

## A STUDY OF CLINICAL PROFILE, RADIOLOGICAL FEATURES, ELECTROCARDIOGRAPHIC AND ECHOCARDIOGRAPHIC CHANGES IN CHRONIC COR PULMONALE IN A RURAL HOSPITAL

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**ABSTRACT: BACKGROUND AND OBJECTIVES:** To study the clinical profile, radiological features, electrocardiographic and echocardiographic changes in clinically proven cases of chronic cor pulmonale. **METHODS:** 50 patients who were diagnosed to have chronic cor pulmonale based on the inclusion criteria were selected from the medical wards of Adichunchanagiri Hospital and research centre, over a period of 2 years. In all the selected patients detailed history and physical examination was noted and chest x-ray PA, 12 lead ECG and echocardiogram done. **RESULTS:** Among 50 patients admitted with chronic cor pulmonale, 45 were males and 5 were females. The peak incidence was found in the 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> decades of life. Smoking was found to be a major cause for COPD and hence cor pulmonale. Among 50 patients 43 were smokers. Among 50 cases, (60%) were diagnosed to have chronic bronchitis with or without emphysema. Chest x-ray showed details relevant to the clinical profile. ECG showed 46% cases with RVH, 64% with RAD, 26% RBBB and 70% with P pulmonale. Every patient showed echocardiographic features suggesting chronic cor pulmonale except 3 patients who showed global hypokinesia. **DISCUSSION AND CONCLUSION:** Many patients who had chronic cor pulmonale were found to have COPD as the underlying disease. Majority of the male patients were smokers in the present study. Echocardiogram was found to be a better diagnostic tool. Though ECG and chest x-ray can support the diagnosis, ECHO can be used as a non invasive, affordable investigation for accurate and early diagnosis of chronic cor pulmonale.

**KEYWORDS:** Chronic cor pulmonale; Clinical profile; Chest x-ray; ECG; Echocardiogram.

**INTRODUCTION:** Cor pulmonale is a synonym for pulmonary heart disease. The term "cor pulmonale" if broken into its constituents "cor" (heart) and "pulmo" (lungs), means cardiac involvement due to pulmonary diseases.

Chronic cor pulmonale is not a single disease entity but resulting secondary to many bronchopulmonary vascular disease and also from thoracic cage abnormalities.

Cor pulmonale accounts for 5-10% of all heart diseases, 20-30% of all admissions for heart failure. The development of PAH has important prognostic implications, as it significantly increases the risk of hospitalization and is associated with reduced survival.<sup>1</sup>

The true prevalence of cor pulmonale is difficult to ascertain for two reasons. First, not all patients with chronic lung disease will develop cor pulmonale, and second, our ability to diagnose pulmonary hypertension and cor pulmonale by routine physical examination and laboratory testing is relatively insensitive.<sup>4</sup>

The reported incidence of the disease in different areas show wide disparities and may reflect these inconsistencies in the diagnostic terminology and conventions. These reports also

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indicate real variations in disease experience and may give important clues to those differences in local environment or ways of life which may underlie the geographical distribution of the disease.<sup>2,5</sup>

Chronic cor pulmonale is recognized as a serious protracted, ultimately fatal human experience consuming frequently a large segment of the sufferers' life. Thus it constitutes a serious problem in public health and preventive medicine.<sup>2,3</sup>

So far as hospital admissions are concerned, high figures for the incidence of cor pulmonale among hosp admission for heart failure ranging from 16% to 38% have been reported from places such as Belgrade, Delhi, Prague and Sheffield. In most reported series more than 50%of cases are attributed to chronic bronchitis, asthma or emphysema, which constitute an ill defined group of diseases ay uncertain aetiology.<sup>6</sup>

So it is apparent that chronic cor pulmonale is of clinical significance of serious problem in public health and preventive incidence.<sup>5,6,7</sup>

Chronic cor pulmonale can be diagnosed clinically, radiologically, electrocardiographically and also by invasive techniques.

## AIMS & OBJECTIVES

1. To know the clinical profile in chronic cor pulmonale
2. To know the radiological features, electrocardiographic and echocardiographic changes in clinically proven cases of chronic cor pulmonale

**METHODOLOGY:** The subjects for the study were be selected from the cases admitted to the medical wards of SRI Adichunchangiri Hospital and research center, B G Nagara, during the time period September 2010 to August 2012.

