Original Article

Effectiveness of Steroid Therapy in Newborns with Meconium Aspiration Syndrome at NICU, Gangaram Hospital, Lahore

Naveed Akbar Hotiana, Sumaira Naveed, Asma Anwar, Rashid Mehmood

ABSTRACT

Objective: Meconium aspiration syndrome (MAS) is one of the serious and life-threatening disorders in newborn infants and is still one of the most challenged neonatal diseases. This study was conducted in order to determine the efficacy of steroids use in the management of this syndrome. **Study Design:** This was a randomized controlled study **Period and Place of study:** Six month period in the neonatal unit of the Gangaram hospital, Lahore. **Materials and Methods:** We included sixty eight (68) babies with MAS which were then distributed randomly into two groups i.e. Group A (n = 34), patients in this group served as controls and Group B (n = 34), patients who were treated with steroids. Injectable decadron was administered at 0.2mg per kg per day in two divided doses (i.e. every 12 hours). Infants in present trial were evaluated on the basis of duration of stay at hospital, mortality rate and were also assessed for other morbidities and infections. **Results:** We observed a statistically significant difference in the duration of stay between the two groups. However, the use of steroids was not correlated with mortality rate since it was same in two groups. **Conclusion:** The conclusion of our study is that steroids revealed shorter duration of stay and less morbidity I newborns with MAS affect the mechanistic way of MAS and thus favorably affect the outcome. **Key words:** Meconium aspiration syndrome, Newborn infants, Steroids, Pakistan.

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INTRODUCTION

Meconium aspiration syndrome (MAS) is often characterized as disease of the term and near-term and post-term infant and is correlated with considerable respiratory morbidity and mortality.[1]The MAS incidence rate has been reported to be 1-2/1000 live births in the well-developed countries; however, this number must be greater in the developing world.[2,3] In addition to acute impact, it can also have serious chronic impact on the respiratory system.[2]

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Despite many control measures to prevent MAS, many infants still develop MAS and thus need some proper treatment. MAS is thus the commonest life threatening emergency in term babies all over the world. About one-third of infants with MAS require intubation and mechanical ventilation.[4]In USA, MAS prevalence decreased almost four times (from 5.8% to 1.5%) during 1990–1992 and 1997-1998.This decrease was attributed to a 33% reduction in births at> 41 weeks' gestation and greater use of amnioinfusion.[5,6] MAS is generally difficult to handle despite an enhanced understanding of its mechanism and the available therapeutic approaches. Therefore, a large number of alternative practices have been tested to successfully manage it. Use of steroids with the

prime objective of managing MAS has been widely accepted although there are many sound critics of their use because of doubts regarding their effectiveness and fear of side effects. The pioneer work done in this regard was not too much encouraging, however a favorable and encouraging effect of this therapy was reported later by many authors.[7,8,9] For example, Ward et al. in 2003 reported, after conducting the analyses of two trials with a total of 85 infants which were having MAS, that there was no significant effect of steroids on mortality although there was a slight increase in the oxygen treatment period in patients treated with steroids.[7] Later on, Basu et al and Tripathi et al. continued their research work in this direction. Both of them reported in their trials that use of steroids in babies with MAS was significantly correlated with a reduced duration of oxygen therapy and hospital stay and other morbidities as well.[8,9] The type of steroid, way of administration and period of steroid use had different results in their trials. They concluded that steroids may be helpful in extreme MAS conditions such as lung edema, pulmonary vasoconstriction, and inflammation. Presently, there is no local study carried out in this direction putting forth some idea of effectiveness of steroid therapy in babies with MAS.[10]

The objective of the study was to evaluate whether steroid use helps modifying the clinical course of MAS and improves the outcome without causing side effects.

MATERIALS & METHODS

We carried out a prospective and interventional study over six months period in neonatal ward of the Ganga Ram Hospital Lahore. This study was approved by the institutional ethical committee.

Inclusion criteria

We included full term babies with birth weight more than 2 kilograms; and in whom meconium was aspirated from below the vocal cords on endotracheal suction at birth.

Babies having respiratory distress with history of meconium stained liquor.

Exclusion criteria

We excluded Preterm and intrauterine growth retarded babies, out-born babies and babies with congenital malformations. Moreover, babies were also excluded if consent by the parents was denied. A total of 68 neonates were included in this study. 34 were randomly placed in group A (Control) and rest of the 34 in group B (treated with steroids). All the 34 patients of group B (Steroid group) were treated with standard regimens of steroids decadron i.e. 0.2mg per kg per day every 12 hours for seven days intravenously. Except for this intervention, management of all the neonates was done according to the regular protocol of the neonatal ward and which was uniform during the whole study period.

Outcome measures for our study were mortality, intubation, and length of hospitalization, Pneumothorax, and cardiac failure.

Statistical analyses

The descriptive statistical analysis included examinations of means, standard deviations, frequencies, ranges, and percentages. The statistical packages SPSS (Version 20) and MS Excel (MS Office 2010) were used. Student's t test was applied to see the difference between control and steroid group.

