

A Single Centre Based Study on Prevalence of Left Ventricular Dysfunction in End Stage Renal Disease Patients on Peritoneal Dialysis

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Abstract

Heart failure affects more than 40 million people globally in a single year and is expected to increase in the coming time. In patients, who have associated comorbidities are more likely to develop left ventricular dysfunction and subsequently heart failure. Left ventricular dysfunction increases cardiovascular mortality and morbidity in end stage renal disease patients on hemodialysis. Peritoneal dialysis has emerged as an alternative mode of renal replacement therapy for end stage renal disease patients. However the prevalence of left ventricular dysfunction in end stage renal disease patients is scarcely known. A 33.33% prevalence of left ventricular dysfunction has been observed in our study.

Keywords: Peritoneal Dialysis • End-stage Renal Disease • Left ventricular Dysfunction

Introduction

Peritoneal dialysis (PD) as a mode of renal replacement therapy (RRT) is gradually increasing in chronic kidney disease (CKD) patients with end stage renal disease (ESRD). The utilisation of PD as RRT varies among countries depending upon national preferences, patient education and mediclaim coverage [1]. The cardiovascular events account for more than 40% of mortality in CKD patients. About 30% of the ESRD patients already have heart failure while another 20% develop heart failure after commencing hemodialysis [2]. The cardiovascular disturbances which are accelerated in ESRD patients include arterial hypertension, congestive cardiac failure, coronary artery disease, rhythm disturbances, left ventricular hypertrophy (LVH), dilated cardiomyopathy (DCM), systolic and diastolic dysfunction, valvular and vascular calcification, valvular abnormality, pericarditis and pericardial effusion [3]. The comorbid conditions like Diabetes Mellitus, hypertension, dyslipidemia and vascular calcification are responsible for progression of cardiac dysfunction in patients on peritoneal dialysis [4]. It is not clinically possible to distinguish between systolic and diastolic dysfunction which is done with echocardiography. The diastolic LV filling is impaired both in normal and hypertrophied myocardium in patients on CAPD [5]. The authors investigated the prevalence of left ventricular dysfunction in ESRD patients on PD.

Methodology

The present study was conducted in the Medicine and Nephrology department of Govt Medical College, Jammu over a period of one year. All the patients who were known cases of ESRD and were on peritoneal dialysis were enrolled in the study with effect from November 2012 to October 2013.

Inclusion Criteria

1. All age groups.

2. Patients who were known cases of CKD on peritoneal dialysis only for minimum of one year duration.

Exclusion Criteria

1. Patients on both PD and HD.
2. Patients with congenital heart disease.
3. Patients with underlying malignancies.
4. Patients with diseases requiring steroids or immunosuppressive agents.

Each patient was subjected to detailed history regarding his illness, history of any past illness, nutritional and socioeconomic history, family history, drug history, and predisposing factors to LV dysfunction. All the patients underwent detailed clinical examination, routine investigations, Electrocardiography, 2D Echocardiography and Doppler Examination (using Toshiba Colour Doppler system: Model- Nemio SSA- 550A). Echocardiographic evaluation was done by in the department of Cardiology, GMC Jammu. A written informed consent was taken from each patient for the participation and investigations.

Results and Discussion

A total of 120 patients from Jammu region of Jammu and Kashmir were included in the study, 78 being males and 42 being females. The maximum patients were in the age group of 31-50 years (46%) followed by that in 51-70 years (44%) (Table 1 and 2).

The etiologic association of risk factors with ESRD was in correlation with the findings by another investigator [6]. The clinical symptoms among the study group at the time of enrollment included breathlessness (58%), chest pain (23%), palpitations (8%), others like giddiness, dizziness (33%).

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Table 1. Results of Zivot Andrews Unit Root Test with one Structural Break.

Etiology	Frequency (No. Of Cases)
Diabetes Mellitus	52
Chronic Glomerulonephritis	10
Hypertension	34
Polycystic Kidney Disease	4
Others	20

Left ventricular hypertrophy being the most common ECG finding was present in 36 (30%) patients. A similar observation was made by Foley et al. in their study. Arrhythmias like atrial fibrillation, paroxysmal atrial tachycardia, premature ventricular ectopic etc [7]. were found in 24 patients (20%). In the present study ejection fraction was found to be 51.48 ± 6.45 which shows that ejection fraction did not fall much with long standing peritoneal dialysis. In our study, 18 out of 120 patients had systolic dysfunction as was demonstrated on echocardiography out of which only 2 patients had severe systolic dysfunction with visual ejection fraction of < 35%. In the present study, mean IVS thickness was observed to be 1.17 ± 0.16 and LA size was 3.66 ± 0.27 which were above the normal values. It implies that the wall thickness and chamber dimensions increase in ESRD patients on PD due to fluid overload state. Similar findings have been observed by Takeda et al.

The average Peak E/A was found to be 1.029 ± 0.23 , 22 patients (18%) had diastolic dysfunction, 4 patients had severe diastolic dysfunction with reversal of E/A ratio and 6 patients (5%) had both systolic and diastolic dysfunction. This was in correlation with the studies conducted by Huting et al. The prevalence of LV dysfunction in the present study is found to be 33.33%. This is supported by the study done by Wang et al. in which the prevalence of new onset heart failure was 27.6% [8].

Conclusion

About one third of the patients developed LV dysfunction during the course of peritoneal dialysis. Adequate dose of dialysis besides correction of other factors like uncontrolled hypertension, uncontrolled blood sugars, anaemia and dyselectrolytemia are paramount to the optimum management of the patients in a pursuit to decrease mortality and morbidity.

Recommendation

Novel approaches to increase the effective dialysis dose of PD and effective management of associated risk factors should be the future areas of research.

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