THE NEED FOR VENTILATORY SUPPORT AND SURFACTANT ADMINISTRATION IN PREMATURE INFANTS WITH NEONATAL RESPIRATORY DISTRESS

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Abstract

Ventilatory support is often necessary to preterm infants due to pulmonary immaturity and associated pathology. Frequently these premature infants also require surfactant administration. Using ventilatory support makes the prognosis in this group of infants to be favorable in most cases.

We performed a retrospective study between January 1, 2008 and December 31, 2013 attended by 483 premature infants who had neonatal respiratory distress syndrome from the total of 1,045 premature infants born in this period.

Neonatal respiratory distress syndromes significantly contribute to morbidity and mortality of premature infants. Ventilatory support is used in cases requiring respiratory support to premature infants. Also, surfactant administration is one of the few therapies that greatly changed the clinical practice in neonatology. Surfactant therapy decreased neonatal mortality by respiratory distress.

Key words: neonatal respiratory distress, prematurity, surfactant, ventilatory support

Introduction

Premature babies continue to be one of the biggest challenges of neonatologists. Respiratory distress syndrome (RDS) is one of the most common respiratory disease and a major cause of neonatal mortality. Prematurity is the most important risk factor for the appearance of respiratory distress syndrome. The incidence of respiratory distress syndrome decreases with gestational age increasing.

Neonatal respiratory distress syndrome occurs due to lung immaturity, especially because primary surfactant deficiency. The main goals of the therapy which involves infants with respiratory distress syndrome are ventilator support and surfactant administration. Surfactant therapy reduced mortality due to respiratory distress syndrome in preterm infants about 50%.

Trends in neonatal ventilation therapy is the use of non-invasive ventilation (CPAP) whenever possible and invasive ventilation (IPPV, SIMV, HFOV) when it is absolutely necessary to support premature infants breathing.

Objectives

This paper aims to highlight the incidence and severity of neonatal respiratory distress syndrome, the use of ventilatory support and surfactant administration in a group of premature infants who developed respiratory distress syndrome.

Material and Methods

The study was conducted at the Clinic of Neonatology "" Bega "Timisoara for a period of six years, between 2008-2013.

From the total of 1,045 premature infants with gestational age below 37 weeks born in this period, 483 premature infants who presented neonatal respiratory distress syndrome were introduced in the study.

The work method was represented by retrospective analysis of patients' observations papers. The study included infants who presented respiratory distress syndrome. We gathered data from each patient , like : year of birth, gestational age, sex, birth weight, Apgar score, mode of delivery, presentation, severity of respiratory distress syndrome, need for ventilatory support, mode of mechanical ventilation, surfactant administration, blood product administration, use of ventilation with mask and balloon in the delivery room, maternal corticosteroid administration and patient evolution.

Results and discussions

Between 1 January 2008 and 31 December 2013, in the Department of Neonatology "Bega" Timisoara, were born a total of 1,045 premature infants under 37 weeks gestational age, of which 483 premature infants developed respiratory distress syndrome. 163 premature infants had mild form of respiratory distress, 123 premature infants had medium form of respiratory distress and 197 premature infants had respiratory distress severe form. We observe that infants who presented severe form of respiratory distress had a higher prevalence (41%). (Fig. 1)

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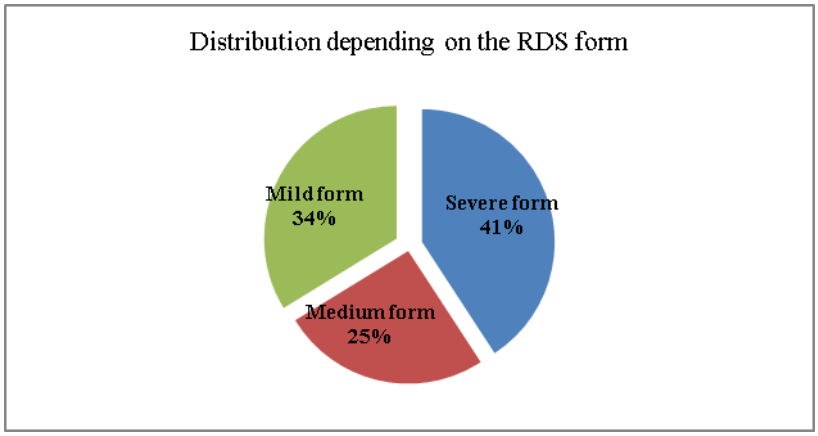

Fig. 1. Distribution of cases depending on the RDS form.

The distribution of the premature infants per year was: 2008-65 cases , 2009-72 cases , 2010-65 cases, 2011-103 cases, 2012-100 cases and 2013-78 cases. The distribution by gender was: 43% females and 57% males. We see a greater predisposition of males in the occurrence of respiratory distress syndrome.

Premature infants with respiratory distress syndrome who come by Caesarean section had a higher prevalence, 75% versus 25% who come by natural birth. Regarding to presentations, 361 premature infants were in cranial presentation, 91 premature infants were in pelvic presentation and 31 preterm infants were in transverse presentation.