RESULTS

In total, 68 patients met all study inclusion criteria, and who agreed to participate in the study. The patients came from different cities and towns of Lahore division. These babies were divided randomly into two groups i.e. Group A (Control) and Group B (Steroids). Results of this randomized control trial showed no significant difference of mortality in two groups. However, babies with meconium aspiration syndrome who acquired pneumonia were discharged earlier with Steroid group as compared with Control group. Patients who were treated with i/v steroids had significant less stay at hospital as compared to those who were not treated with the steroids. Figure 1 clearly shows the difference between two groups as patients in steroid group had a mean stay of 5.3±0.9days at hospital as compared to control group that had a mean stay of 8.8±1.1days. This difference between the two groups showed the efficacy of steroid therapy in babies with meconium aspiration syndrome.

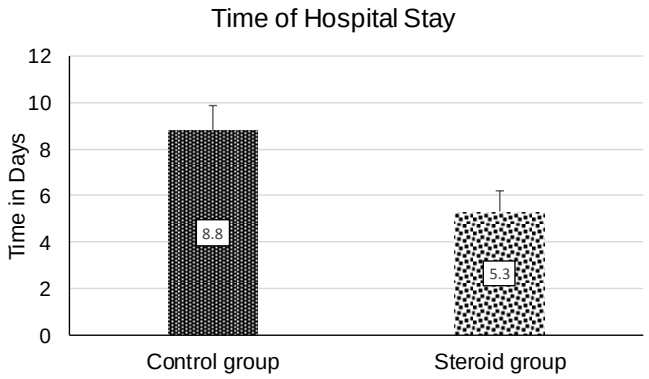

Figure 1: Time of Hospital stay in two groups i.e. Control group (not treated with steroids) and Steroid group (treated with steroids)

In addition, regarding other morbidities, only one case of Pneumothorax was found in Steroid group. By contrast, there were two cases of this morbidity in Control group (Table 1). Similarly when compared the two groups for cardiac morbidity, it was revealed that there was no case of cardiac failure in babies who were treated with steroids. As compared to 1 case of cardiac failure in control group.

Table 1: Number of patients with different morbidities in two groups i.e. Control and Steroids

Variable	Control group (N=34)	Steroid group (N=34)
Pneumothorax	2	1
Cardiac failure	1	0

DISCUSSION

Appropriate care and management in pediatric age group can reduce significantly the incidence and prevalence of MAS. But despite all control measures and efforts, a considerable number of babies develop MAS. Currently, the core area of MAS management in most of the hospitals is only the supportive care. Through an enhanced understanding of the MAS mechanism, this study reports the possibility of altering the adverse outcome of the disease by using steroids to cancel the chemical and inflammatory pneumonitis caused by Meconium. Role of steroids is well established in many pulmonary conditions and is instrumental in decreasing morbidity and mortality. This is the one of the first studies which was carried out in local settings of Pakistan to investigate the effect of steroid therapy in newborn infants with meconium aspiration syndrome.

In our study we found a significant reduction in the duration of hospital stay in the babies who were treated with steroid compared to those who were in control group. Our results are in afreement with Tripathi et al.[9] who also found considerable reduction in hospital stay in steroid treated patients as compared to control ones.[9]There has been a lot of debate and valid concern over complications due to use of steroids in newborn infants (both short-term and long-term effects). In one recent review study, Barrington[11] showed the adverse neurodevelopmental effects of steroids in the preterm infants. He reported that increased incidence of cerebral palsy and neurodevelopment impairments were attributed to dexamethasone use in preterm infants with chronic lung disease.[11] However, he also hypothesized in his review that there could be lower dose and shorter course of steroids which could have favorable results without side effect on brain growth.[11]

Laforce and Brudno[12] however, did not find any increased incidence of infections in their trial of beclomethasone steroid in infants of BPD.[12] Barr[13] did not show any considerable increase in the incidence of any infection (sepsis, hypertension) in uncontrolled study on use of budesonide in newborn infants with severe respiratory impairements.[13]By this time, none of the studies in the local settings of our country have shown any data regarding the use of steroids in infants with MAS. We did not find considerable difference in the mortality rate in two sets of patients (Group A and Group B), though there was slight differences in the incidence of co-morbidities. We showed that babies who were treated with steroids were having shorter stay at hospital. Moreover, those babies were having less incidence of Pneumothoraxand cardiac failure. However, we recommend further studies in this direction in order to determine optimum steroid dose, duration/course of treatment, and ways of administration considering their characteristics and probable acute and chronic side effects.[10]

CONCLUSION

In our study, steroids appeared to be effective in terms of morbidities and hospital stay. Steroids appeared to be effective in newborn infants with MAS. Moreover, there were no short-term adverse effects of steroids were found. At present, there is insufficient evidence to assess the effects of steroid therapy in the management of MAS.As meconium aspiration syndrome is a major cause of mortality in the thirdworld including Pakistan, further studies highlighting proper dose of steroid, mode of administration and duration of treatment should be carried out in order to increase the effectiveness of steroids.

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