Fifty representative cases were selected by simple random sampling method for the study.

**Inclusion criteria:** All patients were included in the study with chronic cor pulmonale of both the genders as cases. The diagnosis of chronic cor pulmonale was established by;

- Clinical history with cough with sputum, paroxysmal cough, dyspnoea, fluid retention with edema and sometimes ascitis, recurrent chest infections, cyanosis, fatigue, chest pain, near syncope, palpitation.
- General physical examination suggesting RVF.
- Radiological examination, electrocardiographic and echocardiographic changes associated with chronic cor pulmonale.

## Exclusion criteria:

- Patients with primary involvement of left side of the heart.
- Patients with valvular or myocardial disease.
- Patients with arterial occlusive disease from emboli.
- Patients with primary pulmonary hypertension.
- Patients with congenital heart disease.
- Patients with congenital heart diseases with reversal of shunt

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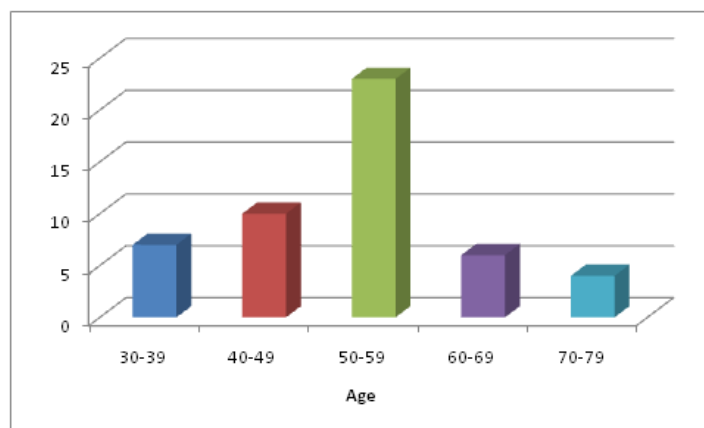
**RESULTS:** Following were the results obtained in our study:

## 1. Age Distribution:

Age	No. of cases	Percentage
30-39	7	14
40-49	10	20
50-59	23	46
60-69	6	12
70-79	4	8

Table 1: Age distribution

Majority of the cases were in age between 40 and 59. Mean age-53 years



Graph 1: Age distribution

## 2. Sex Distribution:

Sex	No. of cases	Percentage
Male	45	90
Female	5	10

Table 2: Sex distribution

Male preponderance was found in our study.

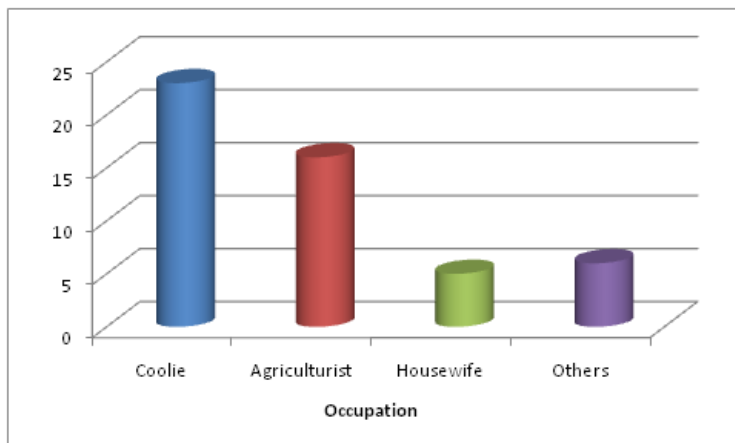
## 3. Occupational Incidence:

Occupation	No of cases	Percentage
Coolie	23	46
Agriculturist	16	32
Housewife	5	10
Others	6	12

Table 3: Occupation

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The bulk of the cases were from low socio-economic status since our hospital caters the rural population.



