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Original Research Article

Study of pleural effusion in chronic kidney disease patient undergoing hemodialysis in Andhra Pradesh population

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ABSTRACT

Background: About 85 patients aged between 30 to 65 years suffering with chronic kidney disease with pleural effusion undergoing hemodialysis were studied.
Methods: X-ray, USG and Biochemical study was performed to confirm the Diagnosis.
Results: The clinical manifestation was 17 (20%) had hypertension (HTN), 16 (18.8%) had DM (Diabetes mellitus), 12 (14.1%) had cardiac disease 9 (10.5%), had cardiovascular disease, 5 (5.8%) had malignancy. 10 (11.7%), had COPD, 13 (15.2%) had hepatitis 3 (3.5%) had thyroid disease, Hb%, profile was 40 (47%), had 9 to 9.5%, 45 (52.9%) had 10 to 10.5, protein (total) 39 (45.8%) had 6.2 to 6.5 g/dl and 46 (54.1%) had 66 to 6.9 g/dl Albumin 43 (50.5%) was 3.1 to 3.5 g/dl, 42 (49.4%) had 3.6 to 3.8 g/dl. Uric acid in 38 (44.7%) was 7.1 to 7.5 mg/dl, 47 (55.2%) had 7.6 to 8.2 mg/dl, Urea nitrogen in 44 (48.2%) was 88 to 89.2 mg/dl 44(51.7%) had 90 to 96.2 mg/dl GFR in 37 (43.5%) was 5.25 to 5.32 and 48 (56.4%) 5.33 to 6.24 ml/min/1.73 Acess to hemodialysis 50 (58.8%) had arterio- venous fistula or graft and 35 (41.1%) had catheter. The degree of pleural effusion in 58 (68.2%) had mild 22 (25.8%) had moderate 5 (5.8%) had severe degree of effusion.
Conclusions: This pragmatic study will be quite useful to physician, urologist, nephrologist to treat such patients efficiently so that the life span of such patients will be increased and avoid the morbidity and long stay in hospitals.

Keywords: Diabetes mellitus, Hypertension, Pleural effusion

INTRODUCTION

As the life expectancy of patients with chronic renal failure increases systemic complications of kidney disease are likely to become increasingly important, chronic renal failure may affect virtually every system of the body, including the lungs.[1]

Pulmonary edema and pleural effusion attributed to fluid overload and increase in the pulmonary capillary permeability, are quite common.[2] In severe cases may include pulmonary fibrosis and calcification, pulmonary hypertension, hemosiderosis and pleuritis and plural fibrosis. Renal replacement therapy may also result in complications. Hemodialysis causes recurrent episodes of hypoxemia due to partial blockage of the pulmonary capillary bed by white cells or silicone microemboli.[3-5]

Moreover, renal transplantation introduces further hazards of lung infections and pulmonary complications from immunosuppressive drugs.

Hence, attempt was made to study the patients suffering with chronic kidney disease, pleural effusion undergoing hemodialysis at different age groups and in both sexes.

METHODS

About 85 patients who were regularly visiting to government medical college hospital, Ananthapur (AP) were included for study. Clinical manifestations of every patients were noted. Their X-ray, USG, was also done to confirm the laboratory findings.

Majority of the patients belonged to middle socioeconomic class. Hence, they were not taking the treatment regularly. Most of the patients had history of alcoholism, smokers, tobacco-chewers, malnutrition, under nutrition.

Inclusive criteria

Total 85 patients aged between <30 years to >65 years having symptoms of renal disease and pleural effusion, undergoing hemodialysis. Statistically the patients having different clinical manifestation, laboratory findings access to types of hemodialysis, types degrees of pleural effusion were grouped and studied with number and percentage.

Exclusion criteria

The patients who had congenital anomalies of KUB (kidney urinary bladder) and HIV patients were excluded from the study.

The ratio of male and female was 2:1 and the period of study -about four years (2014 to 2018).

RESULTS

Table 1 shows co-morbidities in plural effusion patients undergoing hemodialysis: 17 (20%) had HTN, 16 (18.8%) had DM, 12 (14.1%) had cardiac disease, 9(10.5%) had Cerebro-vascular disease, 5 (5.8%) had malignancy, 10 (11.7%) had COPD, 13 (15.2%) had hepatitis, 3 (3.5) had thyroid disease.

Table 1: Co-morbidities in patients with pleural effusion undergoing hemodialysis (No. of Patients-85).

Particular	No. of patients	%
HTN	17	20
DM	16	18.8
Cardiac disease	12	14.1
Cerebro-vascular disease	09	10.5
Malignancy	05	5.88
COPD	10	11.7
Hepatitis	13	15.2
Thyroid Disease	03	3.52

Table-2 Laboratory findings in pleural effusion patients on hemodialysis. Hb-%. Study-40 (47%) had 9 to 9.5%, 45 (52.9%) had 10 to 10.5%, protein (total) a-39(45.8%) had 6.2 to 6.5 g/dl, b-46 (54%) had 6.6% to 6.9 g/dl, -Albumin (g/dl) a-43 (50.5%) had 3.1 to 3.5, 42 (49.4%) had 3.6 to 3.8, Uric acid (mg/dl)a- 38 (44.7%) b-47 (55.2%) 7.6 to 8.2, 5-Urea nitrogen (mg/dl) a-41 (48.2%) 88 to 89.2 b- 44 (51.7) had 90 to 96.2, GFR study a-37(43.5%) had 5.25 to 5.35 b- 48 (56.4%) 5.33 to 6.24 (ml/min/1.732).

