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Clinical and Etiological Findings of Viral Pneumonia: A Single Centre Prospective Study

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ABSTRACT

Introduction: Viral pneumonia is a prominent cause of illness that can occur in all age group throughout the year. Worldwide about 200 million cases of viral community acquired pneumonia occur every year of which 50% cases in children and 50% in adults [1]. Bacterial coinfection found only in 3% of cases [2]. The aim of our study is to find out most common viral pathogen causing pneumonia, most common bacterial co-infection, their typical clinical presentation, common abnormal lab parameters, CT findings, duration of ICU and hospital stay.

Materials and Methods: All cases with sign and symptoms of respiratory infections with confirmed diagnosis of viral pneumonia (confirmed by BioFire FilmArray Pneumonia Panel from lower respiratory tract sample, confirmed by microscopy) were included in the study after proper consent. Demographic data, clinical history, laboratory investigations, all routine and radiological investigations are noted and evaluated.

Results: Of the total 69 cases Influenza A virus (36%) is the predominant etiological agents followed by human rhinovirus (26%) in these cases. Human Rhinovirus predominate in the early part 2023 but towards end of this year Influenza A virus became the predominant cause for pneumonia. Patients of all age groups are affected but there is definitely a seasonal variation with more in the winter months. Most of the patients have typical respiratory findings like cough (83%) and fever (76%). CT scan showed bilateral ground glass opacity (56%) in most cases, and few had consolidation (29%) features. Blood CRP level (91%) was raised in most of these patients. Haemophilus Influenzae (34%) is the most common associated bacterial co-infection followed by Streptococcus Pneumoniae (26%). All patients responded well to conservative management.

Conclusions: Viral pneumonia is not uncommon in the community. Though we found Influenza A followed by Human Rhinovirus are the two most common pathogens in these cases but only 59% of them have bacterial co-infection, so not all patients require antibiotics from the beginning. As most are infected with Haemophilus influenzae so aminopenicillin group is the antibiotics of choice for these patients. Hence as a pulmonologist we must be aware of these cases, their typical presentation and not to over treat these cases with high end antibiotics as most require only symptomatic treatment. Even though it is a single centre study, but it definitely throws a light on the pattern of viral pneumonia in our community.

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Introduction

Pneumonia is an inflammation of lung parenchyma of infective origin. It is a very common disease in all over the world. The worldwide incidence of CAP varies between 1.5 to 14 cases per 1000 persons per year [3]. It is the 8th leading cause of death and 1st among infectious cause of death [3]. It occurs throughout the year and in persons of all ages and is the prominent cause of mortality and morbidity. India accounts for 23% of global pneumonia burden with case fatality rates between 14% to 30% [4]. The mortality rate is as high as 23% for patients admitted to the ICU [3]. Most of mortality at extremes of ages.

Viral Pneumonia

Worldwide about 200million cases of viral community acquired pneumonia occur every year out which approximately 50%cases in children and 50%cases in adult [2]. The etiology of U.S adults

with community acquired pneumonia requiring hospitalization was found to be in 62% cases no pathogen was detected and among rest 38% cases there was a pathogen out of which in 27% of cases had a viral etiology i.e., among the cases where a causative organism was found in almost 70% cases there was a viral etiology [1]. Viral pneumonia is suspected by acute symptoms such as dyspnea, cough, fever, and presence of new focal chest signs without other obvious cause, whereas new pulmonary infiltrates on a chest radiograph is required for a definite diagnosis [5]. Subgroups of patients as in elderly people, the clinical presentation can have less evident classical symptoms delaying the diagnosis frequently [5].

Methods

The study was conducted from 1st January 2023 to 31st December 2023 in the Postgraduate Department of Respiratory Medicine, Ashwini Hospital, Cuttack, Odisha, India. All cases with sign and

symptoms of respiratory infections with confirmed diagnosis of viral pneumonia were included. The data were collected from demography, clinical history, laboratory investigations, sputum for pneumonia panel confirmed by BIOFIRE FilmArray, radiological investigations. A total number of 69 viral pneumonia cases (confirmed by BioFire FilmArray Pneumonia Panel) among 146 samples.

