Federal University of Rio de Janeiro State

Journal of Research Fundamental Care Online

ISSN 2175-5361
DOI: 10.9789/2175-5361

RESEARCH

Síndrome da aspiração meconial: identificando situações de risco obstétricos e neonatais

Meconium aspiration syndrome: identifying obstetric and neonatal risk situations

Síndrome de aspiración de meconio: identificando situaciones de riesgo obstétrico y neonatal

Sheila Duarte de Mendonça[1] , Vanessa Gomes de Oliveira Medeiros [2] , Nilba Lima de Souza [3], Rhuama Karenina Costa e Silva [4] , Samara Isabela Maia de Oliveira [5]

ABSTRACT

Objective: To identify situations of obstetric and neonatal risk that favored meconium aspiration syndrome as well as complications in clinical evolution presented by these neonates. **Method:**lit is a quantitative, retrospective study and documentary analysis, conducted from January 2009 to December 2010. Data from 40 medical records were recorded in a database and analyzed using descriptive statistical analysis software. **Results:** 67.5 % of mothers had fewer than six prenatal consultations and 42.5% had complications during pregnancy. Cesarean section predominated with 75%, indicated by fetal distress. There were 90% of neonates had an average gestational age of 37 weeks or more, 82.5 % had an Apgar score below 7, requiring resuscitation at birth and ventilatory support. **Conclusion:** Proper monitoring of pregnant women throughout pregnancy cycle and in labor as well as the need to care for neonates in the delivery room can reduce the incidence of the syndrome. **Descriptors:** Meconium aspiration syndrome, Intensive care neonatal, Neonatal nursing.

RESUMO

Objetivo: Identificar as situações de risco obstétricas e neonatais que favorecem a síndrome da aspiração meconial, bem como as complicações na evolução clínica apresentadas por esses neonatos. **Método:** estudo quantitativo, retrospectivo e de análise documental, realizado entre janeiro de 2009 a dezembro de 2010. Os dados dos 40 prontuários consultados foram registrados em banco de dados e analisados por meio de software para análise estatística descritiva. **Resultados:** Quanto às genitoras, 67,5% tiveram menos que seis consultas de pré-natal e 42,5% intercorrências na gestação. Predominou o parto cesáreo em 75%, indicados por sofrimento fetal. Dos neonatos, 90% apresentaram idade gestacional de 37 semanas ou mais; 82,5% tiveram Apgar abaixo de 7, necessitando de reanimação ao nascer e suporte ventilatório. **Conclusão:** O acompanhamento adequado da gestante em todo ciclo grávido e no trabalho de parto, bem como o atendimento preciso do neonato na sala de parto podem reduzir a incidência da síndrome. **Descritores:** Síndrome de aspiração de mecônio, Terapia intensiva neonatal, Enfermagem neonatal.

RESUMEN

Objetivo: Identificar las situaciones de riesgo obstétrico y neonatal que favoreció el síndrome de aspiración de meconio y complicaciones en la evolución clínica que presentan estos neonatos. **Método:** Estudio cuantitativo, retrospectivo y de análisis documental, realizado a partir de enero 2009 a diciembre 2010. Los datos de 40 historias clínicas se registraron en una base de datos y se analizaron con el software de análisis estadístico descriptivo. **Resultados:** En cuanto a las madres, el 67,5 % tenían menos de seis consultas prenatales y un 42,5 % de complicaciones durante el embarazo. Cesárea predominó en el 75%, indicado por sufrimiento fetal. De los recién nacidos, el 90% tenían una media de edad gestacional de 37 semanas o más, el 82,5% tenía una puntuación de Apgar por debajo de 7, necesitando reanimación al nacer y el apoyo ventilatorio. **Conclusión:** El control adecuado de la mujer embarazada durante el ciclo de embarazo y en el parto, así como la necesidad de cuidar a los recién nacidos en la sala de parto puede reducir la incidencia del síndrome. **descriptores:** Síndrome de aspiración de meconio, Cuidado intensivo neonatal, Enfermería neonatal.