Table 2: Laboratory abnormalities in patients with pleural effusion undergoing hemodialysis (No of Patients-85).

Particular	No. of patients	%
Hb % (Hemoglobin)		
9 to 9-5	40	47.0
10 to 10.5	45	52.9
Protein (total) g/dl		
a-6.2 to 6.5	39	45.8
b-6.6 to 6.9	46	54.1
Albumin g/dl		
3.1 to 3.5	43	50.5
3.6 to 3.8	42	49.4
Uric Acid mg/dl		
a-7.1 to 7.5	38	44.7
b-7.6 to 8.2	47	55.2
Urea nitrogen mg/dl		
88 to 89.2	41	48.2
90 to 96.2	44	51.7
GFR (Glomerular Filtration Rate) ml/min/1.732		
a-5.25 to 5.32	37	43.5
b-5.33 to 6.24	48	56.4

Table 3 access to hemodialysis and pleural effusion study-(1) 50 (58.8%) had arterio-venous fistula or graft. 35 (41.1%) had catheter for hemodialysis (2)-degree of pleural effusion a-58(68.2%) was mild. 22 (25.8%) was moderate 5 (5.8%) was serve.

Table 3: Access Haemodialysis and Pleural Effusion (No. of Patients-85).

Particular	No. of patients	%
Hemodialysisaccess		
Arterio-venous Fistula or graft	50	58.8
Catheter	35	41.1
Pleural effusion		
Mild	58	68.2
Moderate	22	25.8
Serve	05	5.8

DISCUSSION

The present study of pleural effusion in chronic renal disease patients undergoing hemodialysis. The Comorbidities were 17 (20%) had HTN , 16 (18.8%) had DM, 12 (14.1%) had cardiac disease 9 (10.5%) had cerebro vascular disease 5 (5.88%) had malignancy, 10

(11.7%) had COPD 13, (15.2%) hepatitis , 3 (3.52%)had thyroid disease (Table-1). The laboratory finding of pleural effusion patients on hemodialysis were- In Hb% study 40 (47%) had 9 to 9.5 Hb%, 45 (52.9%) had 10 to 10.5 Hb%. In protein (total)g/dl study 39 (45.8%) had 6.2 to 6.5 g/dl and 46 (54.1%) had 66 to 69 g/dl. In Albumin study 43(50.5%) had 3.1 to 3.5 g/dl and 42 (49.4%) had 3.6 to 3.8 g/dl. In Uric acid study 38 (44.7%) had 7.1 to 7.5 mg/dl and 47 (55.2%) had 7.6 to 8.2 mg/dl. In urea nitrogen study 41 (48.2%) had 88 to 89.2 mg/dl 44 (51.7%) had 90 to 96.2 mg/dl. In GFR study (1ml/min/1.732) 37 (43.5%)had 5.25 to 5.32, 48 (56.4%) had 5.33 to 6.24 (ml/min/1.732) (Table-2) In the access to hemodialysis and pleural effusion, In the study of hemodialysis access 50 (58.8%) had Arterio-venous fistula or graft 35 (41.1% had) catheter was used for hemodialysis. In the study of pleural effusion patients 58 (68.2%) had mild effusion 22 (25.8%) had moderate 5(5.8%) had severe pleural effusion (Table 3).

This finding was more or less in agreement with previous studies.[6-8] No organ in the chest is spared the negative effects of uremia. The causes of plural effusion in uremic patients are numerous. In addition to uremic patients, possible pathogenesis includes over hydration, cardiac failure, pulmonary bacterial infections or tuberculosis, hypo Proteinemia and hemodialysis.[9]

Fluid overload was the most common cause of plural effusion. The thoracic complication of hemodialysis is mainly related to poor management of the fluid balance. In uremic patients' pulmonary edema can occur secondary to variety of interacting factors although the pathogenesis seems to be largely based on hemodynamics. Possible contributors include fluid overload secondary to water and solute retention, left ventricular failure secondary to systemic HTN, uremic cardiomyopathy, coronary artery disease, hypoproteinemia, high-output cardiac failure due toarterio-venous fistula. Injury to alveolar capillary membrane secondary to toxins, Anemia or polycythemia.[10]

Uremic pleurisy result from necrotizing fibrous inflammation and often results in exudates formation because of the inflammatory increase in capillary permeability. The exudates are sterile but may become infected resulting in empyema especially patients who are immunosuppressed by uremia or drugs.[11]

Despite the potential risk of thoracentesis in uremic patients. Pleural fluid should be obtained for analysis, when chemical feature of a transudate is demonstrated, the potential cause should be sought, and particular attention should be paid to salt and water excess. Pleural exudates should be evaluated by culture, a search for malignancy, consideration of collagen vascular diseases and drug reactions.

CONCLUSION

The present study of pleural effusion in chronic kidney disease patients undergoing hemodialysis. Pleural effusion is common in hospitalized patients, moreover abnormalities of lung functions are quite common in renal failure. The major finding being a reduction in carbon monoxide transfer factor. Although hemodialysis may induce acute change in lung function, but the pathological basis of these changes cannot be determined by this present study. Hence, it requires further study to determine the cause of pulmonary function abnormalities.

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