ORIGINAL RESEARCH PAPER
Volume - 9 | Issue - 7 | July - 2020 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

# "CLINICO-EPIDEMIOLOGICAL PROFILE OF MECONIUM STAINED AMNIOTIC FLUID AND MECONIUM ASPIRATION SYNDROME "

Pediatrics

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## ABSTRACT

**BACKGROUND:** Meconium aspiration syndrome (MAS) is a life-threatening respiratory disease affecting neonates born through meconium-stained amniotic fluid (MSAF). MSAF complicates delivery in approximately 5% to 25% of live births, of which nearly 10% of the neonates develop MAS. The present study was undertaken to find out the incidence of MSAF and MAS and to study the etiology, risk factors, clinical profile and outcome of MAS.

**Material & Methods:** The present study was a hospital based study conducted prospectively from SEPTEMBER 2018 to AUGUST 2019 in Neonatal intensive care unit, Department of Paediatrics at Rajkiya mahila chikitsalay, Ajmer, Rajasthan. By purposive sampling technique, all newborns, fulfilling the inclusion criteria during study period were enrolled. Risk factors and clinical profile were compared between those who died and survived.

**Results:** Out of 14551 deliveries, 1096 neonates were born with MSAF of which 108 neonates had MAS. Thereby, incidence of MSAF was 7.58% and incidence of MAS out of MSAF was 9.85%. Of the 108 neonates who had MAS 18.518% died. 90% of the MAS neonates were term. MAS were more common in primigravida (54.62%) and assisted vaginal delivery. Of the total MAS 67.59% had thick meconium (mortality -21.91%). The mortality in MAS cases was significant in low 5-minute APGAR score and non-vigorous baby.

**CONCLUSION:** Meconium in amniotic fluid is a fetal environmental hazard when foetal distress supervene. Thick MSAF in presence of low 1st minute apgar score or/and foetal heart rate abnormality is an omnious sign. Such patients need strict and stringent supervision during perinatal period for a good outcome. With proper neonatal management, complications of MSAF can be reduced to a great extent.

## KEYWORDS

MAS- Meconium aspiration syndrome, MSAF- Meconium stained amniotic fluid

## INTRODUCTION

Meconium aspiration syndrome (M.A.S.) is a respiratory distress in an infant born through meconium stained amniotic fluid(M.S.A.F.) whose signs cannot be otherwise explained.The most common causes of Meconium stained amniotic fluid are: the gastrointestinal maturity of the foetuses, foetal response to hypoxia and intrauterine infection. Elimination or thickening of meconium during the delivery means the new born (NB) has more than double the possibility of having pH<7.1 in the umbilical artery blood and a 5 minute Apgar score of <7, compared to clear fluid or meconium fluid during the whole labour. The main complications arising from meconium stained amniotic fluid is Meconium aspiration syndrome. The mechanical and chemical effects and the inflammatory reactions caused by Meconium aspiration syndrome may interfere with the normal transition to extra-uterine life, causing airway obstructions, damage to lung tissue, inactivation of surfactants, chemical pneumonitis and decreased arterial oxygen pressure.Diverse clinical risk factors for Meconium aspiration syndrome, including black race, male sex, low birth weight, abnormal foetal heart pattern,caesarean section, low Apgar score, and thick meconium, have been reported to be associated with Meconium aspiration syndrome in meconium-stained neonates. Meconium aspiration syndrome reflects a spectrum of disorders in infants born with meconium stained amniotic fluid, ranging from mild tachypnea to severe respiratory distress and significant mortality. The frequency of meconium aspiration syndrome is higher among infants with post term gestation, thick meconium and birth asphyxia. Routine Intranasal and postnasal endotracheal suctioning of meconium in vigorous infants is no longer recommended. Supportive therapy like O2 supplementation, mechanical ventilation and I.V. fluids are cornerstone of management of Meconium aspiration syndrome. Availability of surfactant, inhaled nitrous oxide, high frequency ventilation and E.C.M.O. has made it possible to salvage more infants with meconium aspiration syndrome.Complications of meconium aspiration syndrome includes air leaks in form of pneumothorax or pneumomediastinum, pulmonary sequels and PPHN.