[1]Nurse expert in Neonatal Intensive Care by the Enfermeira especialista em Terapia Intensiva Neonatal pela Multidisciplinary Integrated Residence Health Maternity Januário Cicco School/Federal University of Rio Grande do Norte. Natal, Rio Grande do Norte, Brazil. E-mail: sheilhinha@gmail.com; [2]Nurse expert in Neonatal Intensive Care by the Enfermeira especialista em Terapia Intensiva Neonatal pela Multidisciplinary Integrated Residence Health Maternity Januário Cicco School/Federal University of Rio Grande do Norte. Natal, Rio Grande do Norte, Brazil. E-mail: vanessaoliveira83@gmail.com; [3]Ph.D. Professor from the Graduate Program and Nursing Department of the Federal University of Rio Grande do Norte. Natal, Rio Grande do Norte, Brazil. E-mail: nilbalima@ufrnet.br; [4]Nurse. Master degree from the Graduate Program in Nursing. Federal University of Rio Grande do Norte. Natal, Rio Grande do Norte, Brazil. E-mail: rhuamak@gmail.com; [5]Nurse. Federal University of Rio Grande do Norte. Natal, Rio Grande do Norte, Brazil. E-mail: aramas.maia@gmail.com

INTRODUCTION

The Meconium Aspiration Syndrome (SAM) is characterized by respiratory failure of different levels, with severe clinical presentation and high mortality rate. SAM is based on the blockage of airways by meconium aspiration, hampering ventilation and gas exchange. From this picture, there is a surfactant dysfunction with decreased lung compliance and inflammation of the mucosa of the respiratory tree.[1-2]

The clinical consequences include hypoxemia, acidosis, pulmonary hypertension, the need for supplemental oxygen, and radio-opacities on chest radiographs. The main risk factors for SAM are post-maturity, the delay of intrauterine growth, breech fetus and perinatal asphyxia.[1-3]

It is estimated that 250 neonates deaths occur per hour worldwide, mostly for reasons that can be prevented with the implementation of minimum care to pregnancy, childbirth and postpartum. The main causes of death during the neonatal period are premature delivery, serious infections and perinatal asphyxia.[1-4]

It should be an alert for cases of perinatal asphyxia due to oxygen deficiency (hypoxia) during pregnancy, childbirth or neonatal period, which may result from severe neurological sequels, affecting the psychomotor development, leading to death.[1]

Hypoxia and/or neonatal infection may cause removal of meconium in the utero. If the fetus or the newborn show forced respiratory movements, it may be the aspiration of Tinto Amniotic Fluid in Meconium (LATM), with possible airway obstruction, interference in gas exchange and severe respiratory difficulty. Approximately 5% of neonates with LATM develop SAM and about half of them will require mechanical ventilation.[5]

In about 10 to 20% of pregnancies can be observed meconium amniotic fluid, and 1 to 2% of these fetuses have SAM. In this way, the multidisciplinary health team must be able to properly monitor the pregnant women during prenatal, constantly monitoring the fetus during labor and to early recognize the reasons that lead to the elimination of intrauterine meconium, avoiding it through the application of appropriate measures for each case.[6]

The delivery care by a skilled health team may decrease by about 20-30% neonatal mortality rates and the appropriate use of resuscitation technique reduces by 45% deaths by neonatal asphyxia.[4]

In situations where meconium aspiration cannot be avoided, the newborn will probably develop SAM and will need intensive and specialized care, with advanced equipment and well-trained staff in the Neonatal Intensive Care Unit (NICU). The attention given to this newborn in the NICU will have strong influence in reducing serious consequences or even the full recovery of the newborn.

In everyday NICU of a Maternity Hospital in Natal/RN, there are problems in neonates with SAM, who underwent resuscitation in the delivery room and consequent

hospitalization in the intensive care unit, often presenting poor prognosis and high early neonatal morbidity and mortality.

