ORIGINAL RESEARCH PAPER
Volume - 10 | Issue - 04 | April - 2021 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

CLINICOAETIOLOGICAL STUDY ON RESPIRATORY TRACT INFECTION IN CRITICAL CARE UNITOF ATERTIARY CARE HOSPITAL

Medicine

Dr. Sourav Kundu RMO, School of Tropical Medicine, Kolkata, WB.
Dr. Bibhuti Saha* Prof and HOD, School of Tropical medicine, Kolkata, WB. *Corresponding Author
Dr. Debarshi Jana IPGMER and SSKM Hospital, Kolkata, WB.

ABSTRACT

Introduction: Infections of the lower respiratory tract is one of the common and important causes of human disease from the points of view of morbidity, mortality and economic cost to society. A new study has found that about 3.6 million people have died due to the two most common chronic lung diseases in 2015.1 According to the study, in 2015, about 3.2 million people worldwide succumbed to chronic obstructive pulmonary disease (COPD) - caused mainly by smoking and pollution - while 400,000 people died from asthma.
Aims And Objective: Study of clinical, laboratory and radiological features of LRTI cases in CCU, Identification of organisms causing LRTI and their resistance pattern. To study the outcome of treatment.
Materials And Methods: In Patients Department CCU of Carmichael Hospital for Tropical Diseases (CHTD), School of Tropical Medicine (STM), Kolkata. July 2018 to June 2019 Patients >18 years of age of both sexes with LRTI diagnosed by history, clinical findings, laboratory tests, radiological findings.
Result And Analysis: 11(22.0%) patients had BI LAT lower lobe patchy pneumonitis, 12(24.0%) patients had BI LAT syn pneumonic effusion, 6(12.05) patients had L lower lobe consolidation, 6(12.0%) patients had L sided pneumonitis, 14(28.0%) patients had R sided pneumonitis and 1(2.0%) patient had R upper lobe pneumonitis. 26(52.0%) patients had ventilation. 24(48.0%) patients had sputum. 26(52.0%) patients had ET tube suction. 14(28.0%) patients had Acinetobacterbaunnii complex, 20(40.0%) patients had Klebsiellapneumoniae, 3(6.0%) patients had Proteus mirabilis, 7(14.0%) patients had Pseudomonas aeruginosa, 5(10.0%) patients had Staphylococcus aureus and 1(2.0%) patients had Staphylococcus haemolyticus.
Conclusion: There is use and misuse of the broad spectrum antibiotics that has given rise to this problem. The lack of a definite antibiotic policy is a matter of great concern in management of LRTI. To conclude, this study suggests that the most common organism isolated in lower respiratory tract infections is Acinetobacterbaunnii complex, Klebsiella pneumonia, Pseudomonas aeruginosa, Staphylococcus haemolyticus and Proteus mirabilis among Gram negative bacilli and Gram positive cocci respectively of which mortality rate is very significant in Acinetobacterbaunnii complex and Klebsiella pneumonia infection. By knowing the etiological organism and their antibiotic sensitivity pattern of this organism every institution have their specific use of antibiotic policy can be drafted.

KEYWORDS

Clinicoaetiological, Respiratory Tract And Critical Care

INTRODUCTION

Infections of the lower respiratory tract is one of the common and important causes of human disease from the points of view of morbidity, mortality and economic cost to society. A new study has found that about 3.6 million people have died due to the two most common chronic lung diseases in 2015.[1] According to the study, in 2015, about 3.2 million people worldwide succumbed to chronic obstructive pulmonary disease (COPD) - caused mainly by smoking and pollution - while 400,000 people died from asthma. According to WHO estimates in 2015 respiratory infections caused about 3.6 million deaths in India of which 3.1 million were due to acute lower respiratory tract infections (ALRI). The burden of the disease in terms of DALYs (Disability Adjusted Life Years) lost was 31.5 million, of these 28.3 million were due to ALRI.[2]

Acute respiratory infections (ARI) may cause inflammations anywhere in the respiratory tract from nose to alveoli with a wide range of combinations of symptoms and signs. ARI is often classified by clinical syndromes depending on the site of infection and referred as ARI of upper or lower respiratory tract. LRTI is more frequently used term in day to day practice.