The present study is aimed to study clinico-epidemiological trends of meconium stained amniotic fluid and meconium aspiration syndrome.

**Aims and Objectives:**

1 .To study the incidence of Meconium Stained Amniotic Fluid and Meconium Aspiration Syndrome.
2. To find out risk factors associated with Meconium Stained Amniotic child and Meconium Aspiration Syndrome.
3. To study Neonatal morbidity and mortality associated with meconium stained amniotic fluid and meconium aspiration syndrome.
4. To study radiographic abnormalities of meconium aspiration syndrome.

## MATERIAL AND METHODS

The present study of clinico-epidemiological profile of Meconium stained amniotic fluid and Meconium aspiration syndrome with special reference to persistent pulmonary hypertension of the newborn was a hospital based study conducted prospectively from SEPTEMBER 2018 to AUGUST 2019 in Neonatal intensive care unit, Department of paediatrics and neonatology at Rajkiya mahila chikitsalay, Ajmer, Rajasthan and Neonatal intensive care unit, Department of paediatrics and neonatology,J.L.N. Hospital, Ajmer, RajasthanInclusion criteria-

All babies born with meconium stained aspiration fluid present at first examination or passed during labour were included in the study.

**Exclusion Criteria-**

The babies born with Major congenital malformations and still births were excluded from the study.*Mother's details*-Detailed obstetric and antenatal history was taken along with review of antenatal card when available and recorded.

*Newborn's details*-Following parameters were taken as evidences in favor of fetal distress:1 .Bradycardia i.e. FHR<100/minute2. Tachycardia i.e. FHR>160/minute3. Irregular rhythm.Vigorous baby was defined as1. Strong respiratory efforts2. Good muscle tone3. Heart rate > 100/minuteProper management was done according to situation of baby. All babies who developed MECONIUM ASPIRATION SYNDROME were observed with close monitoring of vital signs and development of complications.

Symptomatic and supportive treatment were given to all these babies.Time of onset of respiratory distress, duration of NICU stay, complications and management were noted.A chest X-ray was

recorded of all babies who developed MECONIUM ASPIRATION SYNDROME and findings were noted.

All babies with MSAF were followed and categorised into 3 groups :1. Normal outcome: babies who did not develop any morbidity for first 48 Hours..2. Morbidity: babies who developed MECONIUM ASPIRATION SYNDROME or other morbidity like HIE, sepsis, jaundice etc.3. Mortality: babies who developed MECONIUM ASPIRATION SYNDROME and expired.

**Sample size and statistical analysis**To test the significance of difference ,the statistical analysis was done whenever it was thought appropriate. For this purpose Chi Square test was done. After setting of null's hypothesis the Chi Square test was appliedThe Chi Squre so calculated were tested at their respective degree of freedom by referring to Chi Square tables. As per calculated value of Chi Square and $p>0.05$ the difference between two is not statistically significant, the $p<0.05$ the difference is statistically significant,the $p<0.001$ it is highly significant.

## RESULTS

14451 consecutive deliveries were attended and of them 1096 babies born with meconium stained amniotic fluid were selected for the study. MSAF was found in 7.58 % of all live births. 38.96% cases had thick meconium and 61.04% had thin meconium. Meconium aspiration syndrome developed in 9.85% cases of MSAF. No statistical difference was found in the occurrence of meconium aspiration syndrome, between infants delivered by mothers of various age groups and parity.

Thickness of meconium had a linear correlation with gestational age while MSAF & MAS was uncommon in very low birth weight infants. 17.09% babies stained with thick meconium developed MAS and 21.91% of them expired. While only 5.23% babies of thin meconium developed MAS and 11.43% of them died. There is no significant difference between various antenatal risk factors in the incidence of MAS.

