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The Interest of Non-Invasive Ventilation in The Management of Respiratory Pathology of Premature Newborns at Ehs Nouar Fadela

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ABSTRACT

The rate of prematurity has increased markedly over the last 20 years. These preterm infants have a high risk of morbidity, especial respiratory, compared to full-term infants. Nasal continuous positive airway pressure (NCPAP) has significantly improved the prognosis of this respiratory distress (MMH).

The objective: **The objective of this work was to study risk factors and management of respiratory pathology in premature newborns at the EHS NOUAR FADELA.**

Patients and methods: **This is a retrospective, descriptive, mono-centric study including all newborns having recourse to CPAP and managed in a level IIb maternity hospital at the E Nouar Fadela between January 2019 and June 2021. Pearson's Chi-squares were used for statistical testing. A p-value<0.05 represented a statistically significant difference.**

Results: **We recorded 12633 deliveries of which 623 were preterm births representing 4.93% of births. For maternal characteristics: the average age was 29 ±5.57 years. Maternal morbidity was present in 20.9% gravidic hypertension and 11.7% gestational diabetes. Neonatal morbidity was dominated in preterm newborns was respiratory distress in 41.4%. Mechanical ventilation was necessary in 12.6% of cases. The two main causes of respiratory distress were MMH, maternal-fetal infection, respiratory distress, and respiratory failure. Significant risk factors for respiratory distress were gestational age, male sex and pre-labour caesarean birth (p<0.05).**

Conclusion: **The use of NIV in newborns with respiratory distress is not negligible. Our results confirm the effectiveness of NIV. It is also essential to limit the use of pre-labour caesarean section to these terms whenever possible.**

Keywords: NCPAP: continuos positive airway pressure, NRD: neonatal respiratory distress, SA: weeks of amenorrhea, VNI: non-in Nasal.

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I. Introduction

Prematurity is defined as a birth occurring before the 37th week of amenorrhoea (sa), calculated from the first day of the last menstrual period. it remains today the major concern of obstetric and neonatal teams. late preterm or 'near term' babies represent 70-75% of all preterm births [1].

Recent studies have shown an increased rate of respiratory morbidity in preterm newborns compared to term newborns [2], [3]. Respiratory failure is the leading cause of neonatal death. up to 33% of preterm infants require mechanical ventilation in neonatal intensive care units [4] the aim of this study was to investigate the risk factors for respiratory pathology in preterm infants.

II. Study Population

The objective of this work to study risk factors and management of respiratory pathology in premature newborns at the EHS NOUAR FADELA.

Patients and methods. This is a retrospective, descriptive, mono-centric study including all newborns who had recourse to CPAP and were managed in a level IIb maternity hospital at the EHS.

III. Data Collection

The study data were entered retrospectively from the medical records and collected on a survey form. The causes of maternal morbidity, pregnancy-related complications (gestational toxaemia, gestational diabetes, retroplacental

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haematoma), indications for induction and mode of delivery as well as the administration of ante-natal corticosteroid therapy were recorded. Neonatal characteristics were noted (gender, term, anthropometric data, Apgar score). Neonates with signs of re-traction, cyanosis or persistent oxygen deprivation beyond [2] hours of life were identified. Respiratory distress (RD) was considered severe when the Silverman score was >6 or the oxygen requirement >40% and was considered severe when the Silverman score was between 4 and 6 or the oxygen requirement between 21 and 40%. The elements of respiratory management were the use of non-invasive ventilation, exogenous surfactant, and caffeine citrate. Prescription of antibiotic therapy.

IV. Statistical Methods

The information collected was coded and entered for analysis in Excel. The qualitative variables were' summarized by their frequency and percentage and the quantitative variables by their mean and standard deviation. The analytical study focused on the risk factors associated with the occurrence of neonatal respiratory distress. It was carried out using the Chi-square test. A probability of less than 5% ($p < 0.05$) was considered significant.

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V. Results

We recorded 12633 deliveries, including 623 premature babies, representing 4.93% of births.

A. Maternal Characteristics

The average age was 29 ±5.57 years. In our study, 0.5% of the premature babies were born to early mothers and 26.5% to late mothers. Maternal morbidity was presented in 20.9% gravidic hypertension and 11.7% gestational diabetes. The caesarean section rate was 61% (Table I).

In the three pregnancy terms, the average prematurity is the majority with a rate of 62.9%. According to our results, the average birth weight is 2088.18 ± 66,548 g. The male sex is predominant in 357 / 636 cases (56.13%). We found 2 cases of sexual ambiguity, with a sex ratio of 1.27. The majority of premature babies present in our neonatology department exceed 1500. According to the results of our study, the Apgar rate between 7 and 10 is 67.4%.

The number of premature babies who were resuscitated in the neonatology department was 35.5%. The average length of stay was 6.9 days (1-50 days). The most common pathology that led to hospitalization was DR.

The number of preterm neonates who received caffeine citrate was 17 %, 6.9 % of preterm neonates received surfactant, 49.8 % of preterm neonates received oxygen therapy and the use of CPAP in 13% of cases. The number of preterm newborns who received CPAP oxygen therapy is 12.4% of preterm newborns.