Graph 2: Occupation

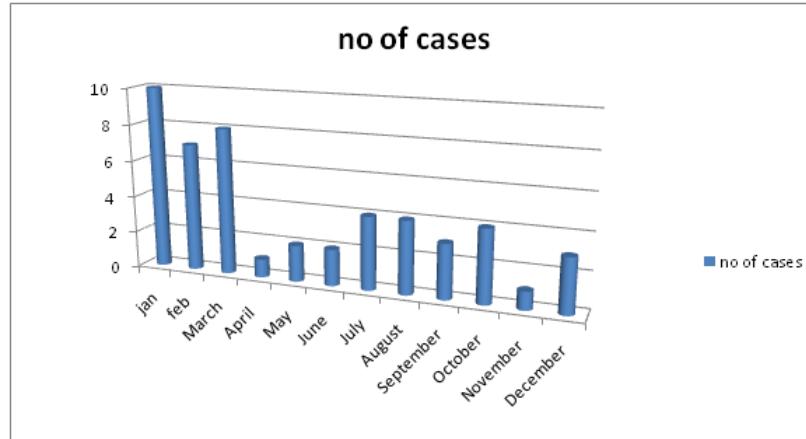
Smoking 43[86%] of male patients were smokers, >10 cigarettes or beedis per day [range-10 -30/day] Duration >10 years in 36 cases, in 7 cases <10 years.

#### 4. Seasonal prevalence of chronic cor pulmonale:

NAME OF THE MONTH	NO.OF CASES	PERCENTAGE
Jan	10	20
Feb	7	14
March	8	16
April	1	2
May	2	4
June	2	4
July	4	8
August	4	8
September	3	6
October	4	8
November	1	2
December	3	6

Table 4: Seasonal prevalence of chronic cor pulmonale

The table above reflects that chronic cor pulmonale is more in Jan, Feb, March months. Thus the peak occurrence was seen in winter months.



**Graph 3: The seasonal prevalence of chronic cor pulmonale**

### 5. Duration of Symptoms:

Duration of symptoms	No of cases	Percentage
<1 year	0	0
2-5	26	52
6-10	16	32
11-20	6	12
>20	2	4

**Table 5: Duration of Symptoms**

Suggesting that for development of chronic cor pulmonale, patient should have pulmonary disorder for some years.

### 6. Symptoms:

Symptoms	No of cases	Percentage
Cough with expectoration	50	100
Breathlessness	50	100
Swelling of limbs	47	94
Loss of appetite	40	80
Pain abdomen	36	72
Fever	20	40
Haemoptysis	12	24
Palpitations	10	20
Chest pain	8	16

**Table 6: Symptoms**

Cough with expectoration and breathlessness was present in all the patients, followed by swelling of the limbs, loss of appetite and pain abdomen.

## 7. General physical findings:

Signs	No of cases	Percentage
Cyanosis	35	70
Clubbing	10	20
Pedal edema	47	56

Table 7: General physical findings

Cyanosis was found in 70% of cases, pedal edema in 56% and clubbing in 20%.

## 8. Respiratory system findings:

Signs	No of cases	Percentage
Tachypnoea	50	100
Barrel shaped chest	40	80
Decreased chest expansion	50	100
Decreased Breath sounds	40	80
Rhonchi	50	100
Creptations	50	100

Table 8: Respiratory system findings

Tachypnoea, decreased chest expansion, rhonchi and creptations were found in all the patients. Barrel chest and decreased breath sounds were noted in 80% of cases.

## 9. Signs:

Signs	No of cases	Percentage
Raised JVP	35	70
Left parasternal heave	38	76
Dullness in left 2 <sup>nd</sup> ICS	30	60
Loud p2	45	90
Tricuspid regurgitation	25	50

Table 9: Signs

Loud p2 was noted in the majority of cases. Other systemic findings - 27 patients had hepatomegaly, 9 had ascitis and 2 had mental confusion.