Intrapartum adverse events like eclampsia, obstructed labour, prolonged labour and cord abnormalities are associated with increased incidence of MAS. 26.27% babies were delivered with assisted vaginal delivery developed MAS in contrast to 8.16 % and 7.49% babies delivered by normal vaginal delivery and caesarean, respectively. There is increased incidence of MAS among babies born through assisted vaginal delivery but statistically no difference was found.

35.13% cases of MSAF were asphyxiated at birth. Cases of MSAF born thick and thin, with low 1 minute apgar score had significantly increased risk of MAS (38.63%) and poor outcome.

Significant relation was found between MAS and foetal distress. 21.84% of the meconium stained babies associated with intrauterine foetal distress developed MAS. In contrast only 4.28% of cases of MSAF,who did not have any evidence of foetal distress presented as MAS

Abnormal chest roentgenograms were found in 75% cases of MAS in form of hyperaeration (most common),air leaks and coarse nodular opacities.Mortality rate of meconium aspiration syndrome was 18.518%.

## Discussion

Total 14923 consecutive deliveries were attended. Of these 688 deliveries associated with still births, were excluded from the study. Out of remaining 14451 live births, 1096 cases had meconium strained amniotic fluid. In our study incidence of MSAF was 7.58%. (Table1)

Comparable incidence was reported by George A Gregory 8.8%, LC Verma 7.95% and Narang 7.48%. The variation in incidence of MSAF can be explained by in selection criteria of the subjects include in the study like exclusion of breech presentation and still births etc.

108 (9.85%) newborns out of 1096 cases of MSAF developed MAS in our study. Various studies have reported comparable incident. K. A. Barham reported 14.92%, Goad & Krishna 13.2%, Narang 10.92%.

The variability in the incidence of MAS can be explained by different methods of labor room management, availability of advanced electronic fetal monitoring equipments to identify fetal distress at the earliest and to intervene accordingly aid selective versus universal intra tracheal suctioning.

Regarding consistency of meconium, in our study 38.96% cases were stained with thick meconium and 61.04% cases were stained with thin (Table 2).Meconium consistency as reported by various workers do not show a constant pattern.S.S. Bride found incidence of thick & thin MSAF close to that found in our study (40.8% and 59.2% respectively.If we analyse the relations of MSAF & MAS with maternal age. No significant difference was found between various age groups.Out of 1096 cases of MSAF, 6.48% were delivered by mothers of <20 years age, 47.99% between 20-25 years age, 30.47% by 25-30 years and 15.05% by mothers of >30 years age group.($p>0.05$) (Table 3).Among 108 cases of MAS, 10.18% cases were born to mothers of age <20 years, 52.78% to 20-25 years age, 24.07% to 25-30 years and 14.82% to mothers of> 30 years age. ($P>0.05$).

Rossi M. in their study found that most of the babies born through MSAF & developing MAS were delivered by mothers of age between 20-25 years as in our studySimilarly Cristala Hernandez reported mean maternal age 23.9 years of infants developing MAS.

Incidence of MAS was 11.54% in infants belonging to primi mothers, 5% to 2nd gravida mothers, 8.33% to 3rd gravida mother's and 30% infants belonged to grandmultiparous mothers (Table 4).Statistically no risk was found between different parities ($P>0.05$).S. K. Sandhu reported that 38% cases of MSAF belonged to primigravida mothers and 62% to multigravida mothers. Relation of consistency of MSAF and gestational age in our study is as following:

Out of 1096 cases of MSAF, 39 (3.56%) infants were <37 weeks of gestation age, 994 (90.69%) between 37-41 weeks and 63 (5.75%) were >41 weeks. 32(82.05%) preterms (<37 weeks) were stained with thin meconium and 7(17.95%) preterms with thick meconium out of 39 cases. Thick meconium was found in 37.93% infants out of 994 cases of 37 - 41 weeks gestation age, in contrast in 68.25% of infants of >41 weeks gestation age. Thus MSAF is uncommon in pre term and thickness of meconium increases with maturity. (Table-5)Study conducted by S. N. Parida]showed that babies who passed meconium, 89.8% were more than 37 weeks gestation age, 6.48% between 34-37 weeks and 3.70% cases were <34 weeks gestation age.

