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Original Research Article

A study of respiratory distress in patients with bilateral lung opacities admitted in a tertiary care hospital

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ABSTRACT

Background: Patients presented with respiratory distress along with bilateral lung opacities, like infections, Neoplasia, primary abnormality of the airways, pulmonary edema, pulmonary haemorrhage, acute respiratory distress syndrome, and interstitial lung diseases is a common scenario in our hospitals. The chest radiograph remains the basic radiological tool in many rural hospitals in our country. Thus, we aimed to study the patients presenting with respiratory distress having bilateral opacities in chest radiograph admitted in a tertiary care centre.
Methods: This study was cross sectional study conducted in the department of respiratory medicine, New Medical College and Hospital, Kota for a period of one year on indoor patients. Fifty patients were studied by detailed clinical history, thorough physical examination, chest x-ray, routine haematological, sputum, electrocardiogram and relevant investigations.
Results: Amongst 50 patients we found tuberculosis in 32% cases, pneumonia in 28%, pulmonary edema in 16%, silicosis (ILD) in 8 %, fungal pneumonia in 8 %, malignancy in 4% and aspiration pneumonia in 4% cases.
Conclusions: Patients presenting with respiratory distress and bilateral lung opacities can have different diagnosis, most of them can be diagnosed by thorough history, clinical examinations and basic investigations. Proper diagnosis is essential in these patients for their management.

Keywords: Bilateral lung diseases, Bilateral lung opacities

INTRODUCTION

Bilateral lung opacities on chest radiography may be the presentation in a variety of lung diseases. Causes include diffuse or multifocal airspace diseases like pneumonia of bacterial, viral, fungal, mycoplasma, pneumocystis in origin, bat wing appearance in pulmonary edema presents with central opacities with peripheral clearing. Pulmonary hemorrhage due to trauma, immunologic disorders (Goodpasture syndrome), bleeding diathesis, and pulmonary embolism also present as bilateral diffuse shadow on chest X-ray.

Lung cancer or metastasis also presents with diffuse lung enrolments. Different interstitial lung diseases present with bilateral reticonodular shadows like idiopathic pulmonary fibrosis, collagen vascular diseases.

Certain diseases like sarcoidosis, pneumoconiosis and progressive massive fibrosis also produce diffuse radiological shadows. We have tried to study in detail the diseases which may present as bilateral diffuse lung shadows in patients who were admitted with respiratory distress.

METHODS

This was a cross sectional study conducted over a period of one year. Fifty patients, admitted in the inpatient department of pulmonary medicine, government medical college, Kota, were enrolled in this study. A detailed clinical history and a thorough general physical and respiratory system examination was conducted. along with chest X-ray. Routine hematological investigations like CBC, Renal function tests, Liver function test, arterial gas analysis, HIV screening were performed. Sputum is analyzed for AFB by Z-N staining, pyogenic organisms by Gram's staining and fungal infections by KOH mounts and fungal culture. Blood culture was sent at time of admission. Throat swab culture was taken for diagnosis of H1N1 viral pneumonia. Electrocardiogram was performed to assess the cardiac status. CT and Echocardiography were performed in required patients. In patients with suspected mass lesion USG/CT guided FNAC was done to rule out the cause.

RESULTS

The age of the study patients ranged from 25 to 75 years with a mean of 45.5 years. Shortness of breath was the most common presenting complaint in all cases even though cough was present in 84% cases followed by expectoration in 80%, fever in 68%, loss of appetite in 56%, and chest pain in 32% (Table 1).

Table 1: Symptomatic profile of cases.

Symptoms	No. of cases	%
Sob	50	100%
Cough	42	84%
Expectoration	40	80%
Anorexia	28	56%
Fever	34	68%
Chest pain	16	32%

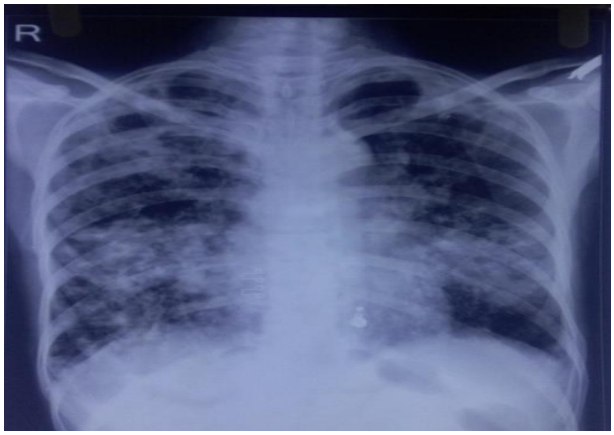

Figure 1: Chest X-ray pa view of bilateral extensive sputum positive pulmonary tuberculosis.

