MECONIUM ASPIRATION SYNDROME , RISK FACTORS

Dr. Adnan M. AL-Rikabi* (CABP. FICMS. DCH)

ABSTRACT

Background and Objective : The presence of meconium in the amniotic fluid is regard as abnormal and both the obstetrician and pediatrician must be alerted to possible fetal or neonatal complication and presence of meconium in trachea may lead to meconium aspiration syndrome (MAS) .

Method : A prospective study was conducted on 155 symptomatic meconium aspiration babies. The information of studay depend on clinical observation at intensive neonatal care unit and delivery room notes.

Results : Meconium stained amniotic fluid (MSAF) is found in (4.8%) of total deliveries and usually in term (78%) , posterm (16%) and (6 %) preterm . The incidence of MAS among meconium stained (18.4 %) . Birth asphyxia, maternal toxaemia and breech presentation were significant risk factors for severity of MAS and not only risk factors for MAS. Most of babies had low apgar score at one minute, and thick meconium was associated with lower apgar score and C.S added more to the problem. Male affacted little more than female and immediate oropharynx suction was very valuable in reducing mortality rate (M.R) from 14% to 6 % .

(9) babies of MAS died (5.8%) because of recurrent seizure , respiratory failure and asphyxia.

Conclusions: MAS is still a great problem in our locality causing a lot of morbidity and mortality. Immediate intervention and oropharynx suction was very beneficial in reducing M.R.

INTRODUCTION

Meconium aspirate present a special problem in delivery room management . (1,2) . Meconium aspiration is primarily a disease of term and post term babies and found in about 9 % of deliveries and at birth 56% of these babies have meconium in their tracheas . However only 20% of born through meconium aspirate develop pulmonary disease requiring O_2 supplementation or have pulmonary air leak [3,4] . There are considerable clinical data in high risk pregnancies such as hypertension, toxaemia, anaemia , pulmonary disease and prolonged gestation to support the association between meconium passage and fetal distress[2,5] . Meconium passage appear to be a physiological response from compression of umbilical cord which elicits vegal response resulting in bradycardia,

* Pediatrics Department . Thi-Qar college of medicine.

increased gastro - intestinal tract motility and sphincter relaxation and meconium passage [2,3,6,7] . Preterm infants even those who are stressed significantly during labour seldom pass meconium in utero, because the motility of small and large intestine are decreased and anal sphincter does not usually relax [3.7.8.9]. Several fetal asphyxia and acidosis of any causes , making , the meconium to be aspirated prenatally because of fetal gasping , but more often meconium is aspirated into the lung immediately after delivery [4-7-10,11,12] . So physiological events early in the course may converted to pathological events that characterized by .

1- Peripheral airway obstruction with atelactasis resulting in ventilation perfusion mis matching .
2- Proximal airway obstruction that causes air trapping .
3- Inflammatory and chemical pneumonitis. All these three may ends with acidosis , hypoxemia and hypercapnea with final result in persistent pulmonary hypertension [4,13].

After aspiration of meconium into airways it may cause pulmonary disease vary from mild respiratory distress to respiratory failure according to the type of meconium as grade one: with good volume of liquor with slightly meconium stained , grade two reasonable volume of liquor with heavy suspension of meconium and grade three thick meconium which is undiluted. Prompt treatment may delay the onset of respiratory distress which may consist only of tachypnea without retraction . [3,7] The diagnosis is made on basis of meconium stained amniotic fluid, presence of meconium in trachea and radiological changes that shows over inflation of the lungs with multiple opacities and flattening of diaphragm. [14, 15,16]

MAS should be largely preventable by carefull antenatal monitoring , rapid delivery for fetal distress and rapid resuscitation . [3,11] The amnioinfusion (AI) a replacement of amniotic fluid during labour in case of thick meconium by infusion trancervical of saline solusion [17.18] .

(AI) proved to be a simple , effective technique for relief the severity of MAS and even the incidence of C.S was seen to be reduced [17,19, 20] . Delee suctioning of oropharynx after the head is delivered reduce the incidence of meconium aspiration and the trachea should be carefully intubated and meconium aspirated from the airway. [21, 22, 23,24]. However large randamized trail showed that this technique had no impact on the incidence of meconium aspiration. [2,3] All babies with aspirated meconium should be admitted for observation and further management . [3] Gentle chest physiotherapy and postural drainage may be helpful , endo tracheal intubation and mechanical ventilation may be indicated. [3,4,7] . Broad spectrum antibiotic should be given to treat co. exist pneumonia. [3] Patient who are refractory to conventional mechanical ventilation may benefit from nitric oxide or ECMO. [2,3,25]

Surfactant may be helpful to improve oxygenation and reducing the severe pulmonary morbidity . [2,3,23]

PATIENTS & METHODS

A prospective study was conducted on babies with respiratory distress syndrome (symptomatic) born at Bint AL-Huda Maternity and Pediatric Hospital in Nassirya city were admitted to the special care baby unit and studied during the period from the 1st of January to the 31st of December 2009 and full filling the following criteria of MAS .

