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Original Research Article

Antenatal rescue corticosteroids and perinatal outcome

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ABSTRACT

Background: Antenatal corticosteroids (ACS) is one of the most effective intervention for prevention of neonatal complications in preterm babies. However, due to its transient effects, single repeat course is recommended. This rescue course of ACS is believed to improve fetomaternal outcome in women with preterm labor and was the subject matter of this study.

Methods: Total 200 antenatal women who were admitted for threatened preterm labor, between 28 to 34 weeks of gestation, who had already received a single course of ACS within 7-14 days were allocated into group A and group B. Group A included 100 women, who were given rescue course of ACS. Group B included 100 women who rescue course was not given.

Results: Out of 115 babies in group A and 114 babies in group B, 18 babies (16%) in group A and 30 babies (26%) in group B had NICU admission ($p < 0.05$). Eight babies (6%) in group A and 23 babies (20%) in group B were diagnosed with respiratory distress syndrome (RDS) where the difference was statistically highly significant ($p < 0.001$). Maternal outcome was similar among both the groups.

Conclusions: A single repeat rescue course of ACS helps to improve neonatal outcome in preterm babies.

Keywords: Antenatal corticosteroids, Respiratory distress syndrome, Preterm labor

INTRODUCTION

ACS have been used for long to improve the neonatal outcome in preterm babies. Corticosteroids accelerate organ maturation that enables the foetus to survive outside the womb.

In preterm birth, the developing foetus does not receive sufficient exposure to endogenous corticosteroids in utero for proper organ development, predisposing the neonate to complications like intraventricular haemorrhage (IVH), RDS, necrotizing enterocolitis (NEC) and sepsis.¹ Synthetic corticosteroids have proved useful in the prevention of these complications. Betamethasone and dexamethasone are the most widely studied ACS²⁻⁴

Although the beneficial effects of ACS on the foetus are very well known, many studies have suggested a transient

effect of ACS.⁵⁻⁷ Thus, we give a single repeat course of antenatal corticosteroids, also termed as salvage, rescue or booster therapy.

The concept of a rescue course of ACS basically involves administering a second course of antenatal corticosteroids to mothers with preterm labour, whose pregnancy continues for more than a week or two beyond their original ACS course.

Currently, ACOG 2017 recommends a single repeat course of ACS for those pregnant women who are less than 34 0/7 weeks of gestation, who are at risk of preterm delivery within 7 days and whose prior course of ACS was administered more than 14 days previously.⁸

In the context of inaccessibility and unaffordability of advanced neonatal interventions in developing countries a

low cost, universally accessible intervention such as rescue course of antenatal corticosteroid has immense potential. Thus, this study was planned to evaluate the effect of rescue course of ACS on perinatal outcome and to compare single vs rescue course of ACS on perinatal outcome.

The primary objective was to study the effect of rescue course of antenatal corticosteroids on perinatal outcome and to compare single versus rescue course of antenatal corticosteroid on perinatal outcome. Secondary objective

was to study the effect of rescue course of antenatal corticosteroids on maternal outcome.

METHODS

This was a prospective analytical study conducted in JNMC, AMU, Aligarh from October 2018 to December 2020. Participants were included only after an informed and written consent, with approval from institutional ethical committee. Following is the algorithm of the study.