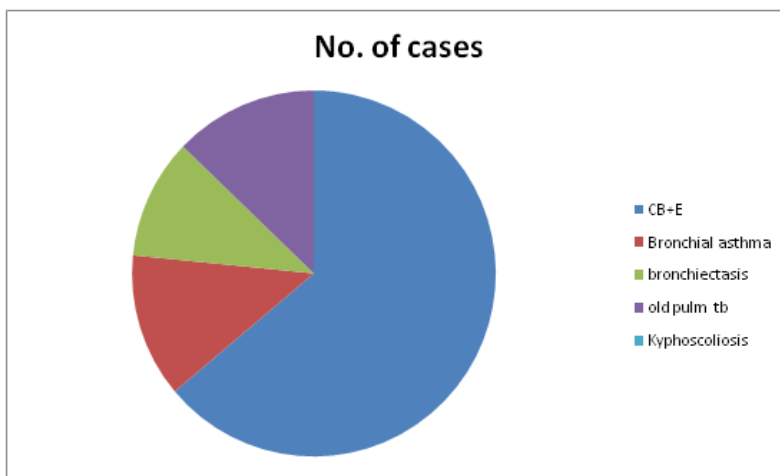
## 10. Causes (Etiology):

Causes	No of cases	Percentage
Chronic bronchitis with emphysema	30	60
Bronchial asthma	6	12
Bronchiectasis	5	10
Old pulmonary tuberculosis	6	12
Kyphoscoliosis	3	6

Table 10: Causes

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In 60% of the cases the cause was chronic bronchitis with emphysema. Bronchial asthma and old pulmonary TB, each was the cause in 12% of cases. Other causes were bronchiectasis and kyphoscoliosis.



**Graph 4: Causes**

### 11. Investigations:

**11a. Hematology:** In most of the cases the hemoglobin percentage was between 8gm% - 14gm% except in 2 patients where the hemoglobin was 5gm%, who required blood transfusion. The total leucocyte count was between 4,000 to 11,000 cells/cumm, 6 cases had counts >10,000 cells/cumm. ESR was raised in most of the cases.

**11b. Urine Examination:** Urine examination showed nothing abnormal except traces of albumin. In 1 patient 10 pus cells with 7-8 epithelial cells were found.

**11c. Sputum examination:** Sputum for AFB was done in patients with X-ray suggestive of pulmonary Koch's. In 2 patients, sputum AFB was positive. Sputum for culture and sensitivity was done in every patient. In 38 patients the sputum culture was sterile. In 5 patients, the sputum culture showed Staphylococcus, 2 patients showed Klebsiella and 3 patients showed E-coli organisms.

### 11d. Radiological Features:

Signs	No of cases	Percentage
Chronic bronchitis with emphysema	30	60
Enlarged T D cardia	20	40
Prominent pulmonary conus	16	32
RDPA>16mm	28	56
Bronchiectasis	5	10
Old pulmonary tuberculosis	6	12
Kyphoscoliosis	3	6

**Table 11: Radiological Features**

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60% of cases had chronic bronchitis with emphysema features in chest X-ray. RDPA>16mm and enlarged T D cardia were found in 56% and 40% respectively.

### 11e. ECG Findings:

Finding	No of cases	Percentage
P pulmonale	35	70
Right axis deviation	32	64
Right ventricular hypertrophy	23	46
RBBB	13	26
Low voltage complex	25	50
Arrhythmias	26	52

Table 12: ECG Findings

P pulmonale and right axis deviation were the most common findings. Other than findings mentioned in table, sinus tachycardia was present in 16 cases and ventricular ectopics in 6 cases, and atrial ectopics in 4 cases.

### 11f. Pulmonary function test:

Type of abnormality	No of cases	Percentage
Obstructive	47	94
Restrictive	3	6

Table 13: Pulmonary function test

Obstructive abnormality was noted in 94% cases and restrictive only in 6%.

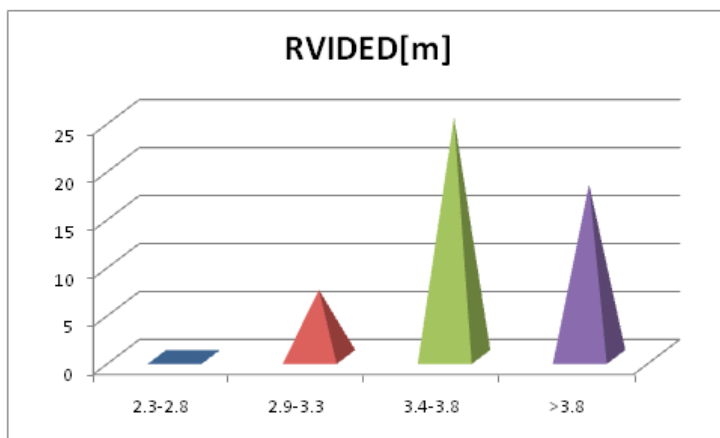
### 11g. Echocardiography:

RVIDED[m]	No of cases	Percentage
2.3-2.8	0	0
2.9-3.3	7	14
3.4-3.8	25	50
>3.8	18	36

Table 14: Echo Findings

Every patient showed enlarged right atrium and right ventricle with pulmonary artery hypertension either associated with trivial or moderate tricuspid regurgitation. Only 3 patients who were known case of COPD with hypertension showed global hypokinesia.





