newborn (TTN), the incidence of respiratory distress syndrome (RDS) and the need for mechanical ventilation. **Results:** There was a highly significant difference between cases and controls as regard TTN and admission to NICU. There was a decrease in the incidence of RDS and the need for mechanical ventilation but with no significant differences. **Conclusion:** Antenatal dexamethasone is effective in reducing neonatal respiratory morbidity and admission to NICU.

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1.Introduction

Caesarean births represent 30% to 40% of all births in some countries⁽¹⁾ and approximately half of them are elective at term⁽²⁾.

Elective cesarean section compared with intended vaginal delivery leads to a twofold to fourfold increased risk of overall neonatal respiratory morbidity and even higher relative risks of serious respiratory morbidity in term newborns. A significant reduction in neonatal respiratory morbidity may be obtained if elective caesarean section is postponed to 39 weeks' gestation. This information should be taken into consideration by women contemplating an elective caesarean section and by the obstetricians counseling them⁽³⁾.

Babies born at term (at or after 37 weeks) by planned (elective) cesarean section and before onset of labor and more likely to develop respiratory complications than babies born vaginally. The risk of respiratory complications, mostly respiratory distress syndrome and transient tachypnoea, decreases from 37 weeks to 39 weeks of gestation, at which stage it is low⁽²⁾.

Respiratory morbidity in cases of term elective caesarean births appears to have a different pathophysiology than in preterm birth, with lack of the physiological catecholamine surge^(4,5) and fluid retention in the lungs⁽⁶⁾ being the most likely causes. Interestingly, recent evidence indicates that, apart

from the traditional mechanical concept of "vaginal squeeze", molecular mechanisms (predominantly lung epithelial sodium channels) promote alveolar fluid drainage, and these channels may be underactive in fetuses not exposed to the process of labour⁽⁷⁾. Glucocorticoids appear to increase the number and function of sodium channels, as well as the responsiveness to catecholamines and thyroid hormones⁽⁷⁾. Providing a rationale for their exogenous administration in cases of elective caesarean⁽²⁾.

In developing countries resources are scarce and it is often difficult to provide expensive treatments such as neonatal care⁽⁸⁾.

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

2. Patients and Methods

This is a double blinded prospective randomized study which was conducted at Ain Shams Maternity Hospital in the period of March 2010 to March 2011.

The study included 2 groups:

Group A (cases): 300 patients who received corticosteroids

Group B (control): 300 patients who received no corticosteroids.

Informed consent was obtained. The ethics committee approval of Ain Shams Maternity Hospital was obtained.

The inclusion criteria were previous caesarean section and complete 37 week calculated from the first day of the last menstrual period.

The exclusion criteria were:

- A- Patients with obstetric complications such as pre-eclampsia, antepartum hemorrhage or known fetal anomaly.
- B- Hypertensive patients.
- C- Patient who had chronic disease e.g. diabetes mellitus.
- D- Patients with known renal disease.