Pneumonia Panel

It is a rapid multiplex PCR based assay. It is a molecular test that detects the genetic material of pathogens. In comparison to standard culture methods, BioFire FilmArray Pneumonia Panel showed an overall sensitivity of 100% and overall specificity of 90% [6]. Detects the presence of multiple pathogens in a single respiratory sample. It can identify microbes that might be missed with traditional testing, such as culture. Result may be available within a few hours, compared to a few days with some traditional testing. In this study we used Film Array BIOFIRE Machine which can detect 15 bacteria species, 3 atypical bacteria species, 9 viruses and 7 antimicrobial resistance genes [7].

Objectives

Aim of the study is to find out!
1. Most common pathogen associated with viral pneumonia.
2. Most common bacteria that causing co-infection in viral pneumonia.
3. Outline the typical presentation of a patient with viral pneumonia.
4. Most common abnormal lab parameter.
5. Common HRCT findings.
6. Average duration in ICU stay and hospital stay.

Results

Demography

There was a seasonal trend with a typical fall and rise pattern of cases. There were high number of pneumonia cases in the winter season and the incidence comes down when summer approaches and again the incidence increases when monsoon and winter sets in.
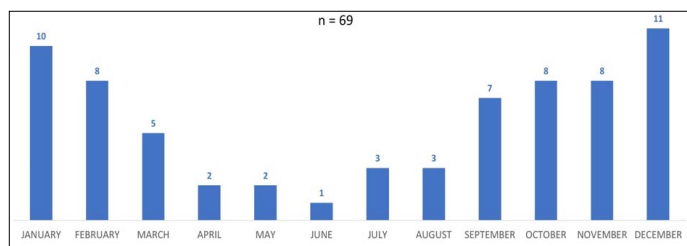

Etiology

Influenza A (36%) was the most common pathogen detected followed by Human Rhinovirus (26%), Respiratory Syncytial virus (15%), Adenovirus (8%), Parainfluenza virus (6%). Human Metapneumoviruses, Influenza B also found in few cases. Viral viral co-detection found in 2 cases, in one case Influenza A with Adenovirus and in another case Respiratory syncytial virus with Human Metapneumovirus.
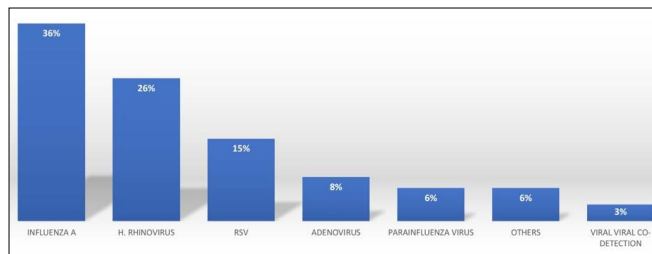

There was a very interesting finding in this study was Human Rhinovirus was the most common pathogen associated with viral pneumonia during the early part of the year but as the year passes by the end of the year that is after the month of September the incidence of pneumonia due to Influenza A superseded Human Rhinovirus drastically.
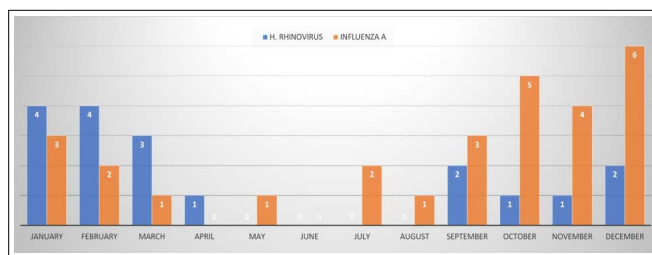

Bacterial Co-Infection

Out of 69 cases bacterial co-infection was found in 41 cases. Out of which Hemophilus Influenzae (34%) was the most common bacterial co-infection followed by Streptococcus Pneumoniae (26%), Pseudomonas Aeruginosa (11%), Klebsiella Pneumoniae (9%), Staphylococcus Aureus (9%). In few cases Acinetobacter, Serratia, Chlamydia, Moraxella also found.
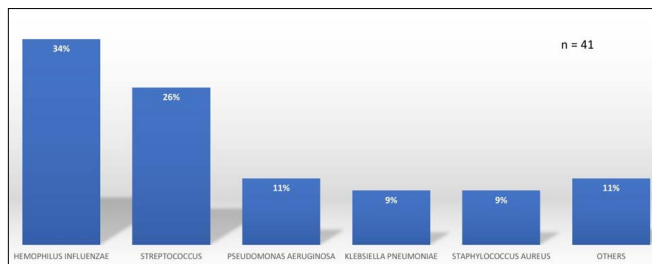