On examination, bilateral crepitation was the predominant finding in 76% cases, followed by pallor in 52%, clubbing in 8% cases and Lymphadenopathy in 10% cases. Hypoxia (spo2 <88 %) was seen in 42% patients. 36%, 16% and 12% cases had comorbidities of diabetes mellitus, cardiac disease and deranged renal functions respectively. Chest x ray of the cases showed consolidation in 70%, nodular shadows in 20%, reticonodular shadow in 4%, mass lesions in 4% and fibrosis in 2%.

Table 2: Overall diagnosis of cases.

Dignosis	No. of cases	%
Tuberculosis	16	32%
Bacterial pneumonia	14	28%
Chf	8	16%
Silicosis/ild	4	8%
Fungal pneumonia	4	8%
Malignancy	2	4%
Aspiration	2	4%
Total	50	100%

Overall diagnosis of cases is given in Table 2. Out of 50 cases 16 patients were diagnosed as tubercular. Bacterial Pneumonia was diagnosed in 7 cases and the most common pathogens were pseudomonas and klebsella. 8 patients who had cardiomegaly and abnormal ECG changes improved by diuretic, were diagnosed as congestive heart failure. 4 patients were having nodular shadow on chest x-ray with pronged history of working in stone mines, CT chest was done and a diagnosis of silicosis was made (Figure 1, 2 and 3). Fungal pneumonia was diagnosed in 2 patients who had positive KOH mounts and culture. Aspiration pneumonitis was diagnosed in 2 patients with features of aspiration clinically and radiologically.

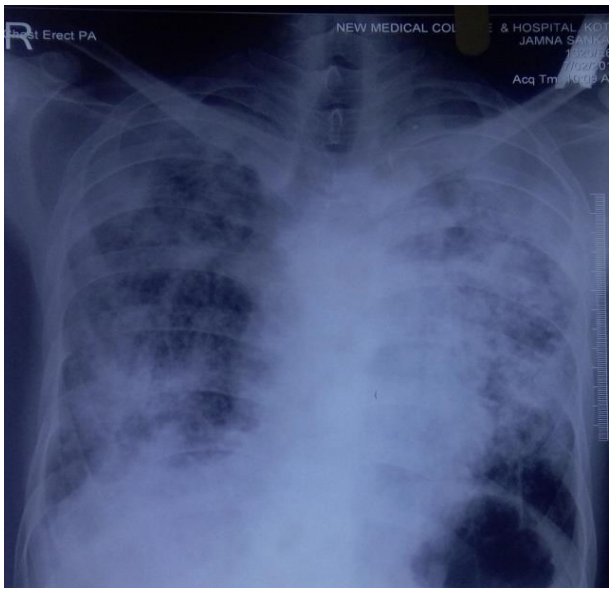

Figure 2: Chest X-ray pa view of silicosis patients showing bilateral nodular shadow with progressive massive fibrosis.

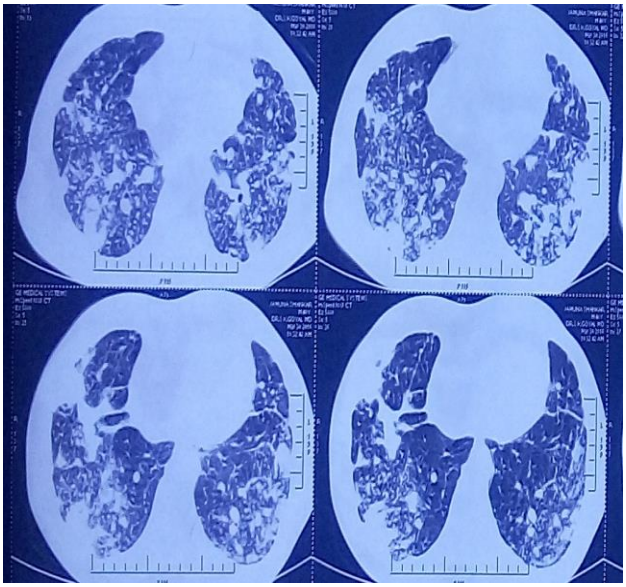

Figure 3: CT chest of silicosis patients showing bilateral nodular shadow with progressive massive fibrosis.

