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Clinical Profile of Neonatal Pneumonia in NICU of A Secondary Care Center

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Abstract
Background: *Neonatal pneumonia is a serious respiratory infectious disease which is very common in worldwide.*
Objective: *in this study our main objective is to assess clinical profile of neonatal pneumonia in NICU of a secondary care center.*
Method: *this cross sectional study was done at secondary care center from March 2015 to march 2017 among 100 neonates. All neonates' data were recorded and analyzed through SPSS version 20 (SPSS, Chicago, IL).*
Results: *in the study most of the patients were male 62% and prolonged rupture of membrane was documented in majority of the enrolled newborn patients 86%. Also majority 78% of the neonatal pneumonia was cured while 2% left against medical advice and 20% died during their hospital course.*
Conclusion: *after many examination we can conclude that establishment of secondary level newborn care units is a feasible option that will help to minimize overall incidence of pneumonia among neonates. Further study is needed for better outcome near future.*
Keywords: *Neonatal pneumonia, NICU, Bacterial infection.*

Introduction

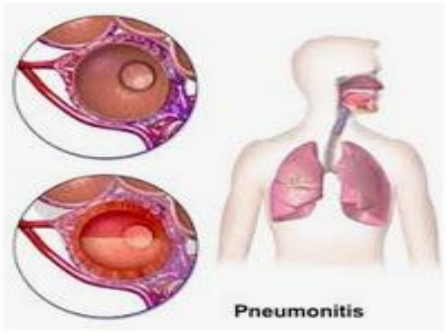
Pneumonia is the most collective invasive bacterial infection after primary sepsis. Early-onset pneumonia is part of widespread sepsis that first manifests at or within hours of birth .Late-onset pneumonia typically occurs after 7 days of age, most usually in neonatal ICUs among infants who require prolonged endotracheal intubation because of lung disease which is called ventilator-associated pneumonia.

Pneumonia is an inflammatory pulmonary process which may originate in the lung or be a focal

difficulty of a contiguous or systemic inflammatory process. It is one of the foremost fatal childhood diseases.

As a significant cause of neonatal infection pneumonia accounts for significant morbidity and mortality, with the highest case fatality rate in developing countries. Global neonatal pneumonia is assessed to account for up to 10% of childhood mortality. Around four million childhood death in developing countries happens due to this fatal disease. Neonatal pneumonia may be acquired by intrauterine, or postnatal).[1][2][3]

The pathogens comprise mainly bacteria, followed by viruses and fungi which encourage an inflammatory pulmonary condition, causing epithelial injury to the airways. Early onset pneumonia is typically caused by ascending infection from maternal genital tract across the membranes, and the baby is often septicemic at birth. Pneumonia of late onset is classically caused by nosocomial infection especially in mechanically ventilated patients after 48 hours of mechanical ventilation.



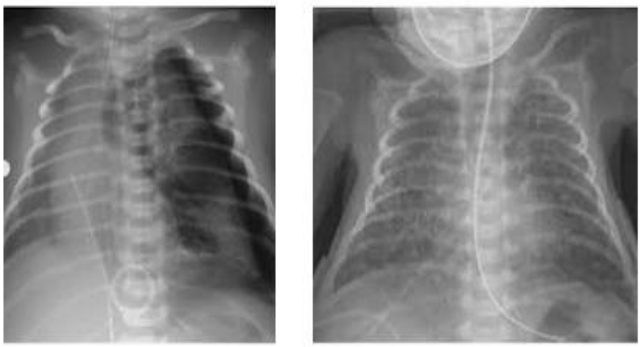


Figure-1a and 1b: Neonatal pneumonia and CT scan report of neonatal pneumonia

Though pneumonia is an important cause of morbidity and mortality among newborn infants, its prompt documentation and treatment remain difficult because radiographic changes may be due toatelectasis or noninfectious diseases such as bronchopulmonary dysplasia rather than infection and infants hardly undergo invasive diagnostic procedures such as bronchoscopy.[4][5]

In this study our main goal is to evaluate clinical profile of neonatal pneumonia in NICU of a secondary care center.

