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ORIGINAL ARTICLE

High Prevalence of Neonatal Respiratory Distress and its Possible Etiologies in NICU in Syria

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Abstract

Introduction: Neonatal Respiratory Distress (NRD) is one of the most causes of hospitalization in Neonatal Intensive Care Units (NICU) worldwide in both preterm and full-term neonates. Its prevalence and etiologies vary according to several geographic, ethnic and service factors. We aimed to determine Prevalence and etiologies of NRD in NICU in Tishreen University Hospital in Lattakia, Syria.

Methods: A prospective cross-sectional study was conducted through the period from June 2020 until June 2021. Data were collected from all patients with NRD during this period.

Results: 460 newborns were admitted to NICU, 160 of them developed neonatal respiratory distress with a prevalence of 36.1%. The commonest etiologies of NRD were early onset neonatal infection (69%), transient tachypnea of the newborn (30.7%) and congenital heart defects (18%).

Conclusion: this study showed a high prevalence of NRD which makes it a widespread and alarming problem for the general health of the newborn, but fortunately most of its etiologies are preventable.

Keywords

Neonatal respiratory distress, Transient tachypnea of the newborn, Early neonatal infection, Hyaline membrane disease

Abbreviations

NRD: Neonatal Respiratory Distress; NICU: Neonatal Intensive Care Unit; CBC: Complete Blood Count; CRP: C-Reactive Protein; CT: Computed Tomography; CSF: Cerebrospinal Fluid; TTN: Transient Tachypnea of the Newborn; HMD: Hyaline Membrane Disease; CHD: Congenital Heart Defect

Introduction

Neonatal Respiratory Distress was defined by the Swiss Society of Neonatology in 1972 as a clinical picture based on five signs and symptoms (tachypnea > 60/min, central cyanosis in room air, nasal flaring, retractions and expiratory grunting) [1]. NRD is a public health concern of the newborn and is responsible for 30-40% of admissions in neonatal units [2]. The severity of NRD could be evaluated by two scores, Silverman-Anderson Score and Downes' Score [3,4]. NRD includes a variety of diseases with varied prevalence, etiology, morbidity and mortality [5]. The underlying cause of respiratory distress in a newborn varies and does not always lie within the lungs [6]. The search for a diagnosis must begin within the first minutes of examining the child. The initial assessment of the child with respiratory distress aims to identify life-threatening situations that need to take immediate measures to save the child's life [2]. Delayed recognition of symptoms and treatment of underlying causes of neonatal dyspnea leads to short and long-term sequelae including chronic lung disease, respiratory failure and even death [7,8].

Therefore, it is necessary to raise the question about the prevalence of this condition in neonates, and to know the most important causes responsible for it, especially in the current circumstances that our country is going through, which will form a basis from which to develop proposals aimed at reducing the frequency of the factors responsible for this condition and to act quickly and properly towards the affected neonates.

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Patients and Methods

In this prospective cross-sectional study, all neonates admitted to NICU of Tishreen university hospital were observed for neonatal respiratory distress.

Data were collected for each neonate with NRD: obstetric history, age when admitted, birth weight, sex, mode of delivery, resuscitation details, and gestational age based on last menstrual period date and need for intubation.

We performed complete blood count (CBC), C-reactive protein (CRP), blood sugar, chest X-Ray for all neonates with NRD. When there is an indication, other investigations were performed, such as blood electrolytes, blood culture and sensitivity, urine culture and sensitivity, cerebrospinal fluid (CSF) culture and sensitivity, arterial blood gases, echocardiography, Cranial ultrasound, Barium esophageal imaging, chest computed tomography (CT). Results were analyzed using SPSS 16. Descriptive statistics were used in analyzing results.

Results

The number of neonates admitted to NICU during the study period was 460, and the number of neonates presented with Neonatal Respiratory Distress (NRD) 166 neonates with a prevalence of 36.1%. The gestational age ranged from 27 to 41 weeks, and the average gestational age was 38 weeks. 67.5% of cases were males with Sex Ratio (M: F) = 2.07:1.