The main causes of respiratory distress were hyaline membrane disease, maternal-fetal infection and transient tachypnea. Risk factors for respiratory distress were gestational age, male sex and pre-labour caesarean delivery.

TABLE I: Maternal Characteristic

	Percentage (%)
Multiple Pregnancies	16
History Of Prematurity	13
History Of Abortion	23
Antenatal Corticosteroid Therapy	32

TABLE II: Risk Factors for Respiratory Distress in Premature Birds

Gestational Age	Percentage (%)	P
22-27 weeks	39	0.004
28-32 weeks	29.4	
33-37 WA	17.1	
Male sex	56	0.049
Mode of delivery	39.2	0.01

TABLE III: Indication For Non-Invasive Ventilation

Respiratory diseaes	Percentage (%)
Mmh	82.2%
Desaturation	13.3%
Apnea	4.4%

VI. Discussion

The incidence of prematurity at EHS Nouar Fadila was 5.03% over the two and a half years. This incidence reflects the good care of premature babies born in Algeria compared to African countries. The following table shows the incidence of prematurity in some African countries.

The who classification of prematurity is based on stages of functional maturation of the different organs:

- before 28 weeks' gestation, immaturity is extreme, the general homeostasis of the organism is difficult to maintain, the vital prognosis is severe.
- beyond 32 weeks, the prognosis for life and brain is generally good, subject to appropriate medical care, thus demonstrating a real capacity for adaptation of the premature baby to the extra-uterine environment.

The classification of premature babies is not constant in the different contexts, the limit of viability is not the same, the technical facilities are not the same everywhere, which does not allow comparisons to be made of the distribution of premature babies in the literature.

In our study, very premature birth occupies less space than the other classes of prematurity with a percentage of 9.3%. This could be explained by the maintenance of the pregnancy

by corticosteroid therapy. The difference with the other series could be explained by an early awareness of the problem of prematurity at their level long before ours. The following table summarizes the geographical distribution of premature babies in Tunisia, Morocco [1].

Increasingly, studies have focused on women living alone rather than unmarried women, as social habits often tend to lead to couples living together without a marriage contract. But a recent French study has shown that there is a high risk of preterm birth both in cohabitation and in single mothers living alone. There is no risk associated with marital status, especially when births outside marriage are very frequent. In our population, premature babies born out of wedlock represent a small percentage of 1.4%. The controversies with our study can be explained by the fact that the study populations are different in number but also by the types of studies [11].

It is no longer necessary to demonstrate that maternal age is a determining factor in the continuation of gestation to term. The many authors have reported in their studies the marked effect of late maternal age on prematurity. This is explained by the increased risk of complications during pregnancy when the age is high, which may lead to medical termination of the pregnancy. However, this finding is not shared by all series. Other studies report that in addition to late maternal age, early parturient are also a risk group. This is the case in the Togolese study, where these factors are very significantly associated with prematurity [2], [4].

The indicative Apgar values and the course of action:

- Score of 4, 5 or 6: the airway should be cleared, and the newborn should be ventilated.
- Score of 0, 1, 2 or 3: urgent care such as cardiac massage and resuscitation is initiated.

In our study we found that 67.6% of preterm infants had an Apgar of more than [7], while 32.6% of preterm infants had an Apgar of less than [7], which reflects good respiratory activity in preterm neonates, following the use of surfactant and caffeine citrate by the service personnel.

In published studies, the proportion of pre-labor caesarean sections is even higher [5], [6]. The primary cause of DR in our series was maternal-fetal infection followed by transient tachypnea. In the literature, the main cause is hyaline membrane disease [1], [5], [7].

One third of our patients with respiratory distress required ventilation. This high rate could be explained by the high maternal morbidity rate. In a study including a population of newborns, assisted ventilation was required for 10-17% of 34 SA. Other authors found a ventilatory support rate of 23% [5].

The causes of respiratory' morbidity in late prematurity are multiple and interrelated. Preterm birth by elective caesarean section increases the risk of transient tachypnoea by combining the existence of pulmonary immaturity, disruption of pulmonary fluid resorption and the absence of labor stimuli.

Studies have shown that caesarean section is an independent risk factor for neonatal respiratory distress syndrome, which was summarized in a recent meta-analysis [9]. The role of ante-natal corticosteroid therapy in reducing the risk of respiratory distress in the preterm newborn has been well established for several years. In addition to their stimulatory effect on the surfactant system, it has been' well 'shown' subsequently that ante-natal corticosteroid therapy in late preterm infants improves their respiratory prognosis by accelerating lung maturation [10], [11], [15]. Our study also identified a risk of idiopathic apnoea of the preterm infant'. These apnoeas occur in 4 to 7% of cases according to the studies [12], [13]. This risk is partly explained by the immaturity of the central nervous system [14].

VII. Conclusion

Preterm infants have a high risk of morbidity, particularly respiratory. The use of NIV in neonates with respiratory distress is not negligible. Our results confirm the effectiveness of NICP. It is also essential to limit to these terms the recourse to caesarean section before labour as far as possible.

Conflict of Interest

Authors declare that they do not have any conflict of interest.

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