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Original Article

Prevalence of Antenatal Steroids Coverage in Preterm Labor and Its Influence on Neonatal Respiratory Morbidity and Mortality in Kanyakumari District

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Abstract

Introduction: Antenatal steroid treatment for women who are at risk of preterm delivery has emerged as the most effective intervention for the prevention of respiratory distress syndrome, reducing early neonatal mortality and morbidity.

Aim: The aim of the study is to study the prevalence of antenatal steroid coverage to preterm <34-6/7 weeks admitted in our neonatal intensive care unit (NICU) and its influence on respiratory morbidity and mortality.

Materials and Methods: This study is a retrospective analysis of antenatal steroid coverage to preterm admitted during 1-year period in our NICU from January 2016 to December 2016. Preterm <34-6/7 weeks were included in the study results were analyzed using statistical graphic methods.

Result: A total of 163 preterm <34-6/7 weeks were analyzed in the study. Dexamethasone is the standard antenatal steroid used in our institution. About 13.4% (22/163) of preterm received a complete course of antenatal steroid. Nearly 38.65% (63/163) did not receive even a single dose of antenatal steroid. Nearly 44.8% received an incomplete course of antenatal steroid. About 3% of preterm received additional dose of antenatal steroid. Among the no steroid group, incidence of respiratory distress and death were higher compared to the complete course of steroid group.

Conclusion: Reduction in the morbidity and mortality in preterm neonates is facilitated by timely administration of antenatal steroids. Hence, empowering health-care professional about knowledge of antenatal steroid in the prevention of preterm morbidity and mortality is a major contributory factor in further bringing down the neonatal mortality rate in our country.

Key words: Antenatal steroid, Neonatal mortality, Newborn care, Preterm birth, Respiratory distress syndrome

INTRODUCTION

Respiratory distress syndrome (RDS) associated with prematurity accounts for nearly 1 million neonatal deaths annually in developing countries.[1] Deficient surfactant production in the immature preterm lung delivered before 34 weeks leads to alveolar collapse and finally respiratory failure and death. Prenatal corticosteroid administration to women at risk for preterm delivery decreases the incidence and severity of RDS and neonatal death by accelerating fetal lung maturation.[2] Glucocorticosteroids stimulates the production of surfactant-associated proteins and increase phospholipids synthesis by enhancing the activity of phosphatidylcholine. Antenatal steroids used in anticipated preterm labor is a low-cost effective intervention for prevention of RDS-related preterm death. Antenatal steroids decrease the incidence of preterm neonatal mortality by 38% and 34% reduction in RDS in high-income countries.[3] There is high-quality evidence of substantial mortality benefit of antenatal steroids in developing countries than in developed countries.[4] The Cochrane meta-analysis has suggested that the need for

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further trial with antenatal steroids in higher income countries is minimal, but data are sparse in lower income settings where the infection rate is higher and the benefit cannot be extrapolated from higher income countries. The coverage of antenatal steroids in the majority of the middle- and low-income countries remains very low (10%) in compared to high-income countries (95%) where many of the preterm respiratory distress-related deaths occur.[5] The Cochrane review on antenatal steroids suggests that betamethasone causes a large reduction in RDS compared to the dexamethasone.[3] Dexamethasone is the recommended antenatal steroid by the Ministry of Health and Family Welfare of India compared to betamethasone due to its component advantage absent in the latter. The protocol for administration of dexamethasone is 6 mg, 12th hourly interval for 4 doses and 24 h gap after the last dose which offers the maximum morbidity and mortality benefit.

Aim

The aim of the study is to study the prevalence of antenatal steroid coverage to preterm <34-6/7 weeks admitted in our neonatal intensive care unit (NICU) and its influence on respiratory morbidity and mortality.

MATERIALS AND METHODS

This retrospective study was conducted in the Department of Neonatology in Kanyakumari Medical College Hospital. Preterm <34-6/7 weeks admitted in our NICU were analyzed for the study. Late preterm and near-term babies were excluded from the study. Results were analyzed graphically by Tables 1-4 and Pie charts.

RESULTS

Steroid coverage to 163-admitted preterm babies are depicted in Tables 1-4.

