



A Study of Efficacy of Steroids In Meconium Aspiration Syndrome

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ABSTRACT

Introduction : Meconium aspiration Syndrome (MAS) remains one of the common cause of respiratory distress in term neonate. Chemical pneumonitis is believed to occur secondary to bile, bile acids and pancreatic secretions contained in meconium. Therefore it has been hypothesised that corticosteroids may be of benefit in the management of this condition through their anti-inflammatory properties. Hence we aimed to analyze the efficacy of steroid therapy in the clinical course and outcome of meconium aspiration syndrome without any serious adverse effects.

Method of study: A randomized controlled trial was conducted in 60 neonates with Meconium Aspiration Syndrome (MAS) admitted in NICU, at RMMCH - Chidambaram, over a period of 1 year. Steroid group (n = 30) received dexamethasone with other supportive treatment and Non steroid group (n = 30) received only supportive treatment for a period of 7 days. Details of clinical progress were noted during the hospitalization. Data's were analysed statistically and Chi square was used to assess the statistical significance.

Results: Patient profile was similar in both the groups. Incidence of MAS was more common among Term neonates with appropriate birth weight. Period of oxygen dependency, inotropic support, occurrence of airleaks, need for ventilator support was less in the steroid treated groups. Similarly full enteral feeding and radiological clearance of chest was achieved earlier in steroid group. But the difference was not statistically significant. Development of sepsis was similar in both the groups and no serious adverse effects were noted in the steroid treated group.

Conclusion: There is insufficient evidence to assess the therapeutic benefit of steroid therapy in the management of meconium aspiration syndrome.

KEYWORDS Meconium aspiration syndrome, steroid, neonate.

INTRODUCTION

Meconium aspiration syndrome (MAS) is a common cause of severe respiratory distress in term & post term neonates and associated with variable morbidity and mortality⁽¹⁾. Meconium aspiration is defined as the presence of meconium below the vocal cords & Meconium aspiration syndrome (MAS) is defined as respiratory distress in a newborn delivered through meconium-stained amniotic fluid (MSAF) with characteristic radiological changes and whose symptoms cannot be otherwise explained⁽²⁾. It is believed that Chemical Pneumonitis occur secondary to bile, bile acids & pancreatic secretions contained in meconium. Therefore it has been hypothesized that corticosteroids may be of benefit in the management of this condition through their anti-inflammatory properties⁽³⁾. MSAF is found in 10-15% of births and MAS develops in 5% of neonates⁽⁴⁾. The study is aimed to analyze the efficacy of steroid therapy in the clinical course and outcome of meconium aspiration syndrome.

MATERIALS AND SELECTION CRITERIA

It is a hospital based randomized control study done for a period of one year from September 2015 to September 2016 at RMMCH, Chidambaram. All term neonates with MAS admitted in Neonatal Intensive care unit were included in the study. Neonates with major congenital anomalies, those with suspected Congenital Heart Disease and those with risk of sepsis were excluded from the study.

METHOD OF STUDY

The study population of 60 neonates were assigned into steroid group (n=30) and Non steroid group (n=30). Injection dexamethasone was administered intravenously to the steroid group (study group) in the dose of 0.5mg/kg/dose q12h for the first 3 days & 0.25mg/kg/dose -q12-h for the next 4 days

along with supportive treatment. Non steroid group received only supportive treatment (control group). Details of clinical progress were noted during the hospital stay and were assessed depending on various parameters. Data's were analyzed statistically and Chi square was used to assess the statistical significance.

RESULTS

TABLE 1: DURATION OF OXYGEN REQUIREMENT

DURATION OF OXYGEN REQUIREMENT	NON STEROID	STEROID	TOTAL
<3 DAYS	12(40%)	18(60%)	30(50%)
>3 DAYS	18(60%)	12(40%)	30(50%)
TOTAL	30(100%)	30(100%)	60(100%)

TABLE 2: REQUIREMENT OF INOTROPIC SUPPORT

NEED FOR INOTROPIC SUPPORT	NON STEROID GROUP	STEROID GROUP	TOTAL
NOT NEEDED	13 (43.4%)	19 (63.4%)	32 (53.3%)
NEEDED	17 (56.6%)	11 (36.6%)	28 (46.7%)
TOTAL	30 (100%)	30 (100%)	60 (100%)