**Graph 5: Echo Findings**

**DISCUSSION:** The present study on chronic cor pulmonale can be discussed and compared under the following criteria.

In the present study the peak incidence was found to be in the 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> decades of life and the age distribution is very well comparable with that of cases studied Padmavathi and Misra [1959] noticed maximum incidence between 40-49 years.<sup>8</sup>

Gupta et al [1989] reported a mean age of 50.2 plus or minus 12.<sup>9</sup>

In the present study we also found that the incidence of cor pulmonale below the age of 40 was also increasing, this can be attributed to environmental pollution, as well as smoking habit earlier in life.

The study showed among 50 cases 45 was male and 5 were female. Various statistical studies have shown that chronic cor pulmonale is more common in males than in females.

Study	Male%	Female%
Padmavathi[1959]	54	46
Basavaraju urs and shankars[1965]	83	17
Gupta et al.[1989]	96	4
Present study	90	10

**Table 15: Sex distribution in various studies**

This difference in sex distribution is mainly due to smoking in males.

Bronchial asthma and chronic bronchitis are the main causes for the development of chronic cor pulmonale which were closely related to the patients' occupation. In the present study majority of the patients were coolie workers 46% and agriculturists 32%. A study conducted by R. Vishwanathan<sup>10</sup> from 1963 to 1966, showed that 66 patients out of 130 were admitted after being exposed to smoke from fire places in which cow dung cake along with fire wood or coal were burnt. Smoke is no doubt a possible source of atmospheric pollution which can produce bronchial irritation in susceptible individuals. Indoor air pollution as a cause for COPD should also be considered.<sup>11</sup>

Smoking takes the credit as one of the major causative factor for COPD which results in chronic cor pulmonale. In the present study, 43 (86%) male patients were smokers who used to

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smoke at least 10-12 beedies per day. The importance of smoking as a causative factor is well established in all the studies and various surveys conducted in United States and Great Britain.

Authors	Percentage
Shankar et al (1965)	80%
Padmavathi et al	70%
Vishwanathan (1965)	60%
J.C. Banerjea (1963)	17%
Present study	86%

**Table 16: Smoking as an etiological factor comparative percentage by various authors**

Majority of patients in the study group presented during the winter months of the year. The exacerbations especially chronic bronchitis occur in winter months and they precipitate the onset of heart failure in cases which have developed chronic cor pulmonale.<sup>11</sup>

In the present study 100% of the patients presented with breathlessness and cough. Many had peripheral edema and distension of the abdomen. Padmavathi et al. [1959]<sup>8</sup> reported dyspnoea in 100%, pedal edema in 90.4% and cyanosis in 83.2% of group.

Gupta et al [1989] noticed cyanosis in 50% of cases.

The present study showed 60% patients had chronic bronchitis and emphysema which was leading cause for chronic cor pulmonale.

Authors	Cause	Percentage
Padmavathi et al	Chronic bronchitis with or without emphysema	50.8%
Kamat et al	Chronic bronchitis with or without emphysema	62%
Banerjea (1960)	Chronic bronchitis + bronchial asthma	60.6%
Vakil (1962)	Chronic bronchitis + bronchial asthma	79.4%
K. Vishwanathan (1965)	Chronic bronchitis and emphysema	76.9%
Banerjea (1963)	Chronic bronchitis and emphysema	68%

**Table 17: Etiological causes in various studies**

Thus reports of various authors and the present study show chronic bronchitis / emphysema as the major causative factor for chronic cor pulmonale.

In the present study chest x- ray showed features according to the clinical profile. Majority of the chest x-rays were suggestive of chronic bronchitis with emphysema (60%) and cardiomegaly (40%).