The upper respiratory tract infection includes common cold, otitis media, sinusitis, pharyngitis, laryngitis epiglottis; the lower respiratory tract infections (LRTI) include laryngotracheitis, bronchitis, bronchiolitis and pneumonia. However, bronchiolitis does not occur in adult. LRTIs are very common, with an incidence in world population of 40-50 per 1000. [3] Every year approximately 7 million people die worldwide as a direct consequence of acute and chronic respiratory infections. It is estimated that Bangladesh, India, Nepal and Indonesia together account for 40% of the global burden of mortality due to respiratory tract infections.

In India, during the year 2011, about 26.3 million cases ARI were reported. During 2011 about 2492 people died of ARI and 2770 died of pneumonia. Pneumonia affects approximately 450 million people globally per year, (seven per cent of population) and results in about 4million deaths mostly in the third world countries.

Disease rates and mortality are higher in developing than industrialized countries, with majority of deaths occurring in Africa &Asia. LRTI can be difficult to distinguish from upper tract infection [4] and not all lower respiratory tract symptoms are due to an infection in the community is also difficult, particularly without diagnostic radiology.

Evidence suggests that no combination of symptoms or clinical findings i.e. pulse, respiratory rate, blood pressure, temperature, and proper chest examination can reliably confirm the diagnosis of pneumonia.[5]

1.Study of clinical, laboratory and radiological features of LRTI cases in CCU
2. Identification of organisms causing LRTI and their resistance pattern
3. To study the outcome of treatment.

MATERIALS AND METHODS

Study Setting:
In-Patients Department CCU of Carmichael Hospital for Tropical Diseases (CHTD), School of Tropical Medicine (STM), Kolkata.

Study Period:
July 2018 to June 2019

Definition Of Population:
Patients >18 years of age of both sexes with LRTI diagnosed by history, clinical findings, laboratory tests, radiological findings.

Inclusion Criteria:
All patients both males and females more than 18 years of age who had Lower Respiratory Tract Infection and admitted to CCU.

Exclusion Criteria:
1. Pregnancy.
2. Patients below 18 years of age.
3. Known case of Pulmonary Tuberculosis.
4. Malignant conditions involving the LRT.

RESULT AND ANALYSIS

Our study showed that 1(2.0%) patients had ≤50 years of age, 14(28.0%) patients had 51-60 years of age, 26(52.0%) patients had 61-70 years of age and 9(18.0%) patients had 71-80 years of age. 23(46.0%) patients had female and 27(54.0%) patients had male. 5(10.0%) patients had Acinetobacterbaunnii complex, 1(2.0%) patient had Klebsiella pneumonia and 44(88.0%) patients had no growth at 1st day of blood CS. 11(22.0%) patients had BI LAT lower lobe patchy pneumonitis, 12(24.0%) patients had BI LAT syn pneumonic effusion, 6(12.05) patients had L lower lobe consolidation, 6(12.0%) patients had L sided pneumonitis, 14(28.0%) patients had R sided pneumonitis and 1(2.0%) patient had R upper lobe pneumonitis. 26(52.0%) patients had ventilation. 24(48.0%) patients had sputum. 26(52.0%) patients had ET tube suction. 14(28.0%) patients had Acinetobacterbaunnii complex, 20(40.0%) patients had Klebsiellapneumoniae, 3(6.0%) patients had Proteus mirabilis, 7(14.0%) patients had Pseudomonas aeruginosa, 5(10.0%) patients had Staphylococcus aureus and 1(2.0%) patients had Staphylococcus haemolyticus.

We found that 6(12.0%) patients had gram positive. The mean age (mean±s.d.) of the patients was 64.9400 ± 7.5496 years. The mean PH (mean±s.d.) of the patients was 7.2744 ± .1618. The mean PCO2 (mean±s.d.) of the patients was 56.2220 ± 18.7942. The mean PO2 (mean±s.d.) of the patients was 63.0600 ± 12.1612. The mean SPO2 (mean±s.d.) of the patients was 81.7800 ± 13.3482. The mean TLC (mean±s.d.) of the patients was 12589.0000 ± 2445.4516. The mean potassium (mean±s.d.) of the patients was 3.8600 ± .7869. The mean urea (mean±s.d.) of the patients was 78.8000 ± 51.0022 mg/dL. The mean creatinine (mean±s.d.) of the patients was 1.5820 ± .6275 mg/dL. In death, the mean PH (mean±s.d.) of the patients was 7.2510 ± .1961. In discharged, the mean PH (mean±s.d.) of the patients was 7.2900 ± .1358. Distribution of mean PH vs. outcome was not statistically significant (p=0.4084). In death, the mean PCO2 (mean±s.d.) of the patients was 55.7550 ± 22.4115. In discharged, the mean PCO2 (mean±s.d.) of the patients was 56.5333 ± 16.3554. Distribution of mean PCO2 vs. outcome was not statistically significant (p=0.8877). In death, the mean PO2(mean±s.d.) of the patients was 62.7000 ± 11.7029. In discharged, the mean PO2 (mean±s.d.) of the patients was 63.3000 ± 12.6495. Distribution of mean PO2 vs. outcome was not statistically significant (p=0.8663).

