



## Original Article

## Severe Coronary Problems in Kidney Illness: Medical and Therapeutic Features

Niaz Hussain Abassi<sup>1</sup>, Khalid Hussain Soomro<sup>1</sup>, Abdul Qadir Bhutto<sup>1\*</sup>, Shah Muhammad Babar<sup>2</sup>, Ali Asad<sup>2</sup>, Muhammad Aslam<sup>3</sup>

<sup>1</sup>Department of Cardiology, Pir Abdul Qadir Shah Jeelani Institute of Medical Sciences Gambat, Pakistan

<sup>2</sup>Intervention Cardiology Fellow NICVD, Karachi, Pakistan

<sup>3</sup>NICVD, Nawab Shah, Pakistan

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## \*Corresponding Author:

Abdul Qadir Bhutto  
Department of Cardiology, Pir Abdul Qadir Shah Jeelani Institute of Medical Sciences Gambat, Pakistan  
[qadira41@gmail.com](mailto:qadira41@gmail.com)

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## ABSTRACT

CAD (coronary artery disease) has a link with the long-lasting kidney issues. The people suffering from some kidney issue may develop coronary artery disorder and its risk factors are very similar to the risk factors in other cases. **Objective:** To assess the parameters of CKD (coronary kidney disease) and CAD (coronary artery disease). There was need for the establishment of some efficient predictive methods or biomarkers for the indication of the coronary disorder. **Methods:** To proceed with this study 301 patients were selected. All of these patients were admitted in the cardiology ward of the hospital. Among them 151 patients had ACS along with CDK while on the other hand, 150 patients had ACS but they do not have any coronary artery disease. Both categories of the patients had made, according to the presence or absence of coronary artery disease. The progression of Coronary disease was estimated by KDIGO (improving global outcome). **Results:** For the prediction of results, all the attributes related to kidney issues as well as coronary artery were analyzed. Different parameters like disease history of the patients, regulatory parameter of both ACS and CKD, cardio graphical results and angiography states, were carefully estimated for both categories. The characteristics related to increased level of myocardial infarction indicated by STEMI. All these inferred that the level of initiation of coronary disease is much higher in the group without chronic kidney disease. It was estimated about 42 %. However, in the case of CKD group having coronary issues, the raise of non-segmented myocardial infarction is lower (28 %). **Conclusion:** There is increased level of CAD in case of kidney disease and in CAD. The different indicators and markers for the coronary and kidney disease as well as different cardiological methods were assessed in this study.

## INTRODUCTION

The prevalence of CAD (coronary artery disease), in case of some kidney disorder was compared with the normal coronary issues in case of other disease. The atherosclerosis process increased, when link develop between cardiological disease and uremia related disease. Different unusual risk factors like RBCs deficiency, changes in the metabolism of calcium and phosphate, uremic issues and inflammation do increase when kidney fails to perform its normal function [1-3]. For the initiation of the atherosclerosis, dyslipidaemia have prime role. For the study of homeostasis, after some kidney issues, AURORA is used. With the help of this test, different factors

related to the disturbance of homeostasis evaluated as well as the role of these factors in the initiation of other diseases can also be studied [4-5]. During some kidney issues, lipid metabolism of the body also gets disturbed and