Objective

General objective

- To evaluate clinical profile of neonatal pneumonia in NICU of a secondary care center

Specific objective

- To identify potential risk factors for early onset pneumonia.
- To detect manifestation of neonatal pneumonia in patients

Methodology

Study type: This was a cross sectional study**.**

Study place and period

This cross sectional study was done at Sadar Hospital, Satkhira (A Clinical teaching hospital of Satkhira Medical College, special department of pediatrics) from March 2015 to march 2017 among 100 neonates.

Method

The baby was assessed in between feeds and in quiet state. Respiratory rate was noted for full 1 minute with the help of stop watch in another hand. Pneumonia was diagnosed in the presence of respiratory distress with: (*a*) Radiologic features suggestive of pneumonia with or without Positive blood culture. Respiratory distress is categorized by any of the following: (*a*) noisy or difficult breathing; (*b*) respiratory rate >60/min; (*c*) chest retraction; (*d*) cyanosis and (*e*) grunting. All radiographs indicative of pneumonia were studied by a radiologist who was blinded of clinical findings of enrolled newborns. Then pneumonia was considered into early onset pneumonia, nosocomial pneumonia, community acquired pneumonia and ventilator associated pneumonia. After registration all neonates were subjected to clinical assessment by: history taking,

with patient data, antenatal and perinatal history, clinical examination, laboratory surveys including complete blood count, C-reactive protein (CRP), blood culture, chest radiography on admission and repeated as required, and arterial blood gases. Follow up period of the babies were till discharge from the hospital or death. Total period of respiratory therapy and hospital stay were also documented.

Data analysis

Data analysis was performed using SPSS version 20 (SPSS, Chicago, IL). The analysis of patient demographics and baseline outcome variables were summarized using descriptive summary measures: expressed as mean for numerical variables and percent for categorical variables.

Results

In figure-2 shows gender distribution of the patients where most of the patients were male 62% and only 38% female. The following figure is given below in detail:

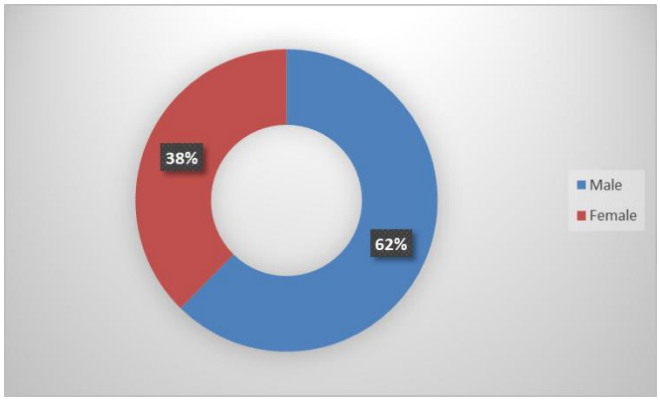


Figure-2: Gender distribution of the patients.

In table-1 shows demographic characteristics of enrolled patients where pneumonia was higher among out born delivery (57%) and 81% had documented maternal risk factor for early onset sepsis. The following table is given below in detail:

Table-1: Demographic characteristics of enrolled patients

variable	%	Mean ± SD
Delivery: • Outborn delivery • Inborn delivery	57% 43%	
Mode Of Delivery: • Vaginal • LUCS	30% 70%	
Maternal risk factor for EOP: • Yes • No	81% 19%	
Birth weight		2395±855
Gestational Age		34±40

In figure-3 shows potential risk factors for early onset pneumonia where prolonged rupture of membrane was documented in majority of the enrolled newborn patients 86%. Followed by maternal fever 7.1%, foul smelling liquor 4%, repeated per vaginal examination 2.9%. The following figure is given below in detail:

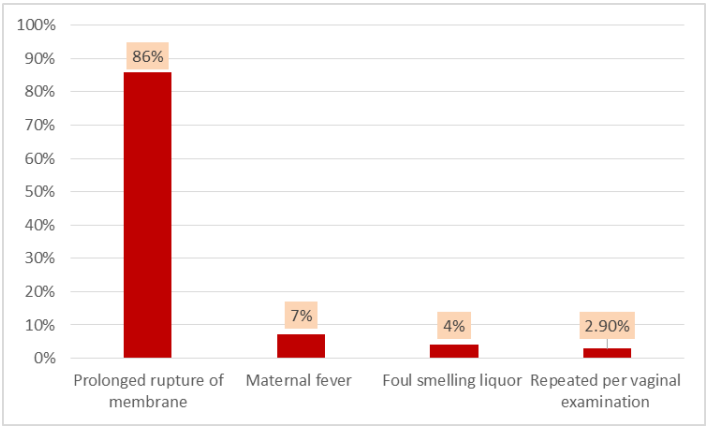


Figure-3: Potential risk factors for early onset pneumonia.

