



CHEST X RAY: DIAGNOSTIC SIGNIFICANCE IN COMMUNITY ACQUIRED PNEUMONIA IN CURRENT TIME. IS IT ENOUGH?

General Medicine

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ABSTRACT

Background:- Community Acquired Pneumonia is a very common health condition especially in south Asian countries. It has a large burden on Indian health care system due to inefficient health care and population ratio resulting into considerable morbidity and mortality. The following study reveals the importance of chest x ray films as initial investigation for early detection of pneumonitis cases at peripheral healthcare system.

Aims & Objectives:-

1. Clinical assessment of cases of Respiratory Infection and making a diagnosis of Community Acquired Pneumonia.
2. Assessment of Chest X-ray findings in clinically diagnosed cases of Community Acquired Pneumonia.

Material & Methods:- An institution-based cross-sectional study was conducted on randomly selected 60 Indoor patients at medicine department at RIMS Ranchi Hospital. Patients of clinically diagnosed Community Acquired Pneumonia case were selected according to Performa of sign and symptoms and investigated with Chest X-ray for radiographic findings. The study was conducted from October 2015 to October 2016. The consistency and completeness of the collected data were checked manually and then coded, cleaned, and entered by using SPSS version 16 software for further analysis. Ethical clearance from the college committee was taken. Written informed consent was taken from the participants.

Results:- All patients had at least some type of Radiological pattern of involvement of Lung parenchyma. 48 patients had lobar pattern of involvement, 10 had bronchopneumonia and 2 had interstitial type of pneumonia. Among lobar involvement right lower lobe involvement was most predominant. **Conclusion:-** Chest R ray has a definitive role in confirmation of diagnosis of community acquired pneumonia at first point of contact at a health care system especially at periphery where early diagnosis and prompt treatment can lessen the morbidity and mortality related with this common healthcare problem.

KEYWORDS

Community Acquired Pneumonia, Chest X Ray, pattern of involvement.

INTRODUCTION:-

In whole world especially in south Asian countries, pulmonary infections are still a major cause of morbidity and mortality in adult patients despite advances in health care facilities. Pneumonia is the sixth most common cause of death in the USA and more than 6 million cases of bacterial pneumonia occur each year in the Immunocompetent population[1]. community-acquired pneumonia (CAP) is defined as "an acute infection of the pulmonary parenchyma that is associated with at least some symptom of acute infection, accompanied by the presence of an acute infiltrate on a chest radiograph, Auscultatory findings consistent with pneumonia, in a patient not hospitalized or residing in a long-term care facility for more than 14 days before the onset of symptoms [2].

Diagnosis of pneumonitis requires a combination of clinical history and examination, appropriate microbiological tests, and Radiographical studies. X ray chest is a test that can demonstrate the presence of pulmonary infection at the time of admission itself. It is an important initial examination in all patients suspected of having a pulmonary infection at primary health care system especially in countries like India where health care infrastructure is less efficient as compared to developed countries.

Findings of chest x ray should always be counted with an idea of how symptomatic the patient is, the level of respiratory distress, tachycardia, presence of fever and cough and whether the cough is productive or dry, and the chronicity of symptoms [3]. As there is a long list of possible diagnosis with similar pattern of presentation knowledge of the immune status and pattern of involvement of lung parenchyma in chest x ray can be helpful in arriving at a shortlist of possible causative organisms [4]. A good clinical history can be a great help in arriving at diagnosis with help of chest x ray films, i.e. the AIDS patient with an acute respiratory infection who has chills, fever, and purulent sputum probably has pyogenic rather than a PCP. Without a clinical background information, radiologists cannot accurately distinguish between pneumonitis and other pulmonary pathologies [5].

Radiographically, lobar pneumonia appears in the periphery close to the pleura and spreads towards the core portions of the lung. Lobar pattern of consolidation occurs when the alveoli are filled with

inflammatory exudate as host response to the infection. The exudate extends along lung parenchyma through channels of adjacent airways, and hence the resultant lung opacity is homogenous and contiguous. Bronchopneumonia begins in the distal airways as bronchiolitis with or without peribronchial inflammation. It is seen on chest radiograph as scattered infiltrates, which are frequently bilateral. Interstitial pattern is observed when there is cellular infiltrate in the alveolar septae and peribronchovascular interstitium. Ground glass opacity (GGO) is caused by incomplete alveolar filling [6,7]. Round pneumonia is most often encountered in children than adults and is most often caused by *S. pneumoniae* [8]. In most patients the following patterns of involvement of lung parenchyma can be identified on chest x ray films. Common findings include segmental or lobar consolidations and interstitial lung disease. Other less common radiographical findings include mediastinal lymphadenopathy, pleural effusion, cavitation, and chest wall.

Community acquired pneumonia is a major healthcare and economic burden because of its high morbidity and mortality rate, and because of its direct and indirect costs of in and out hospital care [9]. The cost of in-hospital care is usually 15-20 times more than out hospital care. In USA it is estimated \$8.4 billion spent annually for the care of patients with pneumonia [10,11]. In countries like India where there is less coverage of health insurance schemes, large number of patients with a limited number of hospitals as compared to population, it is the need of time for early diagnosis and management of community acquired pneumonia at primary health care centers with the help of chest x ray films.

In this study we are going to study whether early use of chest x ray for diagnosis of community acquired pneumonia is a reliable test to detect pneumonitis or to go for further radiological investigations as a diagnostic modality.

OBJECTIVES:-

1. Clinical assessment of cases of Respiratory Infection and making a diagnosis of Community Acquired Pneumonia.
2. Assessment of Chest X-ray findings in clinically diagnosed cases of Community Acquired Pneumonia.