Another criterion was gestational age. Most numerous premature infants were between 30-32 weeks - 37% , between 33-34 weeks - 24% , between 27-29 weeks -16% , between 35-36 weeks - 13% and between 24-26 weeks - 10% . (Fig. 2)

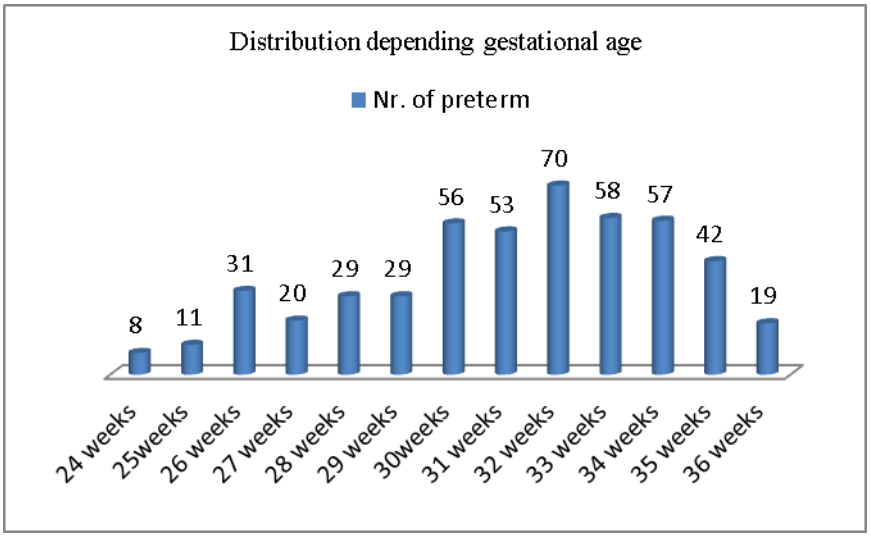

Fig. 2. Distribution of cases depending gestational age.

Another criterion was the Apgar score. Thus, there were 18 cases with Apgar score 1, 19 cases with Apgar score 2, 28 cases Apgar score 3, 31 cases with Apgar 4, 67 cases with Apgar 5, 60 cases with Apgar 6 , 128 cases Apgar 7 , 101 cases with Apgar 8 and 31 cases with Apgar 9. Distribution by birth weight was: under 1000 g = 15% 1000-1499g = 26%, 1500-1999g = 32% , 2000-2499g = 19% , over 2500g = 8%. Can be observed a higher prevalence in premature infants with birth weight between 1500-1999 g.

In the group studied 317 premature infants required positive pressure ventilation with mask and balloon at birth. Surfactant received 121 premature infants. Maternal antenatal corticosteroids were administered to 170 cases. Noninvasive ventilatory support (nCPAP) required 159 premature infants. In this study group 199 premature infants (41%) needed mechanical ventilation for respiratory support. Mechanical ventilation IPPV mode required 195 premature infants in the study group and 72 premature infants required SIMV mode. The duration of mechanical ventilation was 1-5 days in 126 cases (64%) , 6-10 days in 49 cases (25%), 11 to 15 days in 13 cases (6%), 16 to 23 days in 8 cases (4%) and between 28-43 days in 2 cases (1%). (Fig.3)

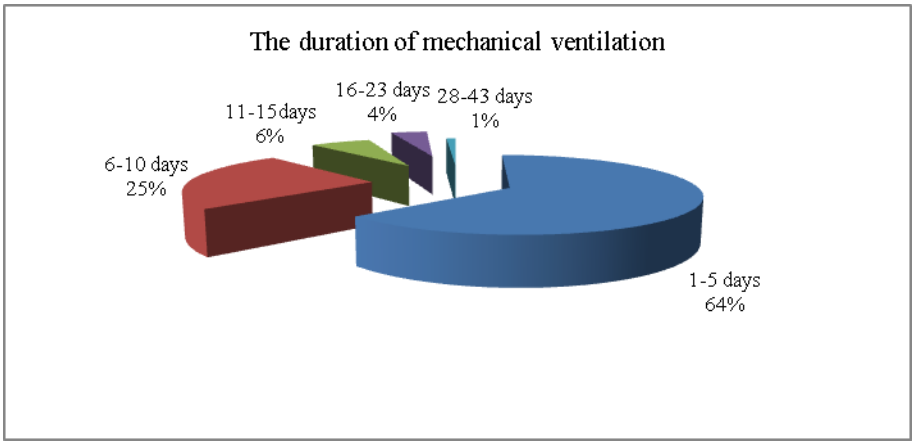

Fig. 3. The duration of mechanical ventilation.

Premature infants require in the majority also blood product administration. So, 169 cases received packed red blood cells, platelet received 71 premature infants , and fresh plasma received 233 premature infants.We notice that fresh plasma received a higher number of premature infants.

The evolution of premature infants relies on several factors. In the study group, 78% of premature infants had a favorable outcome and 22% of the cases had an unfavorable outcome.

Conclusions

1. Risk factors that increase the risk of respiratory distress syndrome are small gestational age, male sex, low birth weight, low Apgar score, caesarean section.

2. Most numerous premature infants were between 30-32 weeks.

3. Ventilatory support is needed more frequently to preterm babyes due to pulmonary immaturity and associated pathology.

4. Ventilatory support makes the prognosis of the premature infants favorable in the most of cases.

5. Premature infants required both invasive ventilatory support and noninvasive ventilatory support.

6. Mechanical ventilation in the IPPV mode was used more often than SIMV mode in our study group.

7. Early administration of surfactant decreases the incidence of complications, the duration of hospitalization and also increase survival of the premature infants.

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