Original Research

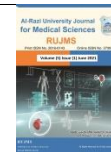Al-Razi University Journal of

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Chronic Kidney Disease in Yemeni Patients with Acute Heart Failure Observation from Gulf Acute Heart Failure Registry (CARE)

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Abstract:

Background: Chronic kidney disease (CKD) represents a major health problem in Yemen that has great socioeconomic and medical con-sequences. (A) It associates with comorbid conditions, such as hypertension, diabetes and cardiovascular disease (B). Heart failure (HF) is highly prevalent in patients with (CKD) and increases greatly as the patient's renal function deteriorates, and can reach 65-70% in end-stage renal disease (ESRD) with increase mortality in these patients. **Aims:** to show the impact of different degrees of renal impairment on heart failure (HF) in Yemeni patients. **Methods:** Gulf CARE is a prospective, multicenter, multinational registry of patients >18 year of age admitted with diagnosis of acute HF (AHF). The data collected included demographics, clinical characteristics, etiology, precipitating factors, management and outcomes of patients admitted with AHF. In addition, data about hospital readmission rates, procedures and mortality at 3 months and 1 year follow up were recorded. Hospital characteristics and care provider details were collected. **Results**: It was found that 30.7% of Yemeni patients with HF had eGFR <60 mL /min/1.73m2 , while 3.5% had eGFR <30 mL /min/1.73m^2. End Stage Renal Disease (ESRD) with eGFR <15 mL /min/1.73m^2 was documented in 2.5% of the patients. High mortality were noted among HF patients with chronic kidney disease (CKD). There were a big association between the degree of renal impairment , the severity of HF and the age of the patient with *P* value of <0.001. **Conclusion:** CKD is highly linked to the severity of HF and its short and long terms outcomes.

Keywords: Heart Failure, Chronic kidney disease, Yemen and Gulf CARE

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Introduction

Cardiovascular disease remains the greatest cause of mortality in patients with CKD and ESRD, and it accounts for 53% of all deaths with a known cause in dialysis patients. Heart failure (HF) is the leading CV complication in CKD patients and its prevalence increases with declining kidney function [1]. The relationship between the heart and the kidney diseases and its pathophysiology of the cardio-renal syndrome is well established [2-5]. It is assessed that up to 36% of all people with ESRD already have congestive heart failure (CHF) at the beginning of dialysis, while another 25% of dialysis patients progress to de-novo CHF [6]. These complex conditions affect a vast population and shows bad prognosis of only three years and no improvement in prognosis from over twenty years and carries a high risk of mortality even in patients treated according up to date medical therapy [7,8]. Heart failure (HF) is a serious sequele of cardiovascular diseases and its morbidity and mortality in Yemen is magnificent[9]. Meanwhile chronic kidney disease (CKD) is another major health problem in Yemen[10]. Several factors lead to poor prognosis of HF patients with CKD[11]. The degree of renal impairment and its spectrum, their relationship with the prognostic events of HF were largely studied but mostly in small sample volume and short terms periods [2,13]. Up to date there is no specific therapy for patients with HF experienced CKD[8] in spite of the current treatment is not always insufficient. Our study is the first study that explore the relationship between CKD and HF.

Methods and Rational

Registry design: Gulf CARE is a prospective, multinational multicenter registry of patients admitted with the diagnosis of AHF in 7 Middle Eastern Gulf countries. It was designed to compile a large clinical database on the clinical characteristics, management, and outcomes of patients hospitalized for AHF across the Gulf countries. Data are collected on episodes of hospitalization beginning with point of initial care, throughout hospitalization, in addition to 3 month and 1-year follow-up.

Recruitment in the study started from February 14, 2012 and ended on November 13, 2012. This was preceded by a pilot phase of 1 month in November 2011. The registry continued to follow-up patients at 3 months and 1 year. Institutional or national ethical committee or review board approval was obtained in each of the 7 participating countries, and all patients provided informed consent. Each patient was given a unique identification number to prevent double counting. Yemen data was extracted from the whole Gulf-CARE patients. The number of Yemeni patients with HF included in this registry was 1536 patients. Patients with moderate and severe renal insufficiency were further extracted from the analysis.

