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SURFACTANT THERAPY IN A PRETERM BABIES WITH ACUTE RESPIRATORY DISTRESS SYNDROME

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ABSTRACT. The authors propose to present their experience in 2 cases of an extreme preterm babies with neonatal respiratory distress who receive surfactant therapy through INSURE strategy. Both of the cases have a good evolution after this stategy, before the babies were transported to an upper level maternity.
KEYWORDS: respiratory distress, surfactant, preterm baby, INSURE, non-invasive ventilation

INTRODUCTION

The idiopathic respiratory distress syndrome is a preterm`s disease and it`s cause is a lung immaturity. The disease is also known as hialine membrane syndrome.

The incidence of these disease increase with the decrease of gestational age: the more premature baby is, the more increase the risk of respiratory distress syndrome. Because of the lung immaturity, the surfactant production is lower. The role of surfactant is to increase the pulmonary compliance and to prevent the alveolar collapse at the end of expiratory phase (Stoicescu, 2009).

The factors known for increase the risk of respiratory distress syndrome are : low getational age, male gender, the modality of delivery (C-section), perinatal hypoxia , chorioamnionitis, gemelarity and diabetes mellitus (Gomella 2009).

The risk factors for an unsuccessful INSURE therapy was gestational age (under 27 weeks), the absence of mother dexamethasone cure or the severe radiological signs (Daanei, 2017).

Untreated respiratory distresse syndrome can lead to death through neonatal hypoxia and respitaory failure. With an appropiate treatment, the evolution of this disease can be favorable.

MATERIAL AND METHODS

We present the clinico- paraclinical data of the two of preterm babies with idiopathic respiratory distress ant the techniques of surfactant administration, than.the particularities of the cases are discussed.

Case 1

Premature baby, 26 weeks gestational age, 700 g birth body weight, who was born in Arad County Emergency Hospital. The newborn was transferred in Timisoara, to an upper level hospital, according to the hierarchy of the maternities by the Ministry of Healt.

Heredocolateral antecedents

Mother- 37 years, higher education, married; G III, PI; 2 abortions on demand;Father- 45 years old; without medical problems.

Pregnacy

G III, PI, with normal follow-up. The pregnancy was a patological one, because of the induced arterial hypertension(HTA). There is no data about the treatment of the HTA in this pregnancy.

There is no cure of dexamethasone before delivery.

Delivery

The delivery took place in emergency, through cesarian section. The indication for cesarian section was: placentar abrubtion. The tipe of anesthesia was general, with endotraheal intubation. After induction, the mother receive propofol, before the extraction of the baby. The fetus was in a pelvine presentation. The Apgar Score was 1 at 1 minute, and 5 at 5 minute of life. The newborn received laborious cardio-respiratory neonatal resuscitation maneuvers: positivepressure balloon ventilation, chest compression, oro-tracheal intubation and drugs (intrafunicular adrenaline administration).

The newborn

The newborn (fig 1, 2), came from high obstetrical risk pregnancy (arterial hypertension, abrubtio placentae), well followed-up, born in emergency (without dexamethasone cure therapy) through cesarion section, 26 weeks gestational age, 700 g body weight, pelvine presentation, score Apgar 1 at 1 minute and 5 at 5 minute of life. The newborn received laborious cardio-respiratory neonatal resuscitation maneuvers: positivepressure balloon ventilation, chest compression, orotracheal intubation and drugs (intrafunicular adrenaline administration). The newborn was admitted in the Neonatal Intensive Care Unit (NICU), in a altereted condition, with neonatal severe respiratory distress (Silverman score = 8), acidosis and

shock. The newborn was placed in a open incubator and a venous umbilical catheter was placed. The treatment included hemostatic, normal saline solution in order to fill the vascular bed (for 2 times, 10 ml/kg body weight) followed by a continue dopamine infusion, acido-basic infusion and antibiotherapy in triple association.

The radiological examination confirme a hialine membrane disease type IV. Unfortunately, the newborn didn`t receive caffeine citrate (Peyona) in order to make a apneea prophylaxis, because of the lack of this drug in the hospital pharmacy.