DISCUSSION

A significant number of respiratory diseases may show a bilateral opacity on a chest Radiograph. Even though specific signs and symptoms pertaining to a particular disease may help to reach a preliminary diagnosis, many a time there remains a doubt due to atypical clinical presentation. Such cases should be undergone a detailed investigation for exact diagnosis.

Pulmonary Tuberculosis is an infection of lung caused by *Mycobacterium tuberculosis*. Chest x ray is frequently used as the initial test to evaluate unexplained cough with fever and other symptoms suggestive of tuberculosis. Pulmonary tuberculosis produces a wide spectrum of radiographic abnormalities. TB is conventionally divided into primary and post-primary (or reactivation) TB, each with corresponding radiological patterns. Primary TB may involve lung parenchyma, LNs, tracheobronchial tree, and pleura. LN enlargement is usually seen in up to 96% of children and 43% adults with primary TB.[1-3] Most common sites of nodal involvement are Right paratracheal, hilar, and subcarinal regions, though other sites may also be affected. Bilateral adenopathy occurs in 31% cases. The prevalence of adenopathy decreases with age.[2] CT is better than CXR in detection and characterization of thoracic LN enlargement.[4] Parenchymal disease in primary TB commonly involve the middle and lower lung zones on CXR, corresponding to the middle lobe, basal segments of lower lobes and anterior segments of upper lobes. Post primary tuberculosis happens in previously sensitized patients and results either from re-infection or from reactivation of dormant bacilli in primary infection (90% of cases) owing to malnutrition, immunosuppression, senility, and debilitation.[5-6] Thus, adolescents and adults are more prone to PPT and usually begins with necrotizing consolidation followed by transbronchial spread.[7] Extensive abnormalities in predisposed locations are often seen in imaging of PPT.[8] Features of active endobronchial infection - consolidations, alveolar opacities on CXR, centrilobular nodules, clustered nodules on CT are hallmarks of active PPT. Bronchogenic spread is evident radiographically in 20% of cases and manifests as multiple, ill-defined micronodules, in segmental or lobar distribution, away from the site of cavitation and usually involving the lower lung zones.[9]

Pneumonia, inflammation of the lung parenchyma with involvement of the alveoli and the interstitium, can be caused by chemicals, physical, allergic and infectious agents (most common). *Streptococcus pneumoniae, Haemophilus influenza, Staphylococcus aureus, Gram-negative bacilli, Legionella species, Mycoplasma pneumoniae, Chlamydia pneumonia* and Viruses cause maximum community acquired pneumonia while Gram negative bacilli are most common pathogens causing hospital acquired pneumonia like *aeroginosa* and *kleibcella*. Pneumonia has classically been divided into three distinctive patterns on image study, namely consolidation (alveolar/lobar pneumonia), peribronchial nodules (bronchopneumonia) and ground-glass opacity (GGO).[10-11] Pneumonia can be diagnosed by sign and symptoms, chest x-ray findings, gram stain and culture and sensitivity of sputum.

Aspiration is the inhalation of either the oropharyngeal secretions or gastric contents into the lower airways. Anaerobes - *GNB bacteroids, prevotella, GNC peptostreptococcus, streptocci, GNR-fusobacterium* are offending agents, alcoholics, neurological disorders. Comatose, hypnotic or sedative drugs overdose are some of risk factors for aspiration pneumonia. Chest x-ray findings includes unilateral or bilateral infiltrates or abscess cavities in the apical segments of either lobes or both lobes, massive aspiration cause lung injury leading diffuse alveolar infiltrates and ARDS.