Thus, there was interest to investigate situations that during women´s care in pregnancy and childbirth cycle may be contributing to the occurrence of SAM and, consequently, increasing hospitalization rate of newborns in a NICU and the high neonatal mortality rates. Thus, it is intended to contribute to a better neonatal prognosis and reduce perinatal mortality, in order to meet the goals established by the Pact for Life.[7]

OBJECTIVE

Based on this, this study aimed to identify obstetric and neonatal risk situations that favored the meconium aspiration syndrome in neonates of a maternity school ad well as complications in the clinical evolution presented by these neonates.

METHOD

This is a descriptive, quantitative, retrospective and documentary analysis study conducted at the Maternity Hospital Januário Cicco, unit belonging to the hospital complex of the Federal University of Rio Grande do Norte (UFRN), in Natal/RN, Brazil. This Maternity works as tertiary referral of the Unified Health System (SUS) for women´s care with high-risk pregnancies and their newborns, having a NICU for up to ten beds and an average of fifty hospitalizations per month.

Data collection was held in the NICU and the Medical File Sector and Statistics of this maternity, performing a documentary research based on the books of hospitalizations and records of the neonates in the NICU.

The research sample included the medical records of newborns hospitalized in the NICU with the initial medical diagnosis of SAM from January 2009 to December 2010, then a convenience sample, totaling 45 records. The study excluded the records that made impossible data collection, being five records. Therefore, 40 records were selected by filling up a form, built specifically for this study, with open and closed questions, with issues of progenitor, pregnancy, childbirth, newborn, clinical outcome and health team behavior.

Data collection was done in May and June 2011 and the variables investigated were: maternal age; marital status, mother´s education and address of origin; prenatal care; complications in pregnancy; delivery; fetal presentation; aspect of amniotic fluid; gender of the newborn; gestational age; weight; Apgar score; conditions at birth; behavior in the delivery room; Oxygen support; and complications of the newborns.

The data were organized and stored in a spreadsheet database in Microsoft Excel 2007 software, descriptive statistical method for data analysis was applied and the results were presented in the form of percentage.

The project was approved by the Ethics Committee in Research (CEP) of the University Hospital Onofre Lopes (HUOL) of UFRN and with protocol number CEP/HUOL: 544/2011 and CAAE: 0412.0.000.294-11.

RESULTS AND DISCUSSION

Regarding mother´s characterization, an average maternal age of 25.84 years old was identified, and only 5% of the mothers had gestational age of risk over 35 years old. Regarding marital status, 25% had uncertain marital status or were single. Regarding the low level of education, as a risk pregnancy, it is observed that 32.5% had levels of education ignored or below four years of study.

With regard to pregnancy and childbirth, it was observed that 67.5% of mothers had no prenatal visits registration or received a lower amount of consultations recommended by the Ministry of Health, being at least six prenatal consultations.[9] In the maternal origin, 50% of them were from the countryside, 42.5% from the capital and 7.5% had no record of their origin.

Complications during pregnancy had 42.5% in mothers with ruptured membranes, fluid loss, small and calcified placenta, hypertension, imminent eclampsia, vaginal candidiasis, lower abdomen pain and urinary tract infection.

Regarding the type of delivery, 75% of newborns born by cesarean section and 25% of vaginal delivery, 10% of them with forceps. In cesarean deliveries, 70% were referred due to fetal distress and 30% for breech presentation, imminent eclampsia, placental abruption, intrauterine growth restriction, cephalopelvic disproportion, post-term and oligohydramnios pregnancy.

In 62.5% the expulsive stage was considered fast, 12.5% long and 25% had no records. As for fetal presentation, 85% of newborns had cephalic presentation, 7.5% pelvic and other 7.5% had no records. Regarding the aspect of meconium, 70% of cases presented it thick and 30% fluid or unspecified.

There 60% males neonates, GA ranging from 25 to 44 weeks, but 90% were 37 weeks or more. Most neonates (67.5%) were considered AGA, with birth weights ranging from 1240g to 4070g, and 75% had weight above 2500g.

In the delivery care, this research showed that 82.5% had Apgar scores at the 1st minute of life below 7 points and at the 5th minute of life this percentage decreased to 65%, although a 12.5% remained low score in the 5th minute of life with a worse prognosis, as can be seen in Table 1.