Age Group

Elderly people were the most vulnerable. The incidence of viral pneumonia was most common in 61yr to 70yr age group (34%) followed by 51yr to 60yr (16%), 31yr to 40yr (16%), 71yr to 80yr (11%), 41yr to 50yr (10%), 21yr to 30yr (7%), 81yr to 90yr(6%).
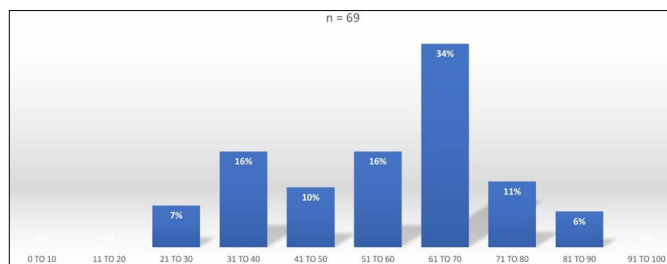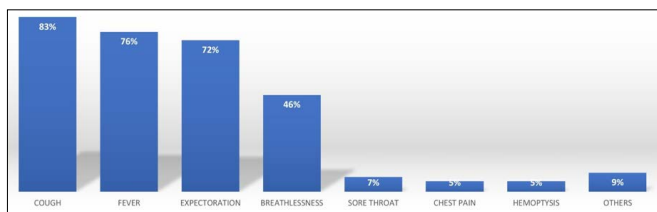

Comorbidities

Hypertension (51%) was found to be the most common associated comorbidity, followed by Diabetes (46%), CAD (20%), Hypothyroid (7%). CKD, Rheumatoid Arthritis, ILD also found in few cases.
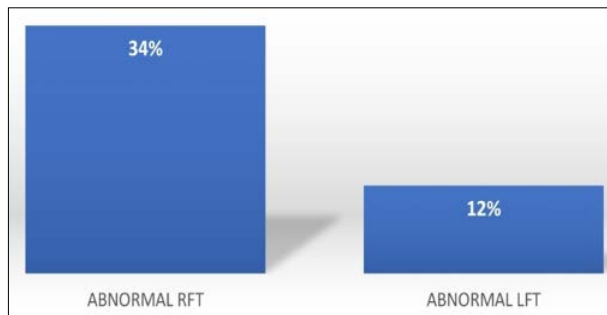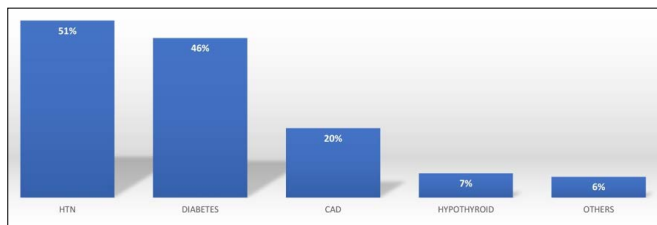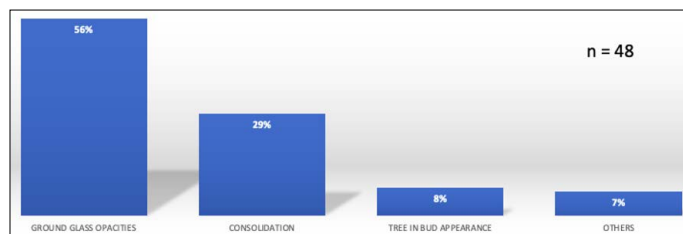
Symptoms

Cough (83%) was the most common symptom followed by fever (76%), Expectoration (72%), Breathlessness (46%). In few cases other symptoms like sore throat, chest pain, hemoptysis, loose motion, rashes also found.

Laboratory Parameters

CRP - Increase CRP was found in 91% of cases.