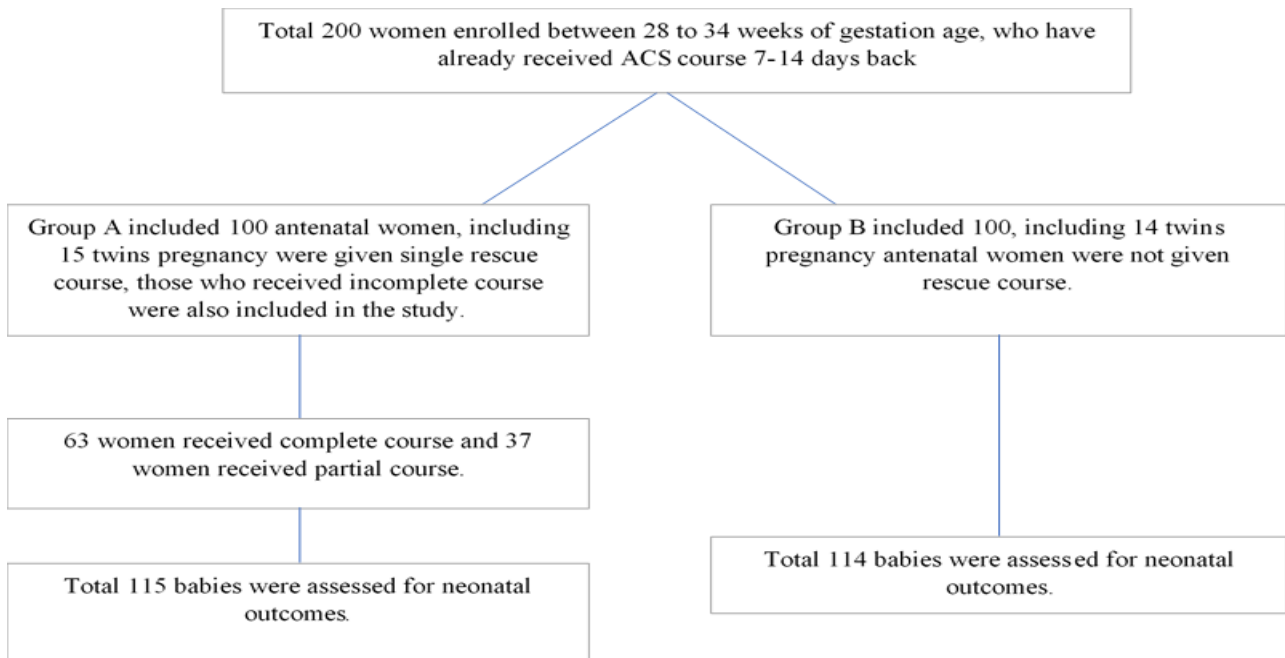


Figure 1: Depicts enrolment of women; 200 women enrolled, divided into two groups; total 115 babies in group A and 114 babies in group B were assessed for neonatal outcomes.

Total 200 antenatal women who were admitted for threatened preterm labour, between 28 to 34 weeks of gestation were included in the study. They had regular uterine contractions, cervical dilatation <2 cm and had already received a single course of antenatal corticosteroid within 7-14 days. These women were allocated into group A and group B. Group A included 100 women with 15 twins pregnancies, who were given rescue course. Group B included 100 women with 14 twins pregnancies who rescue course was not given. Antenatal women who delivered before getting the complete course were also included in the study. All the women included in the study were followed till delivery. Those who delivered after 37 weeks were excluded from the study. Antenatal women with cervical dilatation >2 cm, congenital anomalies in foetus, abnormal presentations, receiving corticosteroids for other maternal conditions, HIV positive and active tuberculosis, severe pre-eclampsia, eclampsia and IUGR were excluded from the study.

Rescue course comprised of injection dexamethasone 6 mg given deep intramuscular in the upper outer quadrant of the gluteal region. Four doses, 6 mg each, were repeated

at 12 hours interval with total duration of 48 hours. All newborns were assessed for birth weight, NICU admissions, Apgar score at 1 and 5 minutes and complications like RDS, NEC, IVH and neonatal death. Maternal outcomes were assessed seven days post-delivery with cervical swab culture, total leukocyte count and any new onset of fever.

Statistical analysis

Data were entered into microsoft excel and then into SPSS. Descriptive statistics was presented as percentage and mean±SD. Inferential statistics was applied using Chi square test and student's t test for categorical and continuous data, respectively. P<0.05 was considered as significant.

RESULTS

In both groups, A and B, parameters such as age, parity, maternal weight and mean gestational age at delivery were similar.

Baseline characteristics in two groups

As shown in Table 1, mean age of women in group A and group B was 25.93±3.20 years and 24.99±2.80 years, respectively. Mean weight in both groups were also comparable, 65.67±7.06 kgs in group A and 64.11±6.37 kgs in group B. Mean parity in group A was 2.49±1.33 and

in group B was 2.39±1.06. Twin pregnancies in group A and group B were 15% and 14% respectively. Mean gestational age at which rescue course was given in group A was 32.40±1.08 weeks and mean gestational age at delivery in group A was 32.81±1.19 weeks and in group B was 32.81±1.19 weeks.

Table 1: Baseline characteristics in group A and group B.

Characteristics	Group A (rescue group)	Group B (without rescue group)
Age (in years)	25.93±3.20	24.99±2.80
Parity	2.49±1.33	2.39±1.06
Maternal weight (in kgs)	65.67±7.06	64.11±6.37
Twin pregnancy (%)	15	14
Gestational age at rescue (in weeks)	32.40±1.08	-
Gestational age at delivery (in weeks)	33.50±1.39	32.81±1.19

Table 2: Neonatal outcome in group A and group B.

