

# Introduction

The heart and kidney are closely related. Their role is to maintain salt–water homeostasis and normal blood pressure. Renal impairment and disturbance of salt and water excretion result in an increase in cardiac preload as well as afterload. Furthermore, low cardiac output can decrease kidney perfusion and lead to kidney failure. Therefore, renal impairment is one of the most serious consequences of HF. Primary mechanisms of this process are mainly reduced renal perfusion and venous congestion. However, coexisting renal failure can also be caused by diabetes, arterial hypertension, or ischemic kidney disease. HFrEF with renal impairment have more complications, hospital admissions, higher incidence of arrhythmia and longer hospital stay.

# Aim of the Work

The aim of the study was to identify the impact of the presence of chronic kidney disease on clinical presentation, management, in hospital and short-term outcomes of patients with heart failure with reduced ejection fraction.

# Subjects and Methods

This study included 100 HFrEF patients: 50 patients with HFrEF and CKD and 50 patients with HFrEF without renal impairment. Inclusion criteria were age older then 18y, Established diagnosis of stage 3 to 5 CKD according to National Kidney Foundation. K/DOQI clinical practice guidelines for chronic kidney disease 2020 and Established diagnosis of HFrEF according to 2021 European society of cardiology (ESC) guidelines for the diagnosis and treatment of acute & chronic heart failure. Each patient was studied with basic lab investigations, resting 12 leads electrocardiography and transthoracic echocardiography. Also, clinical data including demographic criteria, past medical history, vitalsigns, in hospital complications and NYHA class of the patients were obtained.

# Results

The studied population was divided into two groups: group (1) included HF patients with CKD and group (2) included HFrEF without renal impairment. The most prevalent cardiovascular diseases of participants were coronary artery disease and cerebrovascular disease which all were numerically more common in group (1) represented as CAD (n =43) 89 %, CVS (n=12) 24% with no statistically significant difference. In hospital complications as occurrence of new arrhythmia was more prevalent in group (1) representing 38% (n=19)with atrial fibrillation being the most common type of arrhythmia in both groups representing 28% (n=14) and 37.5% (n=6) in group (1) and (2) respectively with statistically significant difference.also,duration of hospital stay was significantly longer in group (1)with the mean for the number of daysbeing 6.54 ± 2.98 compared to group (2) with mean 5.22 ± 1.94.

Table 1: Out of hospital complications during six months follow up of the study population

		CKD & HF (n=50) Group (1)		HF (n=50) Group (2)		Test of significance	p value
		N	%	N	%		
NYHA class (n=77)		(n=37)		(n=40)			
	II	8	21.6	17	42.5	Fisher’s Exact = 5.879	0.041*
	III	26	70.3	23	57.5		
	IV	3	8.1	0	0.0		
Need for Re-hospitalization	Yes	22	44.0	22	44.0	$\chi^2 = 0.0$	1.0
	No	28	56.0	28	56.0		
Occurrence of new arrhythmia	Yes	17	34.0	16	32.0	$\chi^2 = 0.045$	0.832
	No	33	66.0	34	68.0		
	Atrial fibrillation	9	52.9	5	31.3	$\chi^2 = 1.329$	0.249
	Atrial flutter	3	17.6	3	18.8	$\chi^2 = 0.0$	1.000
	Atrial tachycardia	0	0.0	1	6.3	$\chi^2 = 1.010$	1.000
	SVT	3	17.6	4	25.0	$\chi^2 = 0.154$	1.000
	Non sustained VT	2	11.8	3	18.8	$\chi^2 = 0.211$	1.000
Acute HF	Yes	17	34.0	25	50.0	$\chi^2 = 2.627$	0.105
	No	33	66.0	25	50.0		
Death	Yes	13	26.0	10	20.0	$\chi^2 = 0.508$	0.476
	No	37	74.0	40	80.0		
Death during hospital stay (n=23)		(n=13)		(n=10)			
	Yes	11	84.6	5	50.0	Fisher’s Exact = 3.199	0.169
	No	2	15.4	5	50.0		
Cause of death (n=23)	Sudden cardiac death	2	15.4	5	50.0	Fisher’s Exact = 3.543	0.341
	Septic shock	3	23.1	1	10.0		
	Cardiogenic shock	7	53.8	4	40.0		

During 6months follow up, group (1) patients experienced more advanced NYHA class, higher incidence of new arrhythmia and higher mortality rate with cardiogenic shock being the most common cause of death in both groups. The use of MRA , ACE/ARBs , ARNI , SGLT2i was more prevalent in group (2) patients representing 80 % (n=40) ,90% (n=45) , 32.0% (n=16),38 % (n=19) and 80 % (n=40) in group (1) respectively compared to 34 % (n=17) , 32%(n=16) , 26%(n=13) and 66% (n=33) in group (1) respectively with statistically significant difference in the use of MRAs and ACE/ARBs only.

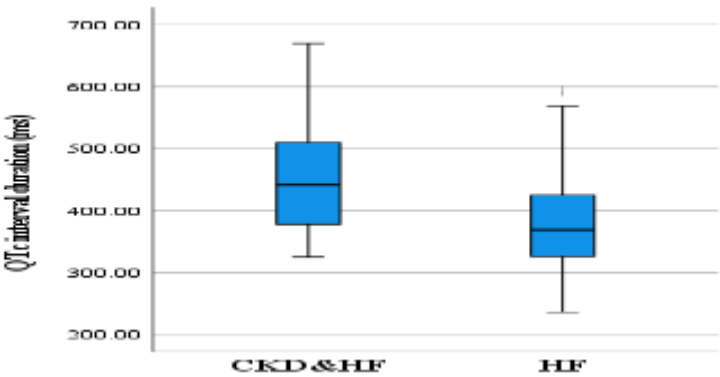


Figure1:  
Qtc interval

# Conclusion

- HFrEF patients with renal impairment have poor quality of life and worse prognosis compared to HFrEF patients without renal impairment.
- HFrEF patient with CKD present with more advanced NYHA class including NYHA III and NYHA IV.
- HFrEF patients with renal impairment has more in hospital complications as longer duration of hospital admission, rate of hospitalization and at higher risk for arrhythmia particularly atrial fibrillation.
- Occurrence of repolarization abnormalities as prolonged QT cinterval and conduction abnormalities as LBBB is common in HFrEF with CKD.
- Compared to patients without renal impairment, HFrEF patients with CKD are more likely to have worse prognosis and receive less evidence -base heart failure treatment.