

# Diastolic Dysfunction on Echocardiography in patients with End Stage Renal Disease

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## ABSTRACT

To determine the Prevalence of diastolic dysfunction on echocardiography in patients with end stage renal failure. In this study, 44 Patients with renal failure require kidney replacement or dialysis treatment were selected using convenient sampling. In 24(54.54%) increased Left atrial pressure was observed. In 32(72.72%) IV septum pressure was high. In 7(15.90%) the EF value was below 50 and in 6(13.64%) it was above 70. Among diastolic dysfunction patients, 20 subjects were with grade I, 12 subjects were with grade II, 8(18.18%) were with grade III and 4(9.09%) were with grade IV diastolic dysfunction.

**Keywords:** Endocardiography, end stage renal disease, diastolic dysfunction

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## INTRODUCTION

In Pakistani population trend of heamo dialysis is increasing. As it is the economical and even in some charity based centers it is done free of cost. But, dialysis is associated with many manifestations, infections and modality. A study conducted in nephrology department of Mayo hospital reveals that the Cutaneous and mucosal problem were common among patients with end-stage renal disease where as other includes Arterio-venous shunt dermatitis, Acquired perforating disorders, calcification and nephrogenic fibrosing dermatopathy

In patients with chronic kidney disease (CKD), cardiovascular disease is the most common cause of death. Patients with CKD have a high burden of conventional risk factors that are closely related to accelerated atherosclerosis, left ventricular (LV) dilatation with hypertrophy, systolic dysfunction, and high LV filling pressure<sup>1</sup>. Furthermore, primary disorders of the cardiac and renal system cause deterioration in each other via direct or indirect injuries through several complex mechanisms<sup>2</sup>.

In CKD patients, retention of sodium and water often causes cardiac problems. CKD is closely related to LV hypertrophy and fibrosis, which is closely associated with stiff ventricles and abnormalities in ventricular relaxation. Thus, a small increase in preload can result in significantly increased left atrial and pulmonary vein pressures, thereby causing pulmonary edema even with normal LV systolic function. Echocardiography enables the evaluation of the diastolic stiffness of the ventricle. The most important variables are the trans mitral pulsed wave Doppler flow and mitral annular

tissue Doppler signal<sup>3,4</sup>.

During diastole, trans mitral Doppler flow can be classified into four stages: isovolumic relaxation time, early filling phase (E), diastasis, and atrial contraction. The value of E/e' is the most powerful prognosticator in most cardiac disorders, including both systolic and diastolic heart failure, myocardial infarction, cardio myopathy, LV hypertrophy, and subclinical myocardial disease<sup>5</sup>.

It is investigated that echocardiographic parameters for estimating the LV filling pressure as a prognosticator in CKD.(4) They suggested that E/e' could predict mortality and cardiovascular events in CKD patients with diastolic dysfunction. . In the general population, diastolic dysfunction has become more prevalent than systolic dysfunction. However, not all patients who have diastolic dysfunction develop clinical heart failure. Diastolic heart failure is more common in heart failure with a LV ejection fraction of more than 50%.

## SUBJECTS AND METHODS

The data was collected from the file of the Patients undergo heamodialysis in the Department of nephrology, Lahore General Hospital, Lahore during December 2015 to November 2016. The data was entered and analyzed in SPSS 22. In it 44 subject's record were taken their echocardiographic reports, ultrasound reports and hematological data was analyzed.

## RESULTS

In this study 44 subjects were studied their mean age was 45.00±13.76years among them 19(43.2%) were Female and 25(56.8%) were Male. Mean age of female was 45.33±13.73years and mean age of