Very low incidence of MSAF among preterms can be explained by 2 reasons. First is anatomical & functional immaturity of intestine. Another is that stress related in utero passage of meconium is supposed to be rare in preterm infants.In present study maximum number of babies belonged to weight group 2500-3500 gms(76.73%), 15.05% belonged to 1500 to 2500 ,6.11% to weight >3500 gms and 2.09% cases of MSAF among babies weighing <1500 gms. Most of the studies had similar results regarding birth weight (Table 6).George A Gregory reported birth weight of babies associated with MSAF ranging from 2100-5350 gms. Average birth weight was 2911 gms.Low incidence of MSAF among premature low birth weight can be explained by immaturity of gastro intestinal tract.

61.5% cases were males and 38.5% cases were female in our study. Male female ratio was 1.58 (Table 7 ) .A ratio of 1.1:1 was reported by Vineeta. Comparison with other studies could not be done due to non availability of data.

Incidence of MAS was 8.77% among female and 10.53 % among male. No difference was found statistically.If we look upon the relation of antepartum complications with MSAF, antepartum hemorrhage was found in 5.10% cases, pregnancy induced hypertension in 10.31%, anemia dating pregnancy in 21.71% and oligohydramnios in 3.83%. 56.20% cases were not having any antenatal complications. (Table 8)These reports indicate that the relation of antepartum complication and the incidence of MSAF is not constant or uniform in various studies. Antepartum complications though having direct bearing on fetal well being. Antepartum complications though having direct bearing on foetal well being, not produce same extent of foetal compromise in every case leading to meconium passage.Present study shows relation of intrapartum complication to MSAF as follows: Eclampsia was present in 6.11% cases, prolonged rupture of membrane in 3.92%, obstructed labour in 5.56%, prolonged labour in 7.66% and cord abnormalities were found in 1.92% cases. Total

25.18% cases of MSAF and 78.70% cases of MAS were associated with significant intrapartum risk factors excluding foetal distress (Table 9).In our study 50.27% cases were delivered by normal vaginal delivery, 10.77% by assisted vaginal delivery and 38.96% cases by caesarean. 26.27% cases developed MAS, out of 118 cases of MSAF delivered by assisted vaginal delivery in contrast only 8.16 and 7.49% cases, associated with normal vaginal delivery and caesarean respectively. (Table 10)Comparable incidence of mode of delivery among MSAF cases were reported by S.S. Bhide 55.17% by normal vaginal delivery, 20.68% by instrumentation, 24.13% caesarean section.

Infants born with MSAF frequently suffered intra partum asphyxia and required vigorous resuscitation. Present study shows relation of MSAF and APGAR score as follows: Out of 1096 cases, 16.24% cases had <3 Apgar score at 1 minute, 18.89% cases had 4-6 and 64.87% cases had more than 7 Apgar score at 1 minute.

At 5 minute, 8.85% babies remained depressed with Apgar score <3, 5.75% babies had Apgar score between4-6. Remaining babies had Apgar >7 at 5 minute. Thus 8.85% cases were associated with severe birth asphyxia Apgar score (<3 at 5 minute). (Table 11). In study conducted by George A Greger, 46% had Apgar score of 6 or less at 1 minute and 19% had Apgar scores of 6 or less at 5 minute, similar to that of our study.

If we analyse the Apgar scoring in relation to consistency of meconium and MAS, it shows that 57.84% cases of thick MSAF were associated with birth asphyxia, while only 20.62% cases of thin MSAF had birth asphyxia. 19.40% patients developed MAS among thin MSAF babies who were asphyxia ted at birth while 22.67% patients developed MAS among thick MSAF with birth asphyxia. 17 patients of thick MSAF developed MAS despite not having any birth asphyxia (Table 12).