MATERIALS AND METHODOLOGY:-

The present study was a cross sectional study done in IPD (In patient department) patients of medicine department at RIMS Ranchi from October 2015 to October 2016.

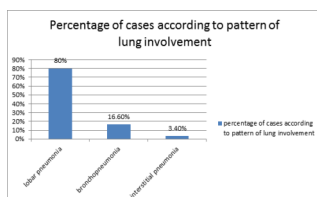
Study subject:- patients with clinical features of community acquired pneumonia. **Method of data collection:-** A detailed history of all included patients was taken and thorough clinical examination was performed. Standard protocol was used for collection of random sampling data. Informed consent was obtained from all the patients.

Inclusion criteria:- patients who presented with or in combination of symptoms like cough with expectoration, fever (temperature >98.8 degree F), chest pain (pleuritic type) and dyspnea. All patients were subjected for detailed history and clinical examination to make a provisional diagnosis of Community Acquired Pneumonia at the time of admission. A total of 60 cases were selected for our study. **Exclusion criteria:-** patients with hospital Acquired Pneumonia, Aspiration Pneumonitis and with history of antibiotic intake prior to this admission were excluded and pneumocystis j. pneumonia in patients with HIV was also excluded.

Statistical analysis:- Data obtained from history and clinical examination was recorded according to the study proforma followed by examination of the patient's sputum and digital chest X-ray postero-anterior view. The consistency and completeness of the collected data were checked manually and then coded, cleaned, and entered by using SPSS version 16 software for further analysis. Descriptive statistics like frequencies, percentage, proportions, and summary statistics were used to define respondents in relation to pertinent variables and presented by using tables.

OBSERVATION AND RESULTS:-

ChestX- ray study revealed various patterns of lung involvement in which lobar pneumonia was the most common finding seen in 48 patients (80%) of patients followed by bronchopneumonia in 10 patients (16.6%) of patients and interstitial pattern of pneumonitis in 2 patients (3.4%) of patients. After analysis of master table it is evident that bronchopneumonia and interstitial pneumonia was seen mostly in elderly age group.



Among cases of lobar pneumonia the right lower lobe was seen to be involved predominantly in 60.4% of cases followed by multilobar pattern of involvement in 10.4% of cases. The frequency of involvement of right upper lobe, right middle lobe and left upper lobe, left middle lobe was approximately equal (6.2% to 8.3). here n=48 as total number of cases of lobar pneumonia were 48.

Table no.1:- Demonstrating comparative involvement of various lobes in cases of lobar pneumonia.

LOBE INVOLVED	NO.OF CASES	PERCENTAGE
RIGHT UPPER LOBE	4	8.3%
RIGHT MIDDLE LOBE	3	6.2%
RIGHT LOWER LOBE	29	60.4%
LEFT UPPER LOBE	3	6.2%
LEFT LOWER LOBE	4	8.3%
MULTILOBAR INVOLVEMENT	5	10.4%



Figure 1. LEFT UPPER LOBE INVOLVEMENT
Figure 2. RIGHT LOWER LOBE INVOLVEMENT



Figure 3. BRONCHOPNEUMONIA



Figure 4: RIGHT MIDDLE LOBE INVOLVEMENT



Figure 5. INTERSTITIAL PNEUMONIA

When mortality analysis was done with type of pneumonia seen in chest x ray film there were 9 mortalities in lobar involvement while 1 mortality seen in case of interstitial pneumonia. No mortality was there in bronchopneumonia.

Table no.2. Showing percentage of mortality in various types of Pneumonia

Type of lung involvement	No.of death	Percentage of death
Lobar pneumonia	9	90%
Bronchopneumonia	0	0%
Interstitial pneumonia	1	10%

DISCUSSION:-

This observational study was performed on 60 cases of clinically and provisionally diagnosed cases of community acquired pneumonia. Maximum number of cases were in elderly age group (between 50 to 70 years of age). incidence was low in young population because prevalence of comorbidities like chronic obstructive airway disease, diabetes mellitus, cardiovascular and cerebrovascular disease is more common in elderly population. Also smoking and alcoholism cumulative duration was more in elderly population. The overall annual rate is 12 cases per 1000 population in USA but the figure increases to 12-18 in children less than 4 years of age and 20 per 1000 population in persons age more than 60 years [12].

As right bronchus is shorter, broader and comparatively vertical as compared to left one. Also right lower lobe is most dependant in upright posture which may be a reason of more cases of involvement of this lobe. Cases of bronchopneumonia and interstitial pneumonia were seen mostly in elderly population as chance of atypical pneumonia increases with age.

Of 60 patients all had a typical pattern of x ray film findings which helped in confirmation of diagnosis of community acquired pneumonia. Death occurred mostly in cases of lobar pneumonia 9 out of 10 which was again seen mostly in elderly age group as because comorbidity and synpneumonic complications were seen mainly in elderly patients. Only one death was recorded in cases of bronchopneumonia. Interstitial pneumonia had no mortality.

CONCLUSION:-

After observation of results it can be said that chest x ray film as a first point is a very important initial investigation after admission and clinical examination to aid in confirmation of diagnosis of community acquired pneumonia. In Indian setup of healthcare where there is large population depends on lesser no. of health care facilities and lesser availability of computed tomography of chest where cost can also make a difference, a plain chest x ray can have a remarkable help by providing early diagnosis of community acquired pneumonia and helping in proper management. Also it helps to rule out other important differential diagnoses like pneumothorax, pleural effusion, pulmonary tuberculosis, lung collapse so that other therapeutic measures can be taken at appropriate time.

It can be concluded that chest x ray as an important initial investigation for community acquired pneumonia at primary and community health care system also at small sized private setups. It has a lesser cost of investment as compared to computed tomography machine and can easily be interpreted by medical graduates as there is a deficiency of radiologists at peripheral healthcare system.

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