Chronic kidney disease (CKD) was defined as eGFR <60 mL/min/1.73m^2 for 3 months or more, with or without kidney damage or on dialysis. If no eGFR is available, serum creatinine >177 mmol/L or 2 mg/dL was marked as CKD. Obesity was defined as body mass index (BMI) >30 kg/m [2,14].

Results

of CKD and P value was less than 0.001 (Table 1). Reduced left ventricular systolic function represented by left ventricular ejection fraction especially less than 40 % were noted in 839 patients and it was of high incidence in each grade of renal dysfunction giving a P value of less than 0.001.

Rapid heart rate was recorded in most of the cases with HF but it was higher in-between patients with CKD especially in ESRD group with *P* value = 0.011. On other hand arterial hypertension on admission was reportedly high in all groups of CKD patient P<0.001. While LBBB in ECG, anemia and high serum creatinine were prevalent in ESRD group with P value <0.001 (Table 2)

High mortality was noted among patients with any grade of renal dysfunction . In hospital mortality was the highest among ESRD (nearly one fifth of the patients dies in the hospital) , also mortality was high among the rest of renal impairment patients P value was <0.001. 3 month and one year mortality is still significantly high in CKD patients (Table 3).

Table 1: Baseline characteristics of whole patients group

Demographics	eGFR ≥90	eGFR 60–89	eGFR 30–59	eGFR 15–29	eGFR <15	P -value
Age (years±SD) (n=1536)	49.15 (±15.77)	54.06 (±14.95)	56.65 (±14.67)	57.82 (±16.10)	55.66 (±13.04)	<0.001
Male (n=991) (% of Total)	325 (21.2%)	371(24.2%)	235(15.3%)	31(2%)	29(1.9%)	<0.001
Risk factors						
Hypertension (n=551)	129(8.4%)	179(11.7%)	189 (12.3%)	30 (2%)	24(1.6%)	<0.001
Diabetes mellitus (n=337)	73(4.8%)	122(7.9%)	104(6.8%)	20(1.3%)	18(1.2%)	<0.001
Smoking (n=483)	132(8.6%)	187(12.2%)	135(8.8%)	16(1%)	13(0.8%)	0.179
Cardiovascular disease						
Previous CAD(n=544)	152 (9.9%)	200(13.0%)	154(10.0%)	26(1.7%)	12(0.8%)	0.119
Previous CHF (n=611)	126(8.2%)	222(14.5%)	216(14.1%)	32(2.1%)	15(1%)	<0.001
Atrial fibrillation /flutter (n=85)	23(1.5%)	34(2.2%)	25(1.6%)	1(0.1%)	2(0.1%)	0.664
Valvular heart disease (n=203)	84(5.5%)	67(4.4%)	45(2.9%)	2(0.1%)	5.(0.3%)	<0.001
CHD (n=9)	5(0.3%)	2(0.1%)	2(0.1%)	0	0	0.498
PVD (n=33)	10(0.7%)	11(0.7%)	11(0.7%)	0(0.0%)	1(0.1%)	0.545
Known Cardiomyopathy (n= 111)	8(0.5%)	35(2.3%)	63(4.1%)	4(0.3%)	1(0.1%)	<0.001
Comorbidity						
Previous stroke or TIA (n=68)	18(1.2%)	19(1.2%)	28(1.8%)	1(0.1%)	2(0.1%)	0.35
Pulmonary disease (n=71)	25(1.6%)	13(0.8%)	29(1.9%)	3(0.2%)	1(0.1%)	0.406
Characterization of heart failure						
New heart failure (n=777)	236(15.4%)	273(17.8%)	233(15.2%)	17(1.1%)	18(1.2%)	0.045
Heart failure >6 month (n=759)	208(13.5%)	255(16.6%)	239(15.6%)	37(2.4%)	20(1.3%)	0.04
NYHA class (n=1525)						
NYHA I (n=44)	16(1.0%)	17(1.1%)	11(0.7%)	0	0	<0.001
NYHA II (n=314)	91(5.9%)	127(8.3%)	76(4.9%)	11(0.7%)	9(2.9%)	<0.001
NYHA III (n=595)	197(12.8)%	203(13.2%)	159(10.4%)	25(1.6%)	11(1.8%)	<0.001
NYHA IV (n=572)	134(8.7%)	180(11.7%)	222(14.5%)	18(1.2%)	18(1.2%)	<0.001
Left ventricular ejection fraction						
>50% (n=299)	120(8.5%)	90(6.4%)	72(5.1%)	10(0.7%)	7(0.5%)	<0.001
41- 49% (n=270)	105(7.5%)	101(7.2%)	50(3.6%)	7(0.5%)	7(0.5%)	<0.001
≤ 40% (n=839)	188(13.4%)	304(21.6%)	301(21.4%)	30(2.1%)	16(1.1%)	<0.001