Table 1 - Apgar Score at the 1st and 5th minutes of life of newborns with SAM hospitalized in NICU of a Maternity Hospital in 2009-2010, in Natal/RN.

Apgar Score	0 to 3 points	4 to 7 points	8 to 10 points
1° minute of life	62,5%	20%	17,5%
5° minute of life	12,5%	52,5%	35%

Source: field research, 2011.

In the pediatric evaluation of the newborns conditions at birth, 70% were considered poor or very poor, 22.5% as good or regular and 7.5% had no record of this evaluation.

As for the behavior performed in the delivery room, 60% required Positive Pulmonary Ventilation (VPP) with bag and mask and/or intubated, 20% of newborns received only inhaled oxygen and/or tactile stimulation, 15% required cardiopulmonary resuscitation and/or adrenaline and 5% had no records. However, in almost half of all records, 45% were not aspiration records found of the trachea under direct visualization and in 31.82% were not specified the reason for the procedure not carried out.

Lack of meconium connector, power outages, failure of intubation and no pediatrician in the delivery room were some of the reasons for not tracheal aspiration performance.

The clinical course and complications experienced by newborns found in this study show that 97.5% of them, when hospitalized in NICU, required some kind of oxygen support, and 50% were under non-invasive ventilation (HOOD or CPAP), 47.5% on invasive mechanical ventilation (VMI) and only 2.5% were in oxygen environment.

In this research, 77.5% of records showed that the newborns had some kind of respiratory distress, 55% had some type of change in lung X-rays and 55% had some kind of adventitious sounds on lung auscultation.

The cardiac and hemodynamic changes were recorded in 42.5% of newborns, such as: persistent pulmonary hypertension of the newborn, systolic murmur, accentuated heart sounds, hypertension, weak pulse, bradycardia and tachycardia.

Registration on psychomotor activity of newborns showed that 37.5% were normal; 35% hypoactive or dropped; 17.5% alternating moments of hypo-activity with agitation; and 10% were angry or agitated. From the total, 42.5% had neonatal seizures.

It is noteworthy in gastrointestinal function that 77.5% of newborns had some type of gastric residue, being 67.74% were sanguinary, dark or dirty and 32.26% clear or yellow. In urinary function, 45% had oliguria, anuria and/or bexigoma.

In the characteristics of the skin of newborns, 30% were evaluated in the NICU as pale, 42.5% with decreased peripheral perfusion, 42.5% dehydrated and 52.5% with edema.

The clinical course of the 40 neonates hospitalized in NICU with SAM, shows that 80% of them were referred to the rooming sector, 15% died, and 5% were discharged or were transferred to another hospital with delayed neurological development.

SAM emerges by a group of factors that may expose the neonate to a big or small serious situation, depending on the pregnancy conditions, childbirth and especially the quality of care in the delivery room.

The findings in this research about maternal gestational risks are supported by the literature showing maternal age greater than 35 years old and less than 15 years old; insecure marital status; low education, among others.[8] In addition, complications during pregnancy that lead to the risk factors associated with the development of SAM were found, such as fetal post-maturity, amniotic fluid with thick meconium, intrauterine growth restriction, delivery with dystocia, breech fetus, fetal heart rate disorder, perinatal asphyxia and fetal distress.[1,10]

The pregnancy registration equal or less than 37 weeks in male newborns found in this research is similar to other authors who showed to be rare the presence of meconium in the amniotic fluid in children under 37 weeks gestation, because it primarily affects full-term or post-term, male newborns, appropriate for gestational age (AGA) and weighing more than 2500g.[5,10-11] In line with prolonged pregnancy or post-term pregnancy, placenta aging and oligohydramnios are related, favoring the development of fetal distress, presented with abnormal fetal heart rate and hypoxia. Therefore, the fetus redistribute the blood flow to protect the heart and the brain with low flow in the intestine and the elimination of meconium, increasing occurrence of SAM.[10] According to the literature, the result of Apgar score from 0 to 3 is associated with a severe asphyxia; from 4 to 7, mild and moderate asphyxia; from 8 to 10 no asphyxia. Most newborns in this study had an Apgar score related to some level of asphyxia.[5,12] It should be noted that the highest records were found in neonates with Apgar score less than seven in the first minute of life, but serious scores persisted in the 5th minute of life, characterizing severe asphyxia with worse prognosis in neurological development of these neonates. Perinatal asphyxia is a disorder that impairs gas exchange and may cause fetal hypoxemia and hypercapnia, and may lead beyond the brain injury, to multiple organ dysfunction.[5,12]