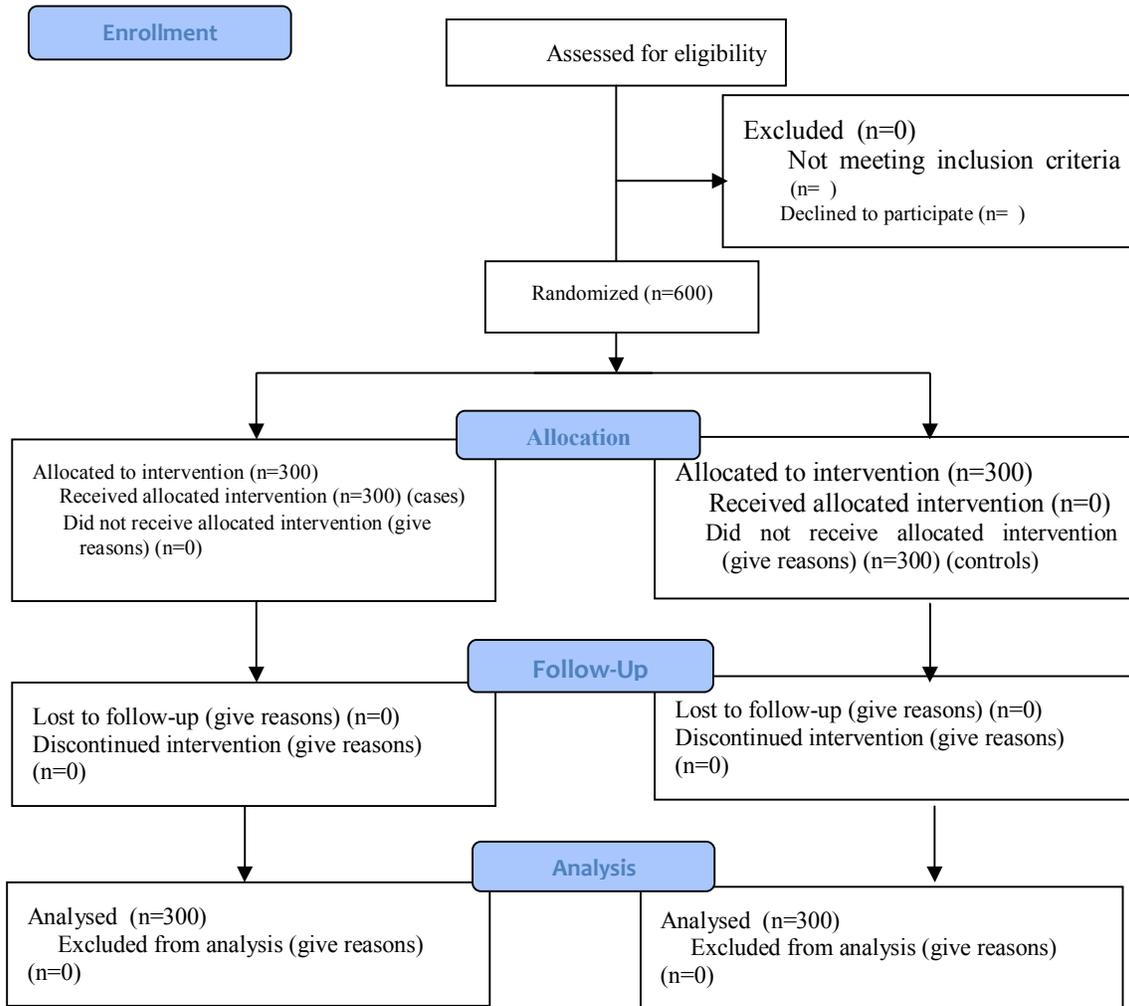
E- Patient who were known to have pre-operative infection.

Patients were randomly allocated to two groups by closed envelope technique. The treatment group received two intramuscular doses of 12 mg dexamethasone 12 hours apart in the 48 hours before delivery. The control group received treatment as usual. Betamethasone was used in a similar study.⁽⁹⁾

Patients were followed up for recording:

- The incidence of admission with respiratory distress to NICU.
- The incidence of transient tachypnea of the newborn (TTN).
- The incidence of respiratory distress syndrome and the need for mechanical ventilation.

CONSORT Flow Diagram



3. Results

There was no statistically significant difference between groups A and B as regards age, parity, number of previous sections and fetal weight as shown in table (1).

There was a highly significant difference between both groups as regard transient tachypnea of newborn RR: 0.27 95% CI: 0.10-0.73, highly significant (P <0.01) as shown in table (2).

There was a statistically significant difference between both groups as regards RDS (0.7% among group A compared to 2% among group B) as shown in table 3. P > 0.05 not significant, RR= 0.33 95% CI: 0.006-1.6.

There was a highly significant difference between both groups as regards admission to NICU: 2.3% among group A with corticosteroids injections

compared to 8% among group B as shown in table 4 P<0.01 highly significant, RR: 0.29, 95%, CI: 0.12-0.66.