Table 2: Physical signs, laboratory results

	eGFR ≥90	eGFR 60–89	eGFR 30–59	eGFR 15–29	eGFR <15	P-value
n = (Total 1536)	444	528	472	54	38	
Physical signs						
Heart rate (n=1471)	97(29–165)	101 (32–200)	102 (30–173)	97(40–130)	105 (70–154)	0.011
Blood pressure systolic (n=1471)	123 (60–220)	130 (60–230)	138 (50–250)	134 (70–210)	146 (60–210)	<0.001
Blood pressure diastolic(n= 1471)	76 (30–120)	82 (30–160)	86 (20–130)	83 (40–120)	88 (30–120)	<0.001
BMI (n=1536)	25 (14–44)	26 (16–41)	26 (14–51)	27 (16–46)	28 (20–59)	<0.001
ECG						
Non-sinus rhythm(n=219)	14%	14%	15%	15%	13%	0.532
Left bundle branch block (n=218)	8%	17%	17%	11%	18%	0.007
Wide QRS (n=289)	12%	20%	23%	15%	21%	<0.001
Lab						
Haemoglobin-gm/dL (n=1536)	13.8 (2.9–20)	13.2 (5.2–19.9)	12.6 (2.3–19.5)	12.2 (7.9–20)	10.7 (6,4–19.2)	<0.001
Creatinine (n=1536)	0.6 (0.3–1.0)	0.1 (0.6–1.4)	1.4 (1.0–2.4)	2.7 (1.8–4.3)	6.2 (3.5–14.5)	<0.001
Potassium (n=1536)	4.2 (2.2–7)	4.2 (2.4–6.2)	4.3 (2.1–7)	4.7 (3.1–6.9)	4.8 (3.6–7.0)	<0.001

Table 3 : Mortality in CKD with HF

	eGFR ≥90	eGFR 60–89	eGFR 30–59	eGFR 15–29	eGFR <15	P-value
n = (Total 1536)	444	528	472	54	38	
IN HOSPIAL DEATH	23 (5.2%)	40(7.6%)	61(12.9%)	10(18.5%)	8(21.1%)	< 0.001
3 MONTH DEATH	26(5.9)	31(5.9%)	38(8.1%)	4(7.4%)	3(7.9%)	< 0.001
12 MONTH DEATH	27(6.1%)	26(4.9%)	18(3.8%)	9(16.7%)	1(2.6%)	< 0.001

Discussion

Our study has its own importance as a first study in Yemen which expose largely the strong association of renal performance and short , long term mortality in Yemeni patients with HF. In hospital mortality was also gross in patients with ESRD. Damman *et al* [15] clearly demonstrated the relationship between renal function and prognosis. Our data shows the impact of different risk factors as diabetes mellitus and hypertension on the prognostic consequences of the disease and this was demonstrated clearly in our subgroups of patients with renal impairment . Most of our patients were relatively younger males

with prior history of heart failure. Those findings were consistent with other studies [16,17,18].

Mortality figures in our study among an important cluster of our population , which still productive cluster. This reflects negatively of the national economy in a developing country like Yemen. Gulf CARE was designed for all cases of heart failure and the chronic kidney disease was not intentionally the main target for the registry , still our mortality data are extremely devastating especially in young age group. Our data contradicting many other studies especially those concluded elderly population mortality rather than young as ours [16, 17, 18].

There are limitations to this study; Gulf Care registry reflects clinical practice. The selection of patients depends on the patients presented to the main hospitals included in the registry still others may not have been included because of misdiagnosed, other comorbidities, or other reasons. Other limitation is lack of guidelines to manage HF .

Conclusion

Heart failure is a major health problem in Yemen. HF per se carries a risk of mortality. Renal dysfunction in association with HF in Yemeni patients attributed to high in-hospital mortality as well as short-term and long term morbidity and mortality. Those findings point out the importance of early diagnosis , close medical care and follow up of patient with HF&CKD.

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