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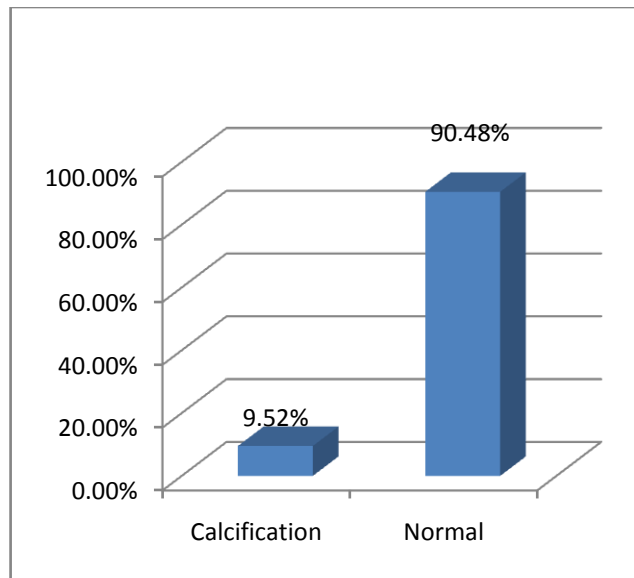
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males was 44.75±14.06years. In 24(54.55%) there was history of diabetic neuropathy, in 13(29.55%) history of Chronic GN was observed and in 3(6.82%) Pre partum renal failure was reported.

Overall mean aortic root pressure was 26.10±4.37mm, Left Atrium was 40.46±8.23mm, IV Septum was 12.33±1.84mm, LV PW was 12.33±1.85, LV EDD was 48.73±6.98mm, LV ESD was 33.54±7.74mm, EF was 60.49±11.72% and F/S was 29.16±7.40%

Among the heamo-dialysis patients, 20 subjects were with grade I, 12 subjects were with grade II, 8 were with grade III and 4 were with grade IV diastolic dysfunction.

35(79.5%) were Normal, 5(11.4%) were with Sclerotic Aortic Valve, 2(4.5) PML Calcified and 1(2.3%) Aortic & Mitral valves Annular calcification whereas 1(2.3%) was found with Annular Dilatation of Mitral Valve. 2(4.5%) were found with Bilateral Enlargement and 15(34.1%) were with Enlarged LA where as 27(61.4%) were normal



Gender wise comparison of USG findings

USG findings	Mean	Std. Deviation	Minimum	Maximum	Normal range	
Aortic root	Female	25.18	3.09	19	33	20-39mm
	Male	26.75	5.05	22	43	
Left Atrium	Female	36.41	6.34	25	48	19-38mm
	Male	43.33	8.32	29	65	
IV Septum	Female	12.00	2.12	8	15	9-11mm
	Male	12.56	1.62	8	16	
LV PW	Female	12.06	2.14	8	15	9-11mm
	Male	12.52	1.62	8	16	
LV EDD	Female	46.12	6.63	36	60	36-56mm
	Male	50.58	6.74	40	72	
LV ESD	Female	31.35	7.48	22	48	25-41mm
	Male	35.08	7.70	22	58	
EF	Female	60.83	13.59	35	78	50-70%
	Male	60.24	10.46	35	72	
F/S%	Female	28.41	9.87	10	41	29-37%
	Male	29.76	4.75	14	34	

**DISCUSSION**

There are many reasons of kidney failure in a local study the reasons of kidney failure documented were mismanaged surgery issues including obs/gynecological, altering climatic conditions, infections, drug abuse (Kushta intake), poisoning or partially treated medical causes<sup>6</sup>. Diastolic dysfunction is found associated with the adverse outcome in patients with end stage kidney failure<sup>7</sup>.

Renal dysfunction in patients with severe MI is individually associated with echocardiographic proof increased LV filling up pressure. However, the prognostic need for renal dysfunction is attenuated to

a larger degree by LV longitudinal systolic function.(8) It was also observed that among CKD patients with diabetes type 1 and increase albuminureia have greater risk of subclinical abnormal myocardial function<sup>9</sup>.

In current study most of the patients 23(52.27%) LV systolic blood pressure was mild, 4(9.09%) have moderate LV systolic blood pressure and in 17(38.64%) LV systolic blood pressure was concentric. 8(18.18%) were with grade III and 4(9.09%) were with grade IV diastolic dysfunction.

A recent study has revealed that Hypocalcemia is an independent predictive factor for LV diastolic dysfunction in patients with CKD.

## CONCLUSION

The diastolic blood pressure was frequent among the patients with end stage kidney disease. Number of patients with abnormal EF value and Grade 3 and 4 left ventricle diastolic dysfunction was substantially high. It is suggested that an in-depth and longitudinal study should be conducted to determine factor affecting the diastolic dysfunction in patients with CKD.

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