1- The presence of meconium in the trachea at birth followed by signs and symptoms of MAS (tachypnea, grunting and cyanosis) .
2- CXR showing the characteristic appearance (overinflation of the lung, coarse opacities and flattening of the diaphragm) after evidence of MSAF .

The mode of delivery (normal , C.S) and presentation of the babies were also reported as breech or cephalic) . Effect the type of meconium (thick, thin) on lowering the Apgar score was also evaluated. To determined the effect of asphyxia as risk factor or not in the premature babies , a control group born in the same hospital during the period of study with history of asphyxia and low Apgar score but without MSAF was Taken. Statistical test including x2, p value (significance) and confidence interval were used for comparisom between the symptomatic and asymptomatic group and CXR was done to all symptomatic babies.

RESULTS

The table (1)shows the incidence of MAS among all deliveries with its mortality rate.
From the table(2) the majority of babies were full term… (78%) versus (6 %) in pre mature babies while post mature were (16 %) only . The table(3) shows in spite of birth asphyxia there is significant (p < 0.0001) lower incidence of MSAF among the premature babies than among babies with higher gestational age in comparisom with the control group. The table(4) shows that (87) babies were males (56)% and 68(44%) were female in the symptomatic group , while the asymptomatic babies consisted of 455 (54.2%) male and 385 (45.8%) female . Males to females rasio was 1.2:1 in both groups, there is no significant p < 0. 92) difference statistically in sex distribution.

From the table(5), it is clear that toxaemia of pregnancy , prolonged labour and breech presentation are risk factors for the MAS (P < . 0001) and not only a risk factors for the occurrence of MSAF.
From the table(6) . there was a significant (P < 0.0001) lower Apgar score (< 7) in the symptomatic babies who were delivered by C.S than those who were delivered normally.

Discussion

The incidence of meconium stained amniotic fluid in Bint Al Huda Maternity and Pediatric Hospital throughout the period of study was 840 infants out of 17511 total deliveries (4.8%) similar to that reported by Kliegman R.M [(4)], while the incidence of meconium aspiration syndrome (MAS) during that period was (13.2 %) of meconium exposed babies, similar to that reported by McIntosh N. but Urbaniak K.J, etal in his study found that MAS occured in 16.6 % of meconium exposed babies [(24)] . Birth asphyxia was risk factor for MAS in fulterm babies , but not in premature babies although premature babies have been under stressful condition , they rarely pass meconiun, so that MSAF should not be regarded as a clinical sign of fetal distress in the premature fetus , similar findings was found by Ostera E.M [(6)]. This failure to pass meconium by premature babies particularly in response to hypoxia , is probably not due to its inability to form meconium during early gestation , but rather than to its failure to respond adequately with effective intestinal peristalsis , this response seems to be a function of its gestational age that becomes more evident in the mature fetus [(2,6)] . The premature with MAS surprisingly they were more severely affacted , this may be explained by the fact they have been under

severe stress for long time , surfactant deficiency or due to infection [3] .

Prolonged labour , toxaemia of pregnancy and breech presentation were not only a risk factors for having MSAF, but they were also associated with more severe problems like pneumothorax, respiratory failure, and seizure similar to that found by Miller F.C. etal [11]. From the total deliveries with MSAF (840) (78%) were mature babies, (16%) were post mature and (6%) were premature and the majority of the latter (82%) were a above 34 weeks of gestations, these finding are consist with that proved by Ostrea E.M [6] . Males were more often affacted than females in both symptomatic and asymptomatic groups and male to females ratio was 1.2: 1 in both groups. The sex difference was not statistically significant (P < o.9) but Coltart T.M etal found a significant difference in his study " the ratio were 1.8: 1 in the symptomatic group and 2.8:1 in asymptomatic group. [22] . Babies who were the product of C.S had a significant (P <0.001) low Apgar score at one min . as compared with babies of normal spontaneous vaginal delivery , who had higher Apgar score at one Min. this finding was also proved by miller F.C et al [11]. This is probably due to under estimation of fetal distress in utero. Aspiration of thick meconium has great effect in lowering the Apgar score of the babies and making the resuscitation more difficult, this was also proved by Hobel C.J [1], Urbaniak Kg etal. [24] and Young Y.P. etal [14], so infusion of normal saline into the amniotic cavity to dilute the thick ligour may be of benefit. [17] . Oropharynx suctioning was beneficial in resuscitation by lowering the mortality rate of MAS from 14% for those without immediate orpharynynx suction to 6 % for those with immediate oropaharynx suction this was also found by Ting and Brady [23] . The mortality rate was (5.8%) but Coltart T.M etal in his study is found that the M.R was 8.3% [22]. The causes of death were due to one of the complications as seizures, pneumothorax, asphyxia, and eventually respiratory Failure , these findings were also proved by Hobel C.J. [1].