TLC

Raised TLC was found in 51% of cases, in 42% cases had normal TLC and low TLC in 7% of cases.

RFT And LFT

Patients having no prior history of any liver or kidney diseases had abnormal RFT (34%) and abnormal LFT (12%) during the disease period.
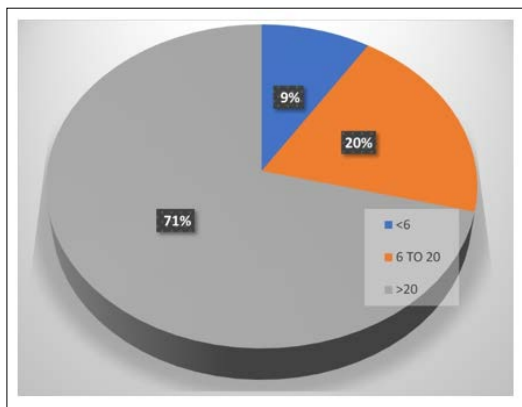

HRCT Findings

Out of 69 cases 48 patients had undergone HRCT of Thorax. Ground glass opacity (55%) was the most common HRCT finding followed by consolidation (28%), Tree in Bud appearance (7%). In few cases Interlobular septal thickening and pleural effusion also seen.
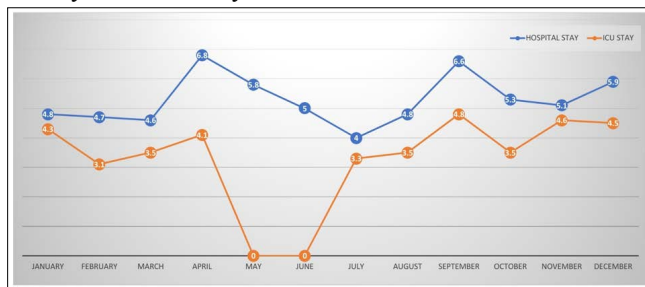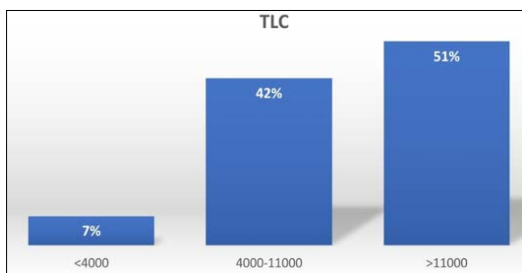

Average Duration in ICU and Hospital Stay

The total duration of hospital stay was found to be 5 to 6 days and those patients who needs ICU admission, the average duration of ICU stay was 4 to 5 days.
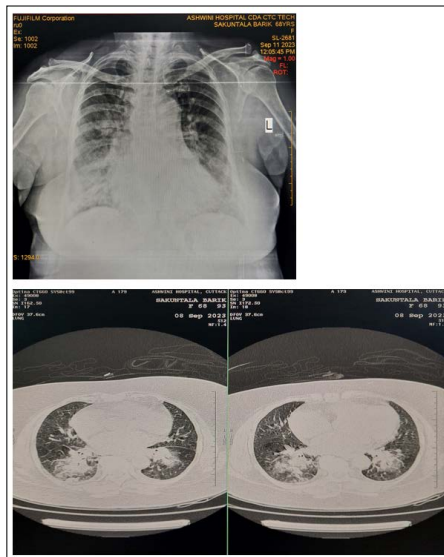