Neonatal outcomes	Group A (with rescue)	Group B (without rescue)	P value
Birth weight (in kgs)	2.04±0.28	1.94±0.22	>0.05
APGAR at 1 minute <5 (%)	12	14	>0.05
APGAR at 5 minutes <7 (%)	9.5	10.8	>0.05
NICU Admissions (%)	16	26	<0.05
RDS (%)	6	20	<0.001
NEC (%)	2.6	3.5	>0.05
IVH (%)	3	2	>0.05
Neonatal death (%)	3.4	6.1	>0.05

Table 3: Maternal outcome in group A and group B.

Maternal outcomes	Group A (with rescue)	Group B (without rescue)	P value
Fever (%)	4	7	>0.05
Increased TLC (%)	4	8	>0.05
Sterile cervical culture (%)	94	98	>0.05

Neonatal outcome in two groups

Table 2 compares the neonatal outcome in both the groups. Out of 115 babies in group A and 114 babies in group B, it was observed that the mean birth weight of babies in group A was 2.04±0.28 kgs and in group B was 1.94±0.22 kgs, which was statistically insignificant ($p>0.05$). Twelve percent of babies in group A and 14% babies in group B had Apgar score <5 ($p>0.05$). Nine and a half percent (9.5%) of the babies born in group A and 11.5% of the babies born in group B had Apgar score <7, where the difference was statistically insignificant ($p>0.05$).

Eighteen babies (16%) in group A and 30 babies (26%) in group B had NICU admission which was found to be statistically significant ($p<0.05$). Thus, babies in group A had significantly lower NICU admissions than group B.

It was also found that 8 babies (6%) in group A and 23 babies (20%) in group B were diagnosed with RDS which was statistically highly significant ($p<0.001$).

Three babies (2.6%) in group A and 3 babies (2.6%) in group B were diagnosed with IVH, which was statistically not significant ($p>0.05$). Similarly, no significant differences were seen in the incidence of NEC. Four babies (3.4%) in group A and 7 babies (6.1%) in group B expired after birth, that is, statistically not significant ($p>0.05$).

Maternal outcome in two groups

As depicted in Table 3, maternal outcome did not differ between the two groups. As the incidence of fever (4% versus 7%), increased TLC (4% versus 8%) and sterile cervical culture (94% versus 98%) were similar in both the groups and was statistically insignificant ($p>0.05$).

DISCUSSION

In the present study the mean age of women in group A (with rescue course) was 25.93±3.20 years and in group B (without rescue course) was 24.99±2.80 years. It was similar to the study done by Mcevoy et al in 2011 which

was 26.9±7.5 years in rescue group and 28.6±6.4 years in placebo group.⁹

Mean gestational age of giving rescue course, in the present study was 32.40±1.08 weeks which was similar to that in the study by Garite et al that is 29.1±2.3 weeks and Majumder et al that is 30.8±4.0 weeks.^{10,11}

Mcevoy et al, his study showed that gestational age at delivery 30.9±2.0 weeks in rescue group and 32.3±2.9 weeks in placebo group. This was found to be similar to our study, 33.50±1.39 weeks in group A (rescue group) and 32.81±1.19 weeks in group B (without rescue course).⁹

Incidence of RDS in the present study was 6% in group A (with rescue course) and 20% in group B (without rescue course) which was statistically highly significant ($p<0.001$). Similar results were observed by Garite et al in 2009 he found that 30.2% of the preterm infants had RDS in the rescue group whereas 41.3% of the preterm infants had RDS in single course group which was highly significant statistically ($p=0.002$).¹⁰

NICU admissions in group A (with rescue) was 16% and in group B (without rescue) 26%. This was statistically significant ($p<0.05$). This result was similar to the study done by Garite et al in 2009, where NICU admissions were 30.2% in rescue course group and 41.3% in single course group.¹⁰

In the present study, both groups, A and B were comparable in terms of gestational age at birth, baby weight, Apgar score at 1 minute and 5 minutes. No significant difference was seen in the incidence of intraventricular haemorrhage, necrotizing enterocolitis and neonatal death in the two groups. Similar results were obtained by Garite et al in 2009 and Majumder et al in 2009 where there was no significant difference in the incidence of NEC, IVH and neonatal death.^{10,11}

In this study, there was no significant increase in the incidence of maternal infection on rescue course administration which was consistent with other studies namely Crowther et al in 2019 and Garite et al in 2009 where rate of chorioamnionitis and sepsis were similar in both the groups.^{12,10}

CONCLUSION

It is therefore concluded from the present study that it is prudent to give a single rescue course of ACS to all women with preterm labour who received ACS 7-14 days back in order to improve fetomaternal outcome especially in a poor resource setting. It is a safe and effective intervention with no serious maternal side-effects or any rise in rate of infections. It is suggested that in future, study with larger sample size and with longer follow-up of newborns will

establish the role of single rescue course of antenatal corticosteroids.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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