TABLE 3: STARTING OF FULL ENTERAL FEEDS

ENTERAL FEEDS	NON-STEROID	STEROID	TOTAL
DAYS ≤ 4	13(43.3%)	18(60%)	31(51.7%)

DAYS > 4	17(56.7%)	12(40%)	29(49.3%)
TOTAL	30	30	60

TABLE 4: INCIDENCE OF PULMONARY AIR-LEAK SYNDROME

PULMONARY AIR LEAK	NON-STERIOD	STERIOD	TOTAL
NO	28 (93.3%)	29 (96.7%)	57 (95%)
YES	2 (6.7%)	1 (3.3%)	3 (5%)
TOTAL	30(100%)	30 (100%)	60(100%)

TABLE 5: NEED FOR VENTILATOR SUPPORT

VENTILATOR SUPPORT	NON-STERIOD	STERIOD	TOTAL
NOT REQUIRED	21 (70%)	25 (83.3%)	46 (76.7%)
REQUIRED	9 (30%)	5 (16.7%)	14 (23.3%)
TOTAL	30	30	60

TABLE 6: OCCURRENCE OF PRIMARY PULMONARY HYPERTENSION

OCCURRENCE OF PPHN	NON-STERIOD	STERIOD	TOTAL
NO	29 (96.7%)	29 (96.7%)	58 (96.7%)
YES	1 (3.3%)	1 (3.3%)	2 (3.3%)
TOTAL	30	30	60

TABLE 7: CROSS TABULATION OF RADIOLOGICAL CLEARANCE

X-RAY CLEARANCE	NON-STERIOD	STERIOD	TOTAL
<5 days	15 (50%)	19 (63.3%)	56.7%
>5days	15 (50%)	11 (36.7%)	26 (43.7%)
Total	30	30	60

TABLE 8: INCIDENCE OF ELECTROLYTE IMBALANCE

OCC. OF ELECT IMBALANCE	NON-STERIOD	STERIOD	TOTAL
NO	19 (63.3%)	20 (66.7%)	39 (65%)
YES	11 (36.7%)	10 (33.3%)	21 (35%)
TOTAL	30	30	60

TABLE 9: OCCURRENCE OF HYPERGLYCEMIA

BLOOD SUGAR LEVEL	NON-STERIOD	STERIOD	TOTAL
EUGLYCEMIA	30(100%)	30(100%)	30(100%)
HYPERGLYCEMIA	---	---	---
TOTAL	30(100%)	30(100%)	60(100%)

TABLE 10: INCIDENCE OF SEPSIS

OCCURRENCE OF SEPSIS	NON-STERIOD	STERIOD	TOTAL
NO	27 (90%)	27 (90%)	54 (90%)
YES	3 (10%)	3 (10%)	6 (10%)

TOTAL	30(100%)	30(100%)	60(100%)
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DISCUSSION

Patient profile was similar in both the groups. Incidence of MAS was more common among term infants with appropriate birth weight. In our study, Oxygen requirement for less than 3 days in non- steroid group was 40%, while that of steroid group was 60%. The radiological clearance within 5 days occurred in 63% of Steroid group neonates and in 50% of Non-steroid group neonates. There was a difference between the oxygen requirement and radiological clearance in both groups, but they were not statistically significant. A similar study was conducted by **Sandeep Tripathi** (4) and **Arvind Sali** at Lady Hardinge Medical College and Kalawati Saran Children's Hospital, New Delhi to evaluate the role of steroids in the management of meconium aspiration syndrome(4).

A total of 51 babies with MAS were randomly distributed into three groups - Control, systemic and nebulized steroids. Methyl prednisolone was given i.v. in dose of 0.5mg/kg/day in two divided doses to one group. Budesonide was given by nebulization in dose of 50 microgram 12 hourly to another group and the third group was assigned as control group. Infants were assessed in terms of duration of hospital stay, oxygen dependence, X-ray clearance and for short term adverse effect. In the study there was a statistically significant difference in the duration of stay, duration of oxygen dependence (5, 6) and radiological clearance. The conclusion of the study was that steroids alter the course of Meconium Aspiration Syndrome and favorably affect its outcome. A study by **Sriparna Basu et al** (7) & **Pekka Kaapa et al** (5) also showed a significant reduction in the duration of oxygen requirement in steroid treated group (7).