Regarding pulmonary fibrosis with other etiological factors as a cause of chronic cor pulmonale, the present study showed 6 cases (12%) that showed x- ray evidence of pulmonary tuberculosis with emphysema.

Pulmonary TB per se may not be considered as the sole cause of chronic cor pulmonale, emphysema due to cigarette smoking and occupational hazards are also contributory factors for lung damage.

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In a study by P.K. Jain et al (1978) showed 11 cases (8.8%) out of 125 patients of pulmonary TB had clinical evidence of cor pulmonale in the form of congestive heart failure.<sup>12</sup>

2 patients (4%) had gross thoracic deformity in the present study. These patients were prone for chronic cor pulmonale due to repeated respiratory infections and decreased lung compliance due to the deformity.

Among 50 patients studied 47 cases (94%) showed P pulmonale and it had definite correlation with severity of chronic cor pulmonale and was found in majority of cases who had longer duration of illness.

Series	Percentage
SPODICK 1959	13.9%
CALATAYUD 1970	46.2%
IVAN J PINTO	32.32%
CHAPPEL 1966	28%
WOOD 1956	85%
MATHUR 1966	49%
PRESENT STUDY	70%

**Table 18: Comparative percentage of P pulmonale in different series**

In the present study 35 cases (70%) showed ECG suggestive of right axis deviation.

Series	Percentage
Padmavathi	43.4%
Pinto	45.5%
Mathur	69%
Vishwanathan	15.3%
Present study	64%

**Table 19: Comparative percentage of right axis deviation**

In the present study 32cases (64%) had ECG showing RBBB.

Series	Percentage
Padmavathi	7.2%
Pinto	13.3%
Vishwanathan	10.7%
Present study	26%

**Table 20: Comparative percentage of RBBB**

In comparison with the studies done by various authors the present study shows that ECG though it has its limitations can still be useful in diagnosing chronic cor pulmonale. ECG can also be used as a negative prognostic sign in targeting COPD patients at risk of shorter survival.

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Echocardiography: the study showed mean RVIDED OF 3.52cms, whereas in other studies conducted by Livo Bertolli et al [1983 and Gupta et al. [1989] showed 3.45cms and 2.97cms respectively, which is similar to our study.

**CONCLUSION:** The present study showed various clinical presentation and investigatory findings which are almost comparable to previous studies done by many authors. In the present study echocardiogram was found to be a better diagnostic tool when compared to electrocardiogram or chest x ray. Though echocardiogram has its own limitations to be considered in a patient with chronic obstructive lung disease, it is found to be useful in diagnosing accurately cases of occult cor pulmonale in recent studies. Thus chronic obstructive pulmonary disease resulting in chronic cor pulmonale constitutes a major burden in the rural population.

## **SUMMARY:**

1. The objective of the study was to know the clinical profile, radiological features, electrocardiographic and echocardiographic changes in chronic cor pulmonale.
2. Among 50 cases in the study, 45 were males and 5 were females.
3. The peak incidence of chronic cor pulmonale was found to be in the middle and older age groups (4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> decades of life).
4. Chronic cor pulmonale patients were admitted more commonly in the winter months of the year (January and February).
5. Smoking was found to be an important factor in precipitating or aggravating the primary lung disease and hence cor pulmonale. Out of 50 cases 43 were found to be smokers in the present study.

Many patients were farmers and coolie workers, thus dusty environment at the site of occupation was also found to be an additional factor in aggravating the primary lung disease.

6. With respect to the presenting complaints breathlessness, cough and edema of the feet were the most common symptoms.
7. In the present study 5 cases were found to have bronchiectases, 6 cases had bronchial asthma, 6 cases had pulmonary tuberculosis and 3 cases had kyphoscoliosis. The rest of the cases were diagnosed to have chronic bronchitis with or without emphysema.
8. Routine blood examination, urine routine, sputum for AFB and culture was done in every patient.
9. Chest x- ray showed details relevant to the clinical profile. 60% of the patients showed chest x- ray suggestive of chronic bronchitis with or without emphysema. 40% showed evidence of cardiomegaly with or without signs of pulmonary hypertension. 10% of patients had x- ray evidence of bronchiectasis (bilateral or right/left). 12% showed evidence of bilateral pulmonary tuberculosis and 6% of patients showed kyphoscoliosis with gross thoracic cage deformity.
10. Electrocardiogram showed changes from normal to right ventricular hypertrophy. The present study showed 46% cases with RVH, 64% RAD, 26% RBBB and 70% with P pulmonale.
11. In echo, all patients showed clear evidence of features suggesting chronic cor pulmonale. Thus echo was a better diagnostic tool when compared to ECG in the present study.