The record of delivery room behaviors indicate that in some situations there were lack of material and human resources for proper neonatal care. The rules of neonatal resuscitation advocate the need for medical to aspire the trachea under direct visualization of the not vigorous newborn and being mandatory the presence of a pediatrician in the delivery room, to allow an advanced resuscitation.[4]

The findings regarding respiratory neonatal complications are consistent to those found in the literature about SAM showing the elimination of intrauterine meconium in term neonates with increased risk of perinatal and neonatal mortality and severe acidemia, which requires oxygen administration.[5]

SAM can also be in mild tachypnea and severe respiratory failure with persistent hypoxemia and consequently to death.[10] Thus, it is important a ventilatory support, maintaining an adequate blood oxygenation and treating complications and management of sequels of perinatal asphyxia.[1,13] Other findings as psychomotor alterations and those regarded as electrolyte disturbances are expected in the case of SAM depending on the severity of the asphyxia and clinical evolution. However, there are seizures, leakage of air, resulting in pneumothorax or pneumomediastinum; damage to the lung tissue; surfactant inactivation; persistent pulmonary hypertension; pulmonary sequels, such as higher incidence of pneumonia or developing chronic lung disease; and increased incidence of infection in the first year.[11,14-15]

Thus, it is believed that the record of neonatal deaths found in this study characterizes the risk neonates are exposed with SAM whose deliveries occur in the field of research institution and the fault records in the immediate care of the newborn in delivery room are highlighted.

CONCLUSION

The records of neonates with SAM indicate the low maternal socioeconomic, an insufficient number of prenatal visits and complications in pregnancy such as rupture of membranes, the hypertensive situations and the genital and urinary infections as risk obstetric situations.

In neonatal risks there were the intrauterine fetal distress, sometimes resulting from complications in pregnancy or inadequacy of human and material resources for proper immediate care to newborns in the delivery room. These may have favored the low Apgar scores of 62.5% in the first minute and 12.5% in the fifth minute, characterizing severe asphyxia and need for neonatal resuscitation and ventilatory support in the NICU. This may have contributed to the record of 15% of deaths among those involved in this research.

It is known that SAM is a serious disease with complications that affect all systems of the body, and, may leave important sequels in the newborn when not enough to death. However, in this study it was not possible to detect neurological involvement of these neonates at discharge, due to non-registration of neurological evaluations in the medical records. However, it is believed that the high rate of neonatal seizures and low APGAR index in the first and fifth minute of life, these sequels are considerable and can be compromising the growth and development of these neonates, being an important point to be investigated.

REFERENCES

1. Vaz FAC, Diniz EMA, Ceccon MEJR, Krebs VLJ. Neonatologia. Coleção Pediatria. Instituto da criança HC-FMUSP. Barueri (SP): Manole; 2011.

2. Espinheira MC, Grilo M, Rocha G, Guedes B, Guimarães H. Síndrome de aspiração meconial – experiência de um centro terciário. Rev Port Pneumol [Internet]. 2011 [citado

em 10 jan. 2013];17(2):71-76. Disponível em: http://www.elsevier.pt/pt/revistas/revista-portuguesa-pneumologia-320/artigo/sindrome-aspiracao-meconial-experiencia-um-centro-terciario-90002027

3. Taylor JV, Sheng J, Hadfield RM, Morris JM, Bowen JR, Roberts CL. Trends in obstetric practices and meconium aspiration syndrome: a population-based study. BJOG [Internet]. 2011 Dez [citado em 25 jan. 2013]; 118:1601–1607. Disponível em: http://onlinelibrary.wiley.com/doi/10.1111/j.1471-0528.2011.03093.x/full

4. Nader PJH, Rego JD, Almeida MFB, Guinsburg R. Manual do Auxiliar da Reanimação Neonatal – Programa de Reanimação Neonatal. Belo Horizonte (MG): Sociedade Brasileira de Pediatria; 2008.