In our study, the requirement of ventilator support in the Steroid group was 17% while that of Non Steroid group was 30%. Though the ventilator requirement was less in steroid group than the non-steroid group the difference was not statistically significant. A study conducted by **Pekka Kappa et al**, 2004(4,5) suggested that the addition of intravenous dexamethasone to the treatment schedule of meconium aspiration syndrome enabled further improvement in oxygenation and decreased the need for ventilatory assistance and nitric oxide inhalation treatment of the infants. **Wu et al**(8) reported the outcome of mechanical ventilation in their study on MAS among 50 infants. In this trial the duration of mechanical ventilation was reported as significantly shorter in the steroid treated group (mean 3.5 days) compared to control group (4.6 days). However, this difference was also not statistically significant.

In our study, the incidence of Air-Leak Syndromes was only 3% in Steroid group, while in Non Steroid group it was 7%. There was a decrease in occurrence of air leaks in the neonates treated with steroids though it was statistically insignificant. A study by **Yeh et al** (10) compared a two day course of intravenous hydrocortisone with lactose placebo between two groups of 35 neonates each. The study examined the outcomes of mortality, the need for mechanical ventilation, the duration of oxygen therapy and the incidence of air leak syndromes. **Yeh et al** found, that there was no significant statistical difference of air-leak between the steroids treated and control groups similar to our study.

According to the study by **Aravind Sali et al** (4) the use of steroids was not associated with an increased incidence of sepsis. In our study also, there was no significant difference in the occurrence of sepsis & hyperglycemia. 67% of neonates in steroid group and 63% in non steroid group developed electrolyte imbalance. But it had no statistical significance. **Wu et al** (8) reported a transient elevation of blood glucose and blood pressure in the steroid treated group on day 2, 3,5& 7 than the other group. None of the study analysed the incidence of electrolyte imbalance between the two groups.

In our study, full enteral feeds within 4 days were started in 60% of the neonates in Steroid group and 43% of the neonates in Non Steroid group. There existed a difference between the two groups, as the neonates in the Steroid group were started on full enteral feeds early than that of the Non Steroid group, but the difference was not statistically significant. In a study conducted by **Sriparna Basu et al⁽⁷⁾** at Institute of Medical Science, Banaras Hindu University, Varanasi, they compared whether systemic and inhaled steroids altered the clinical course and outcome of MAS. Patient profile was similar in all 3 groups. Full enteral feeds and radiological clearance of chest was achieved earlier in the steroid treated groups than the control group. Similarly, the period of oxygen dependency and duration of hospital stay was less in steroid treated group.

In our study, the requirement of inotropic support was less in the steroid group (37%) than that of the non steroid group (57 %), though there existed a difference, it was also not statistically significant. In our study there was no difference in the occurrence of persistent primary pulmonary hypertension in both the groups.

In the present study, Period of oxygen dependency, inotropic support, occurrence of air-leaks and need for ventilator support was less in the steroid treated group. Similarly, full enteral feeding and radiological clearance of chest was achieved earlier in the steroid group. However, the difference was not statistically significant. Development of sepsis & PPHN was similar in both the groups and No serious adverse effects were noted with the use of steroids.

CONCLUSION

There is insufficient evidence to evaluate the risk and assess the therapeutic benefits of steroid therapy in the management of meconium aspiration syndrome. Though the results in our study showed better outcome in the steroid group, it was statistically insignificant. A larger randomized controlled trial with careful assessment of short and long term adverse effects would be required to further delineate the role of steroid therapy in the management of Meconium aspiration Syndrome. This area, thus serves as a better platform for research study & analysis.

LIMITATION

The study group was less. To get more accurate reports- a multi-centric approach should be done at a large study population.

NIBP monitoring should have been used to assess inotropic support.

There is insufficient evidence to assess the effects of steroids in the management of MAS.

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