CONCLUSIONS

1- MAS is still a great problem in our locality causing a lot of morbidity and mortality .
2- Toxaemia of pregnancy, birth Asphyxia and breech presentation well known risk factors for MAS.
3- Thick meconium and C.S were associated with lower Apgar score.
4- Premature babies not a risk factor for MAS but when affacted they suffer stormy course.
5- Oropharynx suctioning was very beneficial in reducing the M.R .

Tables

Table (1) Analysis of infants with MSAF.

Total deliveries	MSAF	MAS among MSAF	MAS among Total deliveries	Mortality rate in MAS
17511	840 (4.8%)	155(18.4%)	17511(0.88%)	9(5.8%)

Table : (2) The gestational age of infant with MSAF

Mature 37-42 wk	Post mature > 42 WK	Pre mature <: 37 WK
655 (78 %)	135 (16) %	50 (6%)

Table (3) The effect of Gestational Age (G. A) on meconium passage in the fetus with perinatal asphyxia.

C.A (wk)	Symptomatic MSAF	Symptomatic non MSAF	Total
< 37	8	350	358
> 37	115	225	340
Total	**123**	**575**	**698**

X2 = 108.7 OR. O.O4 P < 0.0001 very highly significant

Table (4) Sex distribution in MSAF

Sex	Symptomatic		Asymptomatic	
Male	87	(56 %)	455	54.2 %
Female	68	(44 %)	385	45.8 %
Total	**155**		**840**	

X2 = 0.01 P < O.92

Table: (5) The effect of risk factors on pregnancies in symptomatic and asymptomatic group .

Risk factors	Symptomatic	Asymptomatic	P. value
Toxaemia	35	67	0.0001 *
Prolonged labour	48	64	0.0001 *
Diabetes	5	18	0.9 **
Cord prolapse	5	9	0.4 **
Breech	18	55	0.001 *
No risk	44	627	
Total	**155**	**840**	

* High significant ** not significant

Table (6) : The mode of delivery of MSAF in relation to Apgar score

One minute Apgar score	Type of delivery	Symptomatic		Asymptomatic	
> 7	C.S	3	(15 %)	50	(7.5 %)
	Normal	17	(85 %)	610	(92.5 %)
	Total	20		660	
< 7	C.S	40	(29 %)	21	(11.5 %)
	Normal	95	(71 %)	159	(88.5 %)
	Total	**135**		**180**	

REFERANCES

1. Hobel C.J , Bocher C : Meconium staining of Amniotic Fluid. In : Assessment and Care of the Fetus (physiological, chemical and medicological principle). Eden R. D, Frank H.B , international (ed). 1999 : 801 – 9
2. Barbara J. Stoll , Ira Adams. Champman : Delivery room emergencies. In : Nelson Textbook of Pediatrics. Behrman R.E, Kliegman R.M . 18th ed. 2007: 742-3 .
3. Neil Mcintosh, Ben Stenson : The newborn in: Forfar and Arneils Textbook of Pediatrics. Neil Mcintosh, Peter Helms 7th ed . 2008 : 253 – 3 .
4. Richard A., Chrenkranz : The newborn intensive care unit . In : Oski's Pediatrics. Jalia A. Memillan, Ralph D. Feigin . 4th ed., 2006 : 211
5. Elizabeth L. Raab, Lisa K. Kelly: Neonatal respiratory failure. In : Roger's Textbook of Pediatrics intensive care. David G. Nichols, 4th ed . 2008: 706-7 .
6. Ostrea E.M., Nagvi M: The Influence of Gestational Age On the Ability of the Fetus to pass Meconium in Utero. Acta Obstet . Gynecol. Scand. 1992, Vol. 61, pp 272 -7.
7. Clarence W. Gowen : Fetal and neonatal medicine. In : Nelson Essential of Pediatrics. Ropert M. K;iegman , Karen J. Marcdante. 5th ed. , 2006 : 279.
8. James J. Cummings: Neonatal Resuscitation. In : Pediatric Hospital Medicine. Ronald M. Perken, James D. Swift. 2nd . 2008 : 855 .
9. Ian Cross: Respiratory system. In : Oski's Essential Pediatrics . Michael Crocetti, Michael A. Barone. 2nded . 2004: 47.
10. Elizabeth H. Thilo, Adam A. Rosenberg: The newborn infant . in : Current diagnosis and treatment . William W. Hay, Jr. Myron J. Levin , 19th ed , 2008 : 29 .
11. Miller F.C ., Sacks D.A., Paul R.H: Significance of Meconium During Labour . Am.J. Obstet. Gynecol. 1995 July; Vol. 122, No. 5 : 573 – 79 .
12. Suhas M. Nafday, : Neonatal Medical condition In: Textbook of Pediatric care. Thomas K. Mc Inerny, Henry M. Adam. 1st ed. 2009 : 908 – 9 .
13. Collin S. Goto , Brain A. Bates: Resuscitation of the newborn infant. In: Pediatric Emergency Medicine. Cary R. Strange , Willliam R. Ahrens. International ed . 2004: 22 .
14. Yong – yp; Ho-Ly: A 3 – year review of meconium aspiration syndrome. Singapore – J . 1997 May ; 38 (5) : 205-8 .