There was no significant difference between both groups as regards need for mechanical ventilation among group A compared to group B as shown in table 5, P<0.05 not significant, RR: 0.33, 95%, CI: 0.06-1.6.

There was a highly significant difference between both groups as regards the presence of TTN and the need for NICU admission. There was no significant difference between both groups as regards the RDS and the need for mechanical ventilation. However, the percent of neonates who had RDS and needed mechanical ventilation was higher in group B than group A.

Table (1): Comparison between the two studied groups as regards the mean age, patients number of previous sections and fetal weight:

	Group A (n=300) Mean ±SD	Group B (n=300) Mean ±SD	t	p
Age	28.5±3.9	28.9±4.2	1.2	0.2 NS
Parity	1.8±0.9	1.9±0.9	1.0	0.3 NS
Previous section	1.6±0.7	1.7±0.8	0.5	0.5 NS
Fetal weight	3.0±0.3	3.0±0.3	0.9	0.3 NS

NS: non significant

Table (2): Comparison between both groups as regards the presence of transient tachypnea of newborn.

	Normal No. (%)	Tachypnea No. (%)	X ²	p
Group A, N=300	295(98.3%)	5(1.7%)	7.6	0.006** HS
Group B, N=300	282(94.0%)	18(6%)		

HS: Highly significant

Table (3): Comparison between both groups as regards the presence of RDS syndrome:

	Normal No. (%)	RDS No. (%)	X ²	p
Group A, N=300	298(99.3%)	2(0.7%)	2.0	0.1 NS
Group B, N=300	249(28.0%)	6(2.0%)		

NS: non significant

Table (4): Comparison between both groups as regards the admission to neonatal intensive care unit NICU.

	No admission No. (%)	NICU admission No. (%)	X ²	p
Group A, N=300	293(97.7%)	7(2.3%)	9.8	0.002** HS
Group B, N=300	276(92.0%)	24(8.0%)		

HS: Highly significant

Table (5): Comparison between both groups as regards the need for mechanical ventilation.

	No ventilation No. (%)	Need for mechanical ventilation No. (%)	X ²	p
Group A, N=300	298(99.3%)	2(0.7%)	2.0	0.1 NS
Group B, N=300	249(28.0%)	6(2.0%)		

NS: non significant

4. Discussion

In this study dexamethasone administration prior to elective caesarean section in term fetuses reduced transient tachypnea of the newborn.

There was a highly significant difference between cases and controls as regards transient tachypnea of newborn RR: 0.27, 95%, CI: 0.010-0.73., P, 0.01.

There was statistically insignificant difference between both groups as regard respiratory distress syndrome (RDS) 0.7%, among the cases and 2% in the control group.

There was a highly significant difference between both groups as regards NICU admission. It was 2.3% among cases and 8% among controls PR 0.29 95% CI 0.12-0.66, P< 0.01.

There was no significant difference between both groups as regards the need for mechanical ventilation: in the cases it was 0.7% and 2% in the control group RR: 0.33, 95% CI 0.05-1.6, P > 0.05.

In another study⁽⁹⁾, betamethasone was used prior to elective CS in term fetuses 35 babies were admitted to special baby units with respiratory distress: 24 were in the control group and 11 were in the intervention group (P=0.02). The incidence of admission with RDS was 0.051 in the control group and 0.024 in the treatment group RR 0.46, 95% confidence interval 0.23 to 0.93. The incidence of TTN was 0.040 in the control group and 0.021 in the treatment group (0.54, 0.026 to 1.12). The incidence of RDS was 0.011 in the control group and 0.002 in the treatment group (0.21, 0.03 to 1.32).

Admission to NICU separates other and baby, disrupts bonding, and increase the cost of the care and the risk of complications^(10,11). Furthermore, neonatal respiratory morbidity increases the risk of asthma in childhood⁽¹²⁾.

Antenatal dexamethasone is effective in reducing TTN and admission to NICU with significant differences.

Also it decreases the incidence of RDS and the use of mechanical ventilation.

Conflict of interest statement

There is no relationship for any author that may influence the objectivity of the paper.

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