S.S.Bhide reported 74.64% cases of thick MSAF and 24.27% cases of thin meconium associated with low Apgar score at 1 minute (0-6),these results are comparable to the results of our study.Incidence of birth asphyxia was significantly higher in thick meconium compared to thin meconium. 6.47% babies born through thick MSAF developed MAS compared to none in thin meconium group. There was no mortality in thin MSAF with birth asphyxia.

Thus it is inferred that passage of meconium is not a direct cause of birth asphyxia, but if both coexist, it promotes aspiration of meconium and results in MAS.Various studies have clearly shown that consistency of meconium has a direct bearing on final outcome. In our study 17% babies developed MAS and 3% patients expired out of 427 cases of thick MSAF.In Contrast 35 babies developed MAS and 4 expired out of 669 cases of thin MSAF (Table 13)Thus the thick MSAF was associated with more adverse outcome than thin MSAF.If we analyse the relation of MSAF with foetal distress, the present at 348 babies (31.75%) out of 1096,were associated with foetal distress. Out of these 21.84% developed MAS and 4.59% expired. Out of 748 cases of MSAF without any evidence of fetal distress, only 32(4.27%) cases developed MA S and 4(0.53%) expired.36.61% babies developed MAS out of 142 cases of thick MSAF associated with foetal distress, 13 of them expired. While only 7.37% cases developed MAS, out of 285 cases of thick MSAF with no fetal distress and 3 of them expired.11.65% babies our of 206 cases of thin MSAF and fetal distress developed MAS and 1.45% expired while out of 463 cases of Thin MSAF with no fetal distress there was 11(2.38%) cases of MAS and 1 of them died.Thus it can be concluded that babies in whom thick MSAF fetal distress both co-exist, are more vulnerable to develop MAS and have worse prognosis (Table 14).Intrauterine hypoxia probably associated with foetal distress stimulates foetal respiration and in turn intrauterine aspiration of -meconium. This is the reason that despite vigorous airway management and stationing some babies develop MAS.Comparable incidence of fetal distress in MSAF as our study was reported by George 36.36% and S.N. Parida (39. 10%).

This study has revealed that thick MSAF carried an increased risk of MAS and neonatal mortality. Presence of fetal distress in MSAF cases is an ominous sign. It increases the probability of developing MAS. The chest roentgenograms were taken in all 108 babies suffering from MAS.

Out of 73 cases of thick MSAF, 32 cases had hyperaeration. 17 had air leaks, 8 cases had coarse nodular opacities,2 cases had consolidation,1 had pleural effusion and 1 case did not have any radiological abnormality. In contrast to thick MSAF, 9 out of 35 cases of thin MSAF did not have any abnormality, while 11 of them had hyperaeration,6 had air leaks and 3 had heterogeneous opacities. Thus it is obvious that thick MSAF was associated with more roentenographic abnormalities (Table 15).

The incidence of pulmonary air leaks in our patients was 21.29%, compared to the incidence reported by Peterson and Pendleton[23] who noted a 20% incidence of pneumothorax or pneumomediastinum. Pulmonary air leaks can be attributed to partial occlusion of some airways of meconium with hyperainflation of distal segments of the lungs, which increasingly distend and rupture as the infant's respiratory distress increases.

108 cases were diagnosed as meconium aspiration syndrome. Out of these 58.33% had birth asphyxia, 37.96 cases developed Hypoxic ischaemic encephalopathy. 21.3% developed pulmonary air leaks, 35.18% cases sepsis, 35.28% cases shock and 6.48% had congestive heart failure. HIE,Sepsis congestive heart failure, alr leaks and shock were more commonly associated with thick MSAF.(Table 16).

35 patients out of 80 were admitted to NICU during study conducted by George A Gregory. Of these 2 patients developed pneumothorax. No patient required mechanical ventilation or CPAP, All patients were survived.

20 (18.51%) babies were expired due to MAS in our study. Mortality rate was 1.82% among all MSAF cases (Table 17).Majority of workers have reported morality rate ranging flown 5-20%. Goud Krishna 7.26%, 3.44%,Sandhu 6% and Vineeta Gupta 4.9%.