5. Cloherty JP, Eichenwald EC, Stark AR. Manual de neonatologia. 6nd ed. Rio de Janeiro (RJ): Guanabara Koogan; 2010.

6. Brasil. Atenção à saúde do recém-nascido: guia para os profissionais de saúde. V. 3. Problemas respiratórios, cardiocirculatórios, metabólicos, neurológicos, ortopédicos e dermatológicos. Brasília: Ministério da saúde; 2011.

7. Brasil. Portaria n. 2.669, de 3 de novembro de 2009. Estabelece as prioridades, objetivos, metas e indicadores de monitoramento e avaliação do Pacto pela Saúde, nos componentes pela Vida e de Gestão, e as orientações, prazos e diretrizes do seu processo de pactuação para o biênio 2010 - 2011. Diário Oficial da União: Brasília (DF); 06 nov. 2009.

8. Ministério da Saúde (BR). Gestação de alto risco: manual técnico. 5ª ed. Brasília: Ministério da Saúde; 2010.

9. Ministério da Saúde (BR). Pré-natal e Puerpério: atenção qualificada e humanizada - manual ténico. Série A. Normas e Manuais Técnicos. Série Direitos Sexuais e Direitos Reprodutivos - Caderno nº 5– Brasília: Ministério da Saúde; 2005.

10. Caraballo MG, Nogueira KP, Ginestá IA, Prego LAR, Filiú HH. Factores de riesgo del síndrome de aspiración meconial. Medisan. [Internet]. 2006; [citado em 21 set. 2010]; 10(3): Disponível em: http://bvs.sld.cu/revistas/san/vol10_03_06/san03306.htm

11. Madi JM, Morais EM, Locatelli E, Madi SRC, Rombaldi RL. Síndrome de aspiração do mecônio: análise de resultados obstétricos e perinatais. Rev Bras Ginecol Obstet [Internet]. 2003 [citado em 14 set. 2010]; 25(2): 123-128. Disponível em: http://www.scielo.br/pdf/rbgo/v25n2/v25n2a08.pdf

12. World Health Organization (CH). International statistical classification of diseases and related health problems: instruction manual. 2ª ed. Geneva: 2010.

13. Colvero MO, Colvero AP, Fiori RM, Garcia PCR. Novas opções terapêuticas na síndrome de aspiração de mecônio. Rev Bras Saude Mater Infant [Internet]. 2006 Out/Dez [citado em 13 set. 2010]; 6(4): 367-374. Disponível em: http://www.scielo.br/pdf/rbsmi/v6n4/02.pdf

14. Athaíde AMZ. Síndrome de Aspiração do Mecônio. In: Araújo BF, Zatti H, organizadores. Neonatologia – guia de rotinas. Caxias do Sul (RS): Educs; 2004. p.163-167.

15. Osava RH, Silva FMB, Oliveira SMJV, Tuesta EF, Amaral MCE. Fatores maternos e neonatais associados ao mecônio no líquido amniótico em um centro de parto normal. Rev Saude Publica [Internet]. 2012 Dez [citado em 17 mar. 2014]; 46(6):1023-1029. Disponível em: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0034-

89102012000600012&lng=en.%20Epub%20Jan%2028,%202013.%20http://dx.doi.org/10.1590/S0034-89102013005000005

Received on: 25/03/2014
Required for review: No
Approved on: 03/09/2014
Published on: 01/07/2015

Contact of the corresponding author:
Sheila Duarte de Mendonça
Rua Raimundo Chaves, 2189. Residencial Cabugi, Candelária. CEP: 59063390. Natal-RN. E-mail: sheilhinha@gmail.com