Radiological Findings

Virus - Human Rhinovirus, Bacterial Co-Infection - Klebsiella Pneumoniae
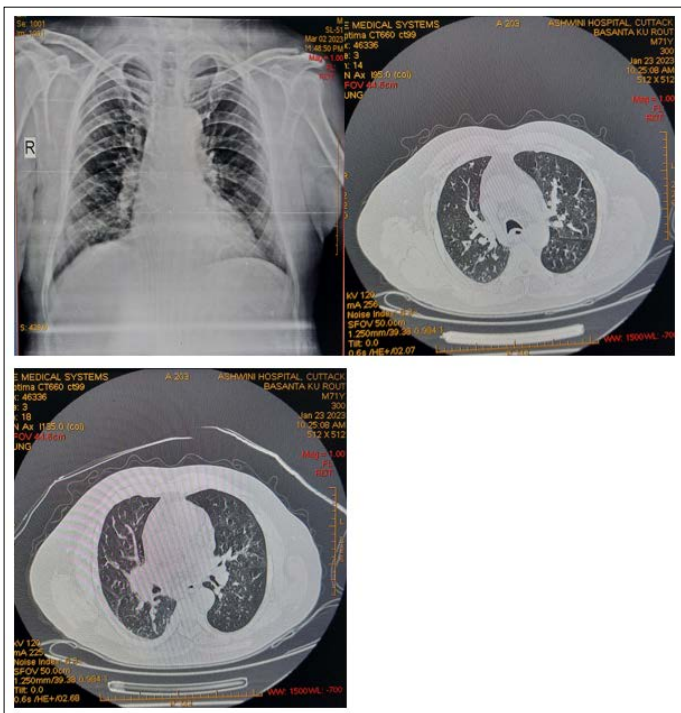
Virus-Influenza A, Bacterial Co-Infection-Pseudomonas Aeruginosa

Virus-Human Rhinovirus, Bacterial Co-Infection-Haemophilus Influenzae

Discussion

Viral Pneumonia occurred throughout the year but had a seasonal variation with high incidence in winter season. Patient affected commonly belongs to elderly age group. Human Rhinovirus was the predominant cause in the early part of 2023 but at the end of the year Influenza A was the predominant cause of pneumonia in our study. Haemophilus Influenzae is the most common associated bacterial co-infection. Hypertension was the most common associated co-morbidity. Cough was the most common

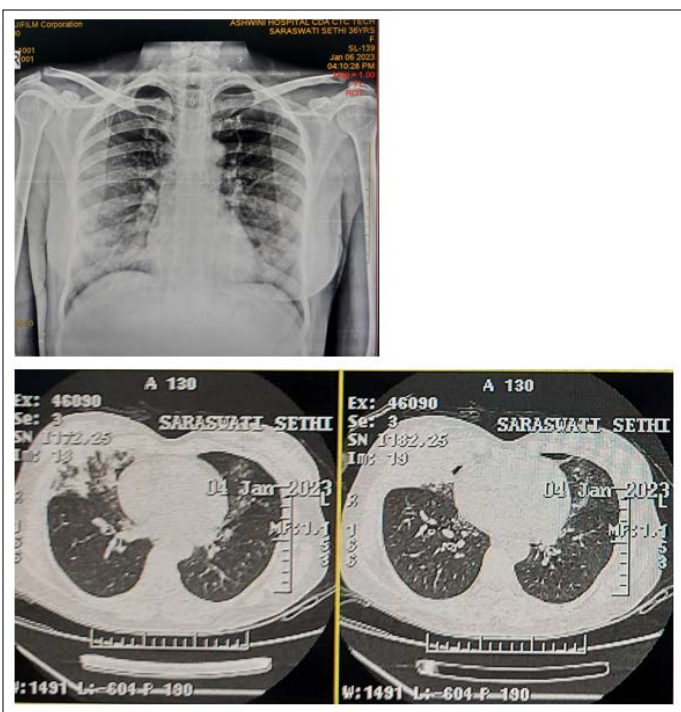symptom. In most patients TLC, CRP were found to be raised. Some patients having no prior history of any liver or kidney diseases had abnormal LFT and RFT during the disease period. Ground glass opacities was the most common HRCT finding. Average duration of hospital stay was 5 to 6 days and those patients who required ICU admission, the duration of ICU stay was 4 to 5 days. Death occurred in 2 patients, one was affected by Human Metapneumovirus and the other one was affected by Influenza A with Haemopilus influenzae bacterial co-infection.

Conclusion

Viral pneumonia is not an uncommon entity. Though Influenza A was the most common pathogen but Human Rhinovirus also responsible for a good number of cases. In cases having only viral etiology, avoid unnecessary use of antibiotics in these cases. Most of the patients responds to symptomatic treatment and those who had bacterial co-infection responds very well to aminopenicillin group of antibiotics. Even though it is a single Centre study, but it definitely throws a light on the pattern of viral pneumonia in our community [8-17].

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