At 1 hour of life, the newborn receive surfactant (Curosurf 200 mg/kg body weight) through oro-tracheal intubation , INSURE method (intubate, surfactant, extubate):. The endotracheal tube was 2mm size, and the insertion was at level 7 cm (,,tip to lipp,, method- 6 cm + kg body weight). The surfactant was administreted though a catheter with a smaller calibre than endotracheal tube. The oxigen saturation was increasing during surfactant administration, from 85% at begining, to 100% of the end of administration. The newborn was extubated and after was ventilated- NCPAP. The parameters of ventilation were: PEEP 5 cm H2O, Fi O2 61% (5L/min air şi 5 L/min oxigen).

The newborn was stable under ventilatory support (Sat O2 97%, TA 48/25 mmHg, MAP 32 mmHg, AV 132 bpm), but in a critical condition.

At 6 hours of life , the newborn was transferred in Timisoara, to an upper level hospital, according to the hierarchy of the maternities by the Ministry of Healt. The transfer was made with the Mobile Neonatal Intensive Therapy – SMURD, with the newborn endotracheal intubated and IPPV ventilated during the transport.

The ventilatory parameters during the transport were: PIP 20 cm H2O, PEEP 5 cm H2O, FR 40/min, Ti 0,3 sec and Te 1 sec.

Fig 1- Preterm baby, 26 weeks gestational age, during surfactant administration

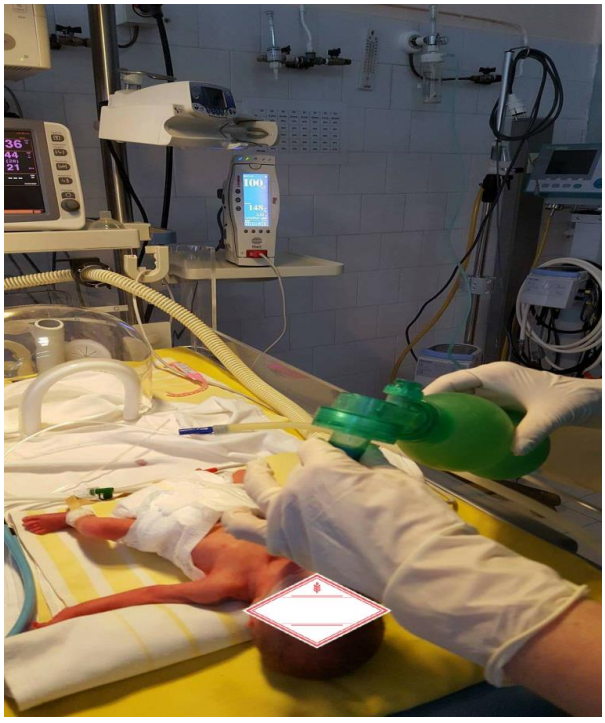

Fig 2- Preterm baby, 26 weeks gestational age, after surfactant administration

Case 2

Preterm baby, 27 weeks and 2 days gestational age, 900 g Birth body weight, born in Arad County Emergency Hospital. The newborn was transferred at 11 hours of age to Children s „Louis Turcanu " Timisoara , to an upper level hospital, according to the hierarchy of the maternities by the Ministry of Health. His mother was 23 years old.

Pregnancy

G I, PI, with normal follow-up. The pregnancy was not a patological one. There is no cure of antenatal steroids before delivery.

The delivery

Took place in emergency, through vaginal delivary. The indication was: a vaginal examination revealed 6 cm cervical dilatation which was also fully effaced and cephalic presentation . Apgar scores were 3 at 1 minutes and 4 at 5 minutes. The newborn received cardio-respiratory neonatal resuscitation maneuvers: positive pressurewith balloon ventilation.

An initial analysis of arterial blood gases showed a: Pco2 of 58mmHg, a pH of 7,19 and a base excess of –7,3 meq/l.