## CONCLUSION

Meconium in amniotic fluid is a fetal environmental hazard when fetal distress supervises rather than solely a marker of pre-existing fetal compromise leading to release of meconium thick MSAF in presence of low 1 minute apgar score or / and fetal heart rate abnormality is an omnious sign. Such patients need strict and stringent supervision during perinatal period for a good outcome. With proper neonatal management, complications of MSAF can be reduced to a great extent. Moreover, a selective approach of tracheal suctioning can be adopted for babies born through MSAF, reserving it for those with evidence of foetal distress in utero and /or who are depressed at birth.

**Declaration**
*Funding:* No funding source
*Conflict of interest:* None declared
**ETHICAL APPROVAL:** The study was approved by institutional Ethics committee

## TABLES

**TABLE 1 :** Meconium Stained Amniotic Fluid And Meconium Aspiration Syndrome : Incidence

| TOTAL DELIVERIES | No. OF CASES OF MSAF | NO. OF CASES OF MAS | INCIDENCE OF MAS AMONG MSAF |
|---|---|---|---|
| 14451 | 1096(7.58%) | 108(0.75%) | 9.85% |

The table shows overall incidence of MSAF and MAS.MSAF was found in 7.58% of all deliveries and 9.85% of them presented with MAS.

**TABLE 2: Distribution Of Msaf According To Consistency Of Meconium**

| CONSISTENCY | NO. OF CASES (n=1096) | PERCENTAGE |
|---|---|---|
| THICK | 427 | 38.96 |
| THIN | 669 | 61.04 |

**Thin MSAF is more common than thick MSAF.**

**Table 3 : Incidence Of Mas In Relation To Maternal Age**

| S. No. | AGE (YEARS) | No. OF CASES OF MSAF (1096) | No. OF CASES OF MAS (108) | INCIDENCE |
|---|---|---|---|---|
| 1. | <20 | 71 | 11 | 15.49 |
| 2. | 20-25 | 526 | 57 | 10.8 |
| 3. | 25-30 | 334 | 26 | 7.78 |
| 4. | >30 | 165 | 16 | 9.69 |

p>0.05(NS)

There is a slightly higher incidence of MAS and MSAF in their babies delivered by mothers aging <20 years. There is no significant difference between various age groups in the occurrence of MAS.

**TABLE 4 Incidence Of Msaf And Mas In Relation To Parity Of Mother**

| S. NO. | PARITY | NO. OF CASE S OF MSAF (n =1096) | N O . O F C A S E S O F M A S (n=108) | INCIDENCE (IN %) |
|---|---|---|---|---|
| 1. | PRIMI | 643 | 59 | 9.17 |
| 2. | 2nd DELIVERY | 228 | 26 | 3.18 |
| 3. | 3RD DELIVERY | 131 | 11 | 8.39 |
| 4. | >4TH DELIVERY | 94 | 2 | 2.13 |

p>0.05(NS)

Maximum case of MSAF and MAS are delivered by Primi mothers.

**TABLE 5 Distribution Of Cases According To Consisttency Of Msaf And Gestational Age**

| S. NO. | G E S T A T I O NAL AGE | TOTAL NO. OF CASES OF MSAF (n=1096) | TOTAL NO. OF CASES OF THICK MSAF (n=427) | TOTAL NO. OF CASES OF THIN MSAF (n=669) |
|---|---|---|---|---|
| 1. | <37 | 39 | 7 (17.95%) | 32 (82.05%) |
| 2. | 37-41 | 994 | 377 (37.93%) | 617 (62.07%) |
| 3. | >41 | 63 | 43 (68.25%) | 20 (31.74%) |

**Table 5 Shows That Thickness Of Meconium Increases As Gestational Maturity Advances.**

**TABLE 6 Relation Of Msaf And Mas To Birth Weight**

| S.NO. | W E I G H T ( gms) | No. of cases of MSAF (n=1096) | No. of cases of MAS (n=108) | %MAS |
|---|---|---|---|---|
| 1. | <1500 | 23 | 0 | 0 |
| 2. | 1500-2500 | 165 | 25 | 15.15 |
| 3. | 2500-3500 | 841 | 75 | 8.81 |
| 4. | >3500 | 67 | 8 | 11.94 |

p>0.05(NS)

This table shows that MSAF and MAS is less common in very low birth weight.