In table-2 shows manifestation of neonatal pneumonia in patients where tachypnoea was the commonest respiratory manifestation among other manifestation. The following table is given below in detail:

Table-2: Manifestation of neonatal pneumonia in patients

Variable	%
Tachypnoea	75%
Chest retraction	12%
Nasal flaring	9%
Lethargy	4%

In figure-4 shows frequency of bacterial pathogen isolation from enrolled patients with pneumonia where out of 100 cases blood culture was positive in 22 cases. The following figure is given below in detail:

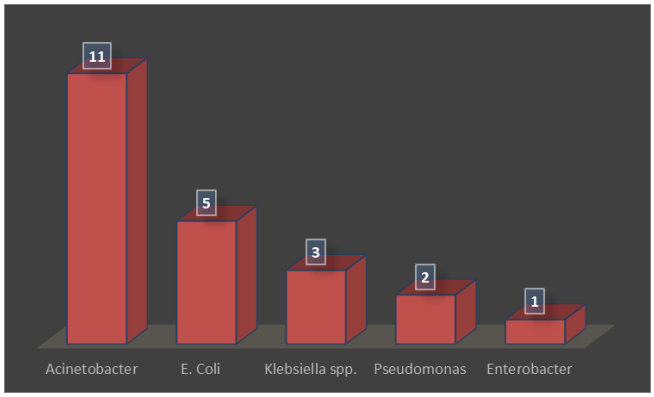


Figure 4: Frequency of bacterial pathogen isolation from enrolled patients with pneumonia

In table-3 shows duration of hospital stay and post treatment outcome of the patients where mean duration of hospital stay was 20±8 days. Majority 78% of the neonatal pneumonia was cured while 2% left against medical advice and 20% died during their hospital course. The following table is given below in detail:

Table 3: Hospital stays and post treatment outcome of the patients

Variable	Mean ± SD	%
Duration of hospital stay	20±8 days	
Post treatment outcome: Cured: Died: Left against medical advice:		 78% 2% 20%

Discussion

In this study, a total of 100 neonatal pneumonia cases were comprised over two year's duration, mean of birth weight and gestational age was 2395±855grams and 34±40 weeks respectively. In this study, the mean of birth weight of pneumonia cases was lower which was similar to the result obtained by one study. [6]

Also lower mean gestational age of infants with pneumonia were recognized which was in agreement with other studies enrolled ventilator associated pneumonia cases only.

In this study, the distribution of pneumonia was slightly higher among out born delivery (57%) and 20% died during their hospital course. which is lower than that reported from other studies.[7][8][9] Wide range of mortality rate from 8% up to 48% was reported in a review of relevant studies done in developing countries.[10] Eight percent death was described in a study done in the emergency department of a referral centre of India.[11] In this study we noted that prolonged rupture of membrane was documented in majority of the enrolled newborn patients 86%. Followed by maternal fever 7.1%, foul smelling liquor 4%, repeated per vaginal examination 2.9%.one study reported that risk factors are often absent in babies who develop pneumonia of early onset and prolonged rupture of membrane(>18hours) were documented in most of the cases (85%) of early onset pneumonia.[12]

In the current study, bacterial etiology of pneumonia was established only in 22 out of 100cases; the yield is low in comparison to other studies.[13][14] The most common pathogen isolated was acinetobacter (11 cases) followed by E coli (5 cases) and Klebsiella (3 cases). Acinetobcter was very uncommon findings in earlier studies done in Indian subcontinent.[10]Increasing frequency of Klebsiella isolation was detected in several studies done in developing countries on neonatal pneumonia.[15][16]

Conclusion

After many examination we can conclude that establishment of secondary level newborn care units is a feasible option that will help to minimize overall incidence of pneumonia among neonates. Further study is needed for better outcome near future.

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