The newborn (fig 3) came from high obstetrical risk pregnancy , well followed-up, born in emergency (without dexamethasone cure therapy) through vaginal delivary, 27 weeks gestational age, 900 g body weight, cranian presentation, score Apgar 3 at 1 minute and 4 at 5 minute of life. The newborn received cardio-respiratory neonatal resuscitation maneuvers: positive pressure balloon ventilation. The newborn was admitted in the Neonatal Intensive Care Unit (NICU), in a altereted condition, with neonatal severe respiratory distress (Silverman score = 8), acidosis and arterial hipotension. The newborn was placed in a open incubator and a venous umbilical catheter was placed. The treatment included hemostatic, normal saline solution in order to fill the vascular bed (for 1 times, 10 ml/kg body weight) followed by a continue dopamine infusion with inotropic support , acido-basic infusion and empiric antibiotherapy.

The radiological examination confirme a hialine membrane disease type IV. Fortunately, the newborn received caffeine citrate (Peyona) in order to make a apneea prophylaxis.

At 30 minutes of life, the newborn receive surfactant (Curosurf 200 mg/kg body weight) through oro-tracheal intubation , INSURE method (intubate, surfactant, extubate):. the endotracheal tube was 3 Fr size, and the insertion was at level 7 cm (,,tip to lipp,, method- 6 cm + kg body weight). The surfactant was administreted though a catheter with a smaller calibre than endotracheal tube. The oxigen saturation was increasing during surfactant administration, from 75% at begining, to 100% of the end of administration. The newborn was extubated and after was ventilated-NCPAP. The parameters of ventilation were: PEE= 5 cm H2O, Fi O2= 61% (5L/min air and 5 L/min oxigen).

The newborn was stable under ventilatory support (Sat O2= 97%, TA= 48/25 mmHg, MAP= 32 mmHg, AV =132 bpm), but in a critical condition.

At 11 hours of life , the newborn was transferred in Timisoara, to an upper level hospital, according to the hierarchy of the maternities by the Ministry of Healt. The transfer was made with the Mobile Neonatal Intensive Therapy – SMURD, with the newborn endotracheal intubated and IPPV ventilated during the transport.

The ventilatory parameters during the transport were: PIP= 18 cm H2O, PEEP=4- 5 cm H2O, FR= 44/min, Ti=0,35 sec and Te= 1 sec.

Fig 3- preterm baby, 27 weeks gestational age, during non-invasive NCPAP ventilation, after surfactant administration

DISCUSSION

The clinical diagnosis in both cases was neonatal idiophatic respiratory distress in a preterm baby. The diagnosis was completed by the radiologic features.

The prophylactic surfactant therapy is necesarry under 26 weeks gestational age in the first 15 minutes of live. In the first case, the surfactant therapy was early applied because of the increase necesarry of oxygen. In the second case, the indication of surfactant administration was the increased oxygen necesary and the absence of mother dexamethasone prophylactic cure.

The INSURE statregy (intubation- surfactant administratin-extubation) was efficiency in both of the cases, and the respiratory distress ccould be non-invasive treated, without mechanical ventilation.

In the first case the risk factors for an unsuccessful INSURE therapy was gestational age (under 27 weeks) and the absence of mother dexamethasone cure, and in the second case- the male gender and also the absence of mother dexamethasone cure.

During the surfactant administration, the babies were continuous monitorisated. The increased oxigen saturation during surfactant administration was a certitude of a good maneuvers.

Because of a good colaborations between our clinic and ,,Luis Turcanu,, Timisoara Children Hospital, the babies were transported in a secure condition to this upper level hospital, according to the hierarchy of the maternities by the Ministry of Healt. The transfer was made with the Mobile Neonatal Intensive Therapy – SMURD. It is noted that the babies were transferred in the first 6- 12 hours of life, after a good stabilisation.

CONCLUSSIONS

-Surfactant therapy can be performed in a lower level hospital in order to stabilise a preterm babies
-The INSURE strategy was efficiency in both cases
-Non-invasive CPAP ventilation can be use in acute respiratory distress due to a surfactant deficiency
-The succes of surfactant administration and non-invasive ventilation was a good and continuou monitorisation
-The secure neonatal transport to an upper level hospital also contributed to a good evolution of these cases

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