Our study showed that in death, the mean SPO2(mean±s.d.) of the patients was 82.6000 ± 10.3842. In discharged, the mean SPO2 (mean±s.d.) of the patients was 81.2333 ± 15.1537. Distribution of mean SPO2 vs. outcome was not statistically significant (p=0.7268). In death, the mean age (mean±s.d.) of the patients was 64.9000 ± 7.9000 years. In discharged, the mean age(mean±s.d.) of the patients was 64.9667 ± 7.4440 years. Distribution of mean age vs. outcome was not statistically significant (p=0.9760). Association of CXR (PA) vs. outcome was not statistically significant (p=0.4336). In death, 17(85.0%) patients had ventilation. In discharged, 9(30.0%) patients had ventilation. Association of ventilation vs. outcome was statistically significant (p=0.0001). In death, 3(15.0%) patients had sputum. In discharged, 21(70.0%) patients had sputum. Association of sputum vs. outcome was statistically significant (p=0.0001).

Table: Association Between CXRPA vs. Outcome

OUTCOME			
CX R(PA)	**Death**	**Discharged**	**TOTAL**
BI LAT LOWER LOBE PATCHY PNEUMONITIS	6	5	11
Row %	54.5	45.5	100.0
Col %	30.0	16.7	22.0
BI LATERAL SYNPNEUMONIC EFFUSION	5	7	12
Row %	41.7	58.3	100.0
Col %	25.0	23.3	24.0
L LOWER LOBE CONSOLIDATION	2	4	6
Row %	33.3	66.7	100.0
Col %	10.0	13.3	12.0
L SIDED PNEUMONITIS	3	3	6
Row %	50.0	50.0	100.0
Col %	15.0	10.0	12.0
R SIDED PNEUMONITIS	3	11	14
Row %	21.4	78.6	100.0
Col %	15.0	36.7	28.0
R UPPER LOBE PNEUMONITIS	1	0	1
Row %	100.0	0.0	100.0
Col %	5.0	0.0	2.0
TOTAL	20	30	50
Row %	40.0	60.0	100.0
Col %	100.0	100.0	100.0

Table: Distribution Of Mean PCO2, PO2 and SPO2 vs. Outcome

		Number	Mean	SD	Minimum	Maximum	Median	p-value
PCO2	Death	20	55.7550	22.4115	3.1000	89.0000	50.5000	0.8877
	Discharged	30	56.5333	16.3554	28.0000	89.0000	51.0000	
PO2	Death	20	62.7000	11.7029	48.0000	85.0000	60.5000	0.8663
	Discharged	30	63.3000	12.6495	40.0000	88.0000	66.0000	
SPO2	Death	20	82.6000	10.3842	50.0000	93.0000	86.0000	0.7268
	Discharged	30	81.2333	15.1537	50.0000	99.0000	88.0000	

DISCUSSION

We found that most common age group 26(52.0%) patients had 61-70 years of age and 23(46.0%) patients had female and 27(54.0%) patients had male.

It was found that blood CS 1ST day 5(10.0%) patients had Acinetobacterbaunnii complex, 1(2.0%) patient had Klebsiella pneumonia and 44(88.0%) patients had no growth at 1st day of blood CS.

Ahmed SM et al [6] (2013) found that the highest isolation rate was observed in the 61-80 years age group with a male preponderance and Klebsiellapneumoniae (41.95%) was found to be the predominant organism.