Table 1: Number of doses received by preterm babies

Number of antenatal steroid dose	Number of preterm babies received antenatal steroid	%
0	63	38.65
1	28	17.2
2	45	27.6
3	-	-
4	22	13.4
5	1	0.6
6	4	2.4

Table 2: Indications for the antenatal steroid admissions

Indications for steroid administration	Number of babies
Imminent preterm labor	102
PPROM	36
Severe PIH	6
No data available	19

PPROM: Preterm premature rupture of the membranes, PIH: Pregnancy-induced hypertension

Table 3: The respiratory morbidity pattern and antenatal steroid coverage

Diagnosis	Complete course of steroid group (%)	Incomplete course of steroid group (%)	No steroid group (%)
RDS	8/22 (36.3)	45/73 (61.6)	43/63 (68.2)
Requirement for surfactant	3/96 (3.1)	13/96 (13.5)	20/96 (20.8)

RDS: Respiratory distress syndrome

Table 4: Mortality pattern and antenatal steroid coverage

Death in complete course of antenatal steroid group (%)	Death in no steroid group (%)	Death in incomplete course of antenatal steroid group (%)
0/22 (0)	7/63 (11.1)	3/28 (10.7)

DISCUSSION

We observed only 13.4% coverage of complete course of antenatal steroid in our study. This in comparison is very low compared to universal coverage in developed countries.[6] The coverage rate of antenatal steroids in high-income countries is more than 90%. The antenatal steroid coverage in low-income countries ranges from 5% to 10%. About 6 studies conducted in Latin America concluded a coverage range between 4% and 71%.[7] We too observed a low antenatal steroid coverage as observed by other studies. The coverage for incomplete course of antenatal steroid is quite high (44.8%) compared to complete course (13.4%). Short-time gap available for steroid administration to delivery, failure to give referral shot of steroid, lack of knowledge to give steroid after admission could be attributable to the poor coverage of antenatal steroid. Incomplete course is beneficial compared to no steroid in reduction of respiratory morbidities[8] in preterm neonates. Elimian *et al.* have assessed the effectiveness of incomplete course of antenatal steroids compared to placebo and found to be associated with reduction in the need for intraventricular hemorrhage, neonatal death in preterm.[8] We observed increased mortality in the no steroid group (11.1%) compared to complete steroid group (0%), and the requirement of surfactant and RDS was higher in the no steroid group (68.2%) suggesting that antenatal steroid is a low-cost effective drug in the prevention of RDS even in

a low-resource setting. The incidence and requirement of surfactant was low in the complete course of steroid group (3.1%) compared to the no steroid (20.8%) and partial cover steroid group (13.5%) suggesting cost beneficial effect with full coverage. Evidence from Cochrane observed a significant reduction in serious adverse outcomes with antenatal steroids including perinatal death relative risk (RR) 0.72 (confidence interval [CI]: 0.58-0.89), neonatal death (RR: 0.69, 95% CI: 0.59-0.81), and RDS (RR: 0.66, 95% CI: 0.56-0.77).[9] We observed a substantial reduction in morbidity and mortality similar to western trials with dexamethasone. Concurrent infection and other parameters which might influence morbidity and mortality in low-resource settings were not analyzed in our study which is a limitation of our study. Further randomized controlled studies are needed to assess the influence of antenatal steroid in low-income and community settings. We observed 3% of preterm receiving rescue doses of antenatal steroid. The effect of rescue doses is limited and its uses should be restricted after the primary course. Multiple courses, in fact, could have harmful neurodevelopmental effects in the baby.[10] The multiple course of antenatal steroid for preterm birth trial found that the infants exposed to have decreased mortality and morbidity, but the weight and head circumference were smaller than the placebo. Hence, repeat dose should not be recommended as a routine.[11]

CONCLUSION

Reduction in the morbidity and mortality in preterm neonates is facilitated by timely administration of antenatal steroids. Hence, empowering health-care professional about knowledge of antenatal steroid in the prevention of preterm morbidity and mortality is a major contributory factor in further bringing down the neonatal mortality rate in our country. Further studies are needed to analyze the factor which prevents its universal implementation in the community level.

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