15. Philip N. Baker , Neonatology. In : Obstetrics by ten teachers, 18th ed., 2006 : 322 – 3 .
16. Elizabeth L. Raad : The resuscitation and care of the newborn at risk in: Current Diagnosis and Treatment . Alan H. Dechnerney , T. Murphy Goodwin , 2007 : 502 – 3.
17. Weismiller – DG: Transcervical Amnioinfusion Am- Fam. Physician . 1998 feb ; (3) : 504 -10 .
18. Moodley – J., Matchaba – P . Pagne – AJ: Intra partum Amnioinfusion for Meconium .Stained ligour in developing countries. Trop. Doct. 1998 Jan ; 28(1) : 3 – 4.
19. Surbek – DV; Hosli – IM ; pavic – N . Transcervical Intrapartum Amnioinfusion : Asimple and effective Technique. Eur-J- Obstel . Gynecol – Reprod- Biol. 1997 , Dec, 75 (2) : 123 – 6 .
20. Khoasla – A- H ; Sangwan – K ; Ahuja – SD ; Prophylactic Amnioinfusion During labour complicated by Meconium . Aust – N- 2 – J – Ostet . gynecol. 1997 Aug. 937 (3): 294-7
21. Alan W. Ducan : Acute Respiratory Failure in children. In: OH's Intensive care Manual .And Drew D. Bersten, Neil Soni. 2009: 1104 .
22. Coltart. T.M ., Byrne D.L ., Bates S.A : Meconium Aspiration A6 year Retrospective study. British J. Obstet . Gynecol . 1999 April , vol . 96 : 411-14.
23. M.A. Thomson , A.D . Edwards. Neonatal care for Obstetrician . In : Dew hursti Text book of Obstet. Gynecol. Keith Edward. 7th ed . 2007 : 87.
24. Urbaniak – K.J; Mc Cowan ; Townened – KM : Risk factors for Meconium Aspiration syndrome – Aust – N- 2-J – Obstet – Gynecol. 1996 Nov, 36 (4) : 4016.
25. Morava – E ., Gill – W ; Pierce – M : ECMO in Neonatology : Review of the use of the method. Oru – Hetil. 1998 Feb 22 ' 139

متلازمة استنشـاق العق

د. عدنان محسن الركابي*

الخلاصـــة

دراسة أجريت على (١٥٥) طفلا وليدا يعانون من متلازمة استنشاق العق . وقد تم اخذ المعلومات بالاعتماد على معلومات وحدة العناية المركزة لحديثي الولادة وغرفة صالة الولادة في مستشفى بنت الهدى التعليمي للنسائية والاطفال خلال عام ٢٠٠٩ .

تبين من الدراسة ان نسبة حدوث انصباغ السائل الاميني بمادة العق هي (4.8%) من المجموع الكلي للولادات وكانت اكثر حدوثا بكثير في الطفل التميم (78%) من الطفل الخديج (6%) .

الاختناق الولادي وارتفاع ضغط الدم لدى الام الحامل وولادة المقعد اولا كانت عوامل خطورة لزيادة شدة المتلازمة وليست عوامل خطورة لحدوث المتلازمة فقط .

الاطفال المولودين مع العق الثخين والمولودين بعملية قيصرية كانوا اقل درجة ابغار، والذكور اكثر عرضة من الاناث .

سحب السوائل الموجودة في الفم واعلى القصبة الهوائية بعد الولادة مباشرة كان ذو قيمة في خفض نسبة الوفيات من (14 % الى 6%) .

كان عدد الوفيات (9) وبنسبة (5.8%) لأسباب الاختلاجات المتكررة ، الاختناق الولادي وعجز الجهاز التنفسي .

استنشاق العق مازال يشكل مشكلة كبيرة ويتسبب في كثير من المضاعفات والوفيات لذلك يجب المتابعة الجيدة للام الحامل المعرضة للخطورة ومتابعة سير الولادة عن قرب وبتواجد فريق عمل طبي متخصص.

---

* قسم الأطفال / كلية الطب / جامعة ذي قار