The causative viruses for pneumonia are innumerable like *influenza virus, adenoviruses, respiratory syncytial virus, cytomegalovirus, herpes simplex*. The influenza viruses are the most common viral cause of pneumonia. Primary influenza pneumonia manifests with persistent symptoms of cough, sore throat, myalgia, headache, and malaise for more than three to five days. The symptoms may worsen with time with new respiratory signs and symptoms, such as dyspnea and cyanosis. Respiratory syncytial virus (RSV) is the most common cause of lower respiratory tract infection in infants and children and the second most common viral cause of pneumonia in adults. Almost all viral infections can be diagnosed via serological tests (usually measured by complement fixation or enzyme immunoassay [EIA]). Other tests are Cytologic evaluation (Intranuclear inclusions/ Cytoplasmic inclusions), Viral culture rapid antigen detection,

Polymerase chain reaction (PCR) assay. Chest radiography usually shows bilateral lung involvement - multiple nodules, patchy areas of peribronchial ground-glass opacity and airspace consolidation, with variable hyperinflation, bronchopneumonia and GGO predominance are the most common presentations of viral pneumonia.

Fungal pneumonia, an infectious process usually occurs in immunocompromised patients caused by one or more endemic or opportunistic fungi. Mode of infection are inhalation of spores, inhalation of conidia, and the reactivation of a latent infection. Endemic fungal pathogens (eg, *Histoplasmacapsulatum, Coccidioidesimmitis, Blastomycesdermatitidis, Paracoccidioidesbrasiliensis, Sporothrixschenckii, Cryptococcusneoformans*) cause infection in healthy hosts and in immunocompromised persons. Opportunistic fungal organisms (e.g. *Candida* species, *Aspergillus* species, *Mucor* species) tend to cause pneumonia in patients in immunocompromised persons. The diagnosis of fungal pneumonia is done by combination of clinical, radiologic, and microbiological factors. Chest radiography shows patchy infiltrate, consolidation, nodules, cavitation, pleural effusion, Mediastinal adenopathy (unilateral or bilateral), Miliary infiltration and Halo sign (pulmonary nodules surrounded by ground-glass opacity seen in aspergillosis).[16-17]

Silcosis is a diffuse pulmonary interstitial disease characterized by a fibrotic response in lung parenchyma caused by prolonged inhalation of crystalline silica (SiO2). Diagnosis of silicosis is based on occupational history of crystalline silica exposure and characteristic radiologic findings. The classic radiological sign of simple silicosis is a bilateral diffuse nodular pattern (opacities <10 mm), with greater upper lobe and posterior involvement. The simple form may progress to complicated silicosis (defined as presence of opacities >10 mm) by a process of nodular conglomeration, parenchymal retraction and paracicatricial emphysema. This examination is essential and made possible by The International Labor Office (ILO) classification which coded radiological changes in a reproducible format.[12]

Hydrostatic pulmonary edema is as an abnormal increase in extravascular secondary to increased pressure in the pulmonary circulation, due to congestive heart failure or intravascular volume overload. Diagnosis of hydrostatic pulmonary edema is usually based on clinical signs with conventional radiography findings. As severity of congestion increases, chest radiographs shows redistribution of vascular markings towards the upper lobes and distention of the upper pulmonary veins, enlargement and loss of definition of hilar structures, septal lines in the lower lung indicated as Kerley A and B lines, peribronchial and perivascular cuffing with widening and blurring of the margins and thickening of interlobar fissures with subpleural fluid accumulation.[13-14] Cardiomegaly and pleural effusions are frequent findings in cardiogenic pulmonary congestion. When alveolar edema occurs due to congestion, chest radiography shows bilateral and usually symmetric parenchymal opacities, with a central or basilar distribution, without air bronchogram.[15]

Primary bronchogenic carcinoma arises from the bronchial epithelium, bronchial glands and epithelium of the alveolus. Classified into Small cell lung cancer (SCLC) and Non-small cell lung cancer (NSCLC) include adenocarcinoma, squamous cell carcinoma, large cell carcinoma. Metastasis to lung occurs from adrenals - ~50% of cancers liver 30-50%, brain 20%, bone 20%. Chest x-ray of metastatic cancer lesions and diffuse pulmonary adenocarcinoma often shows bilateral lung shadows.

CONCLUSION

Many patients are presented with respiratory distress and bilateral lung opacities in tertiary care centers. Proper early diagnosis and management is essential and will help the patients for early recovery.

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