In North India K. pneumonia and Acinetobacterspp were the most common Gram-negative bacteria and S. aureus the most common Gram-positive one. High level resistance to all the antimicrobials was seen; with K. pneumonia being the most multidrug resistant GNB isolated in the ICU setting.

In Tamilnadu, South India shown on 2454 patients that the commonest organism isolated was Klebsiellapneumoniae (48.2%) followed by Pseudomonas aeruginosa (15.3%), E. coli (8.4%), Acinetobactor species (7.7%), Proteus species (6.9%).

Pseudomonas, Acinetobacter, Klebsiella, Citrobacter, and Esecheria coli were the most common pathogens, accounting for 9% to 55% of cases in the various studies or 18%.

According VITEC Culture, it was found that 14(28.0%) patients had Acinetobacterbaunnii complex, 20(40.0%) patients had Klebsiellapneumoniae, 3(6.0%) patients had Proteus mirabilis, 7(14.0%) patients had Pseudomonas aeruginosa, 5(10.0%) patients had Staphylococcus aureus and 1(2.0%) patients had Staphylococcus haemolyticus.

We found that in death, 12(60.0%) patients had Acinetobacterbaunnii complex and 7(35.0%) patients had Klebsiella pneumonia. In discharged, 2(6.7%) patients had Acinetobacterbaunnii complex, 13(43.3%) patients had Klebsiella pneumonia, 3(10.0%) patients had Proteus mirabilis, 6(20.0%) patients had Pseudomonas aeruginosa, 5(16.7%) patients had Staphylococcus aureus and 1(3.3%) patient had Staphylococcus haemolyticus. Association of VITEC culture vs. outcome was statistically significant (p=0.0011).

J. P. Metlay and others concluded in their study that respiratory and non-respiratory symptoms are less commonly reported by older patients with pneumonia. Even after the control there is increased comorbidity, and illness severity in these older patients. [7]

Some work has been carried out in specialized settings in India for example in the ventilated ICU patients.[8] Some workers have looked specifically in organisms such as Acinetobacter in ICU 71who concluded it very important to target Acinetobacter associated with

nosocomial infection. Again, we have no clear data from West Bengal or Kolkata.

Zampieri FG et la [9] (2018) After controlling for illness severity and baseline health status, we could not find an association between VA-LRTI and ICU mortality (odds ratio: 1.07; 95% confidence interval: 0.62-1.83; P = .796); VA-LRTI was also not associated with prolonged ICU length of stay or duration of mechanical ventilation. After controlling for relevant confounders, they could not find an association between occurrence of VA-LRTI and ICU mortality in patients with ARDS.

De Pascale G et al [10] (2017) found that pneumonia requiring ICU admission, non-ventilator-associated LRTIs occurring in the ICU.

It was found that in death, 17(85.0%) patients had ventilation. In discharged, 9(30.0%) patients had ventilation. Association of ventilation vs. outcome was statistically significant (p=0.0001).

We found that in death, 3(15.0%) patients had sputum. In discharged, 21(70.0%) patients had sputum. Association of sputum vs. outcome was statistically significant (p=0.0001).

In death, 17(85.0%) patients had ET tube suction. In discharged, 9(30.0%) patients had ET tube suction. Association of ET tube suction vs. outcome was statistically significant (p<0.00001).

CONCLUSION

LRTIs are mostly diagnosed clinically, but etiological diagnosis could be done by sputum culture or ET tube suction in our patients which will help clinician to start proper antibiotic therapy. The high resistance rate to various antimicrobials observed in the present study could be attributed to the fact that LRTI is commonly treated by general practitioners without culture and sensitivity report. We found that the patient who need ventilator support for their survival from LRTI morality rate in high and that also statistically significant.

There is use and misuse of the broad spectrum antibiotics that has given rise to this problem. The lack of a definite antibiotic policy is a matter of great concern in management of LRTI. To conclude, this study suggests that the most common organism isolated in lower respiratory tract infections is Acinetobacterbaunnii complex, Klebsiella pneumonia, Pseudomonas aeruginosa, Staphylococcus haemolyticus and Proteus mirabilis among Gram negative bacilli and Gram positive cocci respectively of which mortality rate is very significant in Acinetobacterbaunnii complex and Klebsiella pneumonia infection.

By knowing the etiological organism and their antibiotic sensitivity pattern of this organism every institution have their specific use of antibiotic policy can be drafted.

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