58 cases of studied group weighed less than 2.5 kg, and 108 cases weighed 2.5-4 kg. No newborn weighed more than 4 kg.

60.2% of neonates were born with an elective caesarean section, 30.1% with an emergency caesarean section, and 9.6% with a normal vaginal delivery.

The main etiologies of NRD in the studied group were early neonatal infection (68.6%) including pneumonia and septicemia, transient tachypnea of the newborn (TTN) (30.7%), congenital heart defects (CHD) (18%), surgical conditions (9.6%) and hyaline membrane disease (HMD), also known as Neonatal Respiratory Distress Syndrome (NRDS) (9%) (Table 1).

Most neonates with early neonatal infection and TTN were ≥ 37 gestational weeks weighing between 2.5 and 4 kg also most of them were males and were delivered by elective cesarian section.

Discussion

In this study, NRD accounted for 36.1% of all NICU admissions during the fore mentioned period. We have no previous data in our country to compare with. In comparison to other international studies, many of them reported lower percentage. Zaman, et al. in Saudi Arabia found that only 4.24% of all admissions presented with NRD [9]. Also, the prevalence of NRD was 6.4% by Dutta, et al. in India [10]. Conversely, it was 88.4% in a study conducted at Egypt by Zaazou, et al. [11].

This discrepancy in prevalence rates among studies may be due to the difference in the size of study sample on one hand, and the different level of prenatal care and the availability of advanced health centers between different countries on the other hand which regressed during the last period in our country due to the current circumstances that it is going through.

It was also noted that most neonates with NRD were born with elective cesarian section. This may be related to an early gestational age upon delivery and delayed post-partum care and services.

The most common cause of neonatal respiratory distress (NRD) in the current study was early neonatal infection with a rate of (68.6%), including congenital pneumonia (36.7%) and sepsis (31.9%). Similar data were reported by Tochie, et al. in Cameroon [12] and Mehta, et al. in India [13]. This may be due to the high rate of streptococcal infection among pregnant women in our country and the lack of routine streptococcal testing during pregnancy [14].

TTN was the second most common cause, it constituted 31% of cases. While TTN was the most common cause in most other studies, such as Wadi's study in Iraq in 2012 [15].

Congenital heart defects CHD constituted the third cause by 18%, while it constituted only a small percentage in most studies such as the study of Wadi and Kareem in Iraq [15], where CHD accounted for 7.8% and Dutta's study in India (3.3%) [10]. The high rate of CHD in the current study may be due to the high environmental risk factors of CHD in our society under the current conditions, such as untreated infections in the mother, psychological distress in the mother during the first period of pregnancy and the low level of mother's education [16].

The rate of Hyaline Membrane Disease) HMD (was

Table 1: Spectrum of diagnosis of cases with respiratory distress.

Etiology of NRD	Frequency	Percent
Early neonatal infection	114	68.60%
Transient tachypnea	51	30.70%
Congenital heart defects	30	18%
Surgical conditions	16	9.60%
Hyaline membrane disease	15	9%
Birth Asphyxia	10	6%
Neurological causes	8	4.80%
Anemia	6	3.60%
Meconium aspiration syndrome	4	2.40%
Esophageal reflux	2	1.20%

low in the current study compared to other studies, as it constituted only 9% of the total causes of NRD, while it was the most common cause in many studies such as Palod's study in India [17] and Abedami's study in Nigeria [18]. This low prevalence rate of HMD may be due to the use of antenatal steroids in our center. Knowing that surfactant is rarely used in preterm neonates due to its low availability and high price in Syria after the crisis.

Conclusion

This study is the first study of its kind in Syria and it showed a high prevalence of neonatal respiratory distress. All Syrian pediatricians and pediatricians around the world should be aware of our results. The most common cause of NRD in our study was early neonatal infection, followed by transient tachypnea of the newborn, then congenital heart defects.

Obstetrics and Gynecology physicians should be aware of the importance of routine vaginal swab for streptococcus during pregnancy which, when treated, may lower significantly the incidence of streptococcal neonatal infection responsible for most cases of NRD.

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