**TABLE 7 Distrribution Of Msaf And Mas According To Sex Of Newborn**

| S.No. | Sex | No. of cases of MSAF (no.= 1096) | No. of cases of MAS (no.=108) | %MAS |
|---|---|---|---|---|
| 1. | Male | 674 | 71 | 10.53 |
| 2. | Female | 422 | 37 | 8.77 |

Above observations suggests that there no significant difference in the incidence of MSAF and MAS as far as sex of the child is concerned.

**Table 7 Distrribution Of Msaf And Mas According To Sex Of Newborn**

| S.No. | Sex | No. of cases of MSAF (no.= 1096) | No. of cases of MAS (no.=108) | %MAS |
|---|---|---|---|---|
| 1. | Male | 674 | 71 | 10.53 |
| 2. | Female | 422 | 37 | 8.77 |

**TABLE 8 Msaf, Mas And Antenatal Maternal Risk Factors**

| S. No. | ANTENATAL RISK FACTORS | No. OF CASES OF MSA F (n=1096) | No. OF CASES OF MAS (n=108) | P E R C E N T A GE (%) |
|---|---|---|---|---|
| 1. | APH | 56 | 11 | 19.35 |
| 2. | PIH | 113 | 20 | 17.48 |
| 3. | ANEMIA | 238 | 39 | 16.38 |
| 4. | OLIGOHYDR AMNIOS | 42 | 11 | 25.53 |
| 5. | MEDI CAL I LLNESS | 31 | 5 | 16.13 |

p>0.05(NS)

There is no significant difference between various antenatal risk factors in the incidences of MAS.

**TABLE 9 Msaf, Mas And Intrapartum Risk Factors**

| S. No. | RISK FACTORS | No. OF CASES OF MSAF (n=1096) | No . O F CASES OF MAS (n=108) | PERCENT AGE (%) |
|---|---|---|---|---|
| 1. | Eclampsia | 67 | 30 | 44.78 |
| 2. | PROM | 43 | 3 | 6.97 |
| 3. | Obstructed labour | 61 | 21 | 34.43 |
| 4. | Prolonged labour | 84 | 23 | 27.38 |
| 5. | Cord Problems | 21 | 8 | 38.09 |

p>0.05(NS)

Intrapartum adverse events like eclampsia,obstructed labour, prolonged labour and cord abnormalities are associated with increase incidence of MAS.

**TABLE 10 Msaf, Mas And Mode Of Delivery**

| S. No. | Mode of Delivery | No. of cases of MSAF (n=1096) | NO. of cases of MAS (n=108) | P e r c e n t a g e (%) |
|---|---|---|---|---|
| 1. | NORMAL VAGINAL DELIVERY | 551 | 45 | 8.16 |
| 2. | ASSISTED VAGINAL DELIVERY | 118 | 31 | 26.27 |
| 3. | CAESAEREAN | 427 | 32 | 7.49 |

p>0.05(NS)

Above table shows there is increased incidence of MAS among babies born through assisted vaginal delivery but statistically no difference was found.

**TABLE 11 Correlation Of Apgar Score At 1 Minute And 5 Minute With Msaf**

| APGAR SCORE | No. OF CASES OF MSAF (n=1096) | PERCENTAGE(%) |
|---|---|---|
| 1" Apgar Score | 178 | 16.24 |
| 0-3 | 207 | 18.89 |
| 4-6 | 711 | 64.87 |
| 7-10 | | |
| 5" Apgar Score | 97 | 8.85 |
| 0-3 | 63 | 5.75 |
| 4-6 | 936 | 85.4 |
| 7-10 | | |

This table shows that 35.13% babies born through MSAF were born asphyxiated at birth. 14.6% remained depressed even at 5 minutes of birth.