## BIBLIOGRAPHY:

1. Sandeep Singh. Cor pulmonale. In: YP Munjal, editor. API Text Book of Medicine. 9th ed. Mumbai: The Association of Physicians of India; 2012.p.1798-1802.
2. Bhargava RK. Cor pulmonale (Pulmonary Heart Disease). New York USA: Futura publishing company; 1973.
3. White J, Bullock RE, Hudgson P, Gibson GJ. Neuromuscular disease, Respiratory failure and Cor pulmonale. Postgraduate Med J 1992; 68: 820-823.
4. Douglas L. Mann, Murali Chakinala, Heart failure and Cor pulmonale. In: Kasper DL, Fauci AS, Longo DL, Hauser, Longo, Jameson JL, Loscalzo. Editors. Harrison's principles of Internal medicine. 18th ed. Vol-2. New York: McGraw-Hill; 2012.p.1913-1915.
5. Chronic cor pulmonal. Report of an expert committee. CLINICAL PROGRESS. Circulation vol xxvii apr 1963; 59-614.
6. Calverly PM, Cattrall JR, Shapiro C, Douglas NJ. Cor pulmonale in asthma. Br, J Dis Chest 1983 Jul; 77(3); 303-7.
7. Paules RA, Buist AS, Calverly PMA, et al. on behalf of the GOLD scientific committee. Global strategy for the diagnosis, management and prevention of chronic obstructive pulmonary diseases. NHLBI/WHO global initiative for chronic obstructive lung disease {GOLD}workshop summary. Am J Respir Crit Care Med 2001;163:1256-1276.
8. Padmavathi S.: "Chronic cor pulmonale in INDIA". Physiol. Med . Sci. India, 2:27, 1958.
9. John B, Pier G, Agaston. Cor pulmonale. In: Murray Nadel, editor. Text Book of Respiratory Medicine. 2nd ed. Vol-2. Philadelphia : W.B Saunders company; 1988.p.1779-1798.
10. Vishwanathan K. Chronic Cor pulmonale. Ind J Chest Dis 1965; 7(4):155-169.
11. Tripathi KD, editor. Essentials of medical pharamcology. 4th ed. New Delhi: Jaypee Brothers ; 2000.
12. Jain PK, Singh RG, Agarwal BV, Jha VK. Significance of right sided electrocardiographic leads in the diagnosis of cor pulmonale in pulmonary tuberculosis. Ind J chest Dis Allied Sci 1978;20(3):112-117.
13. Senior RM, Stapiro SD. Chronic obstructive pulmonary disease: epidemiology, pathophysiology and pathogenesis. In: Fishman AP, Elisa JA, Grippi MA, Kaiser LR, Senior RM, editors. Fishman's Pulmonary Disease and Disorders. 3rd ed.Vol-1. New York: McGraw Hill; 1998. p. 659-681.
14. Rich S, Mclaughlin VU. Pulmonary Hypertension. In: Zippes DP, Libby P, Bonow RO Braunwald E, editors. Braunwald's Heart Disease: A Text Book of Cardiovascular Medicine. 8th ed. USA: Elsevier Saunders; 2005.p.1807-1845.
15. Reilly JJ, Silverman EK, Shapiro SD. Chronic obstructive pulmonary disease. In: Kasper DL, Fauci AS, Longo DL, Braunwald E, Hauser SL, Jameson JL, editors. Harrison's Principles of Internal Medicine. 16th ed.Vol-2. New York: McGraw Hill; 2005. p 1547-1554.
16. Newman JH. Chronic Cor pulmonale. In: Fuster V, Alexander RW, O'Rourke RA, Roberts R, King SR, Wellen HJJ, editors. Hurst's the Heart. 10th ed. Vol.2. USA: McGraw Hill; 2001.p.1645-1654.

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