**TABLE 12 Correlation Of Apgar Score At 1 Minute With Consistency Of Meconium And Mas**

| S. No. | A P G AR SCORE | THICK MSAF | | THIN MSAF | | P Value |
|---|---|---|---|---|---|---|
| | | No. of case s (n=427) | No. of M AS | No. of ca ses (n=669) | No. of MAS | |
| 1. | 0-3 | 122 | 47 38.52) | 56 | 21 (37.5) | 0.001HS |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2. | 4-6 | 125 | 9 (7.2) | 82 | 5 (6.09) | |
| 3. | 7-10 | 180 | 17 (9.44) | 531 | 9 (1.69) | |

Above table shows that severely depressed babies born through thick or thin MSAF has significantly increased risk of MAS.

**TABLE 13 Consistency Of Msaf And Foetal Outcome**

| S.No. | Outcome | Thick MSAF | Thin MSAF |
|---|---|---|---|
| 1. | Total no. of cases | 427 | 669 |
| 2. | No. of MAS | 73(17.09%) | 35(5.23) |
| 3. | Mortality | 16(3.74%) | 4(0.59%) |

p<.05 significant

According to above table consistency of meconium bears direct relation with final outcome.Thick MSAF is associated with increased risk of MAS and mortality.

**TABLE 14 Correlation Of Consistency Of Msaf,mas And Foetal Distress**

| Consistency of MSAF | Foetal distress present | | | Foetal distress absent | | |
|---|---|---|---|---|---|---|
| | No. of cases | No. with MAS | Mortality | No. of cases | No. with MAS | Mortality |
| Thick MSAF | 142 | 52 (36.61%) | 13 (9.15%) | 285 | 21 (7.37%) | 3 (1.05%) |
| Thin MSAF | 206 | 24 (11.65%) | 3 (1.45%) | 463 | 11 (2.38%) | 1 (0.21%) |

Above table shows that thick MSAF, if associated with foetal distress had significantly increased risk of MAS and mortality.

**TABLE 15 Meconium Aspiration Syndorme And Radiological Abnormilities**

| S. No. | Radiographic pattern | Thick MSAF (n=73) | Thin MSAF (n=35) | Total (n=108) |
|---|---|---|---|---|
| **1.** | Hyeraeration | 32 | 11 | 44 |
| **2.** | Air leaks | 17 | 6 | 23 |
| **3.** | Coarse nodular opacities | 8 | 3 | 11 |
| **4.** | Consolidation | 2 | _ | 2 |
| **5.** | Pleural effusion | 1 | _ | 1 |
| **6.** | Normal | 5 | 9 | 14 |

Hyeraeration and air leaks are the most common radiological abnormalities found in both thick and thin MSAF group. No radiological abnormalities was found in 62% cases of MAS associated with thin meconium.

**TABLE 16 Meconium Aspiration Syndrome: Morbidity**

| S. No. | Morbidity Pattern | No. of cases of MAS | | Total (n=108) |
|---|---|---|---|---|
| | | Thick MSAF (n=73) | Thin MSAF (n =35) | |
| 1. | Birth asphyxia | 43 | 20 | 63 |
| 2. | H.I.E. | 28 | 13 | 41 |
| 3. | Air leaks | 17 | 6 | 23 |
| 4. | Sepsis | 23 | 15 | 38 |
| 5. | C.H.F. | 5 | 2 | 7 |
| 6. | Shock | 27 | 11 | 38 |

Table 16 shows that thick MSAF is more commonly associated with adverse neonatal events like-birth asphyxia,H.I.E.,air leaks,sepsis and shock.

**TABLE 17 Msaf, Mas And Mortality**

| | NUMBER OF CASES | % EXPIRED (n=20) |
|---|---|---|
| TOTAL DELIVERIES | 14451 | 0.138 |
| MSAF | 1096 | 1.82 |
| MAS | 108 | 18.518 |

This table shows that MAS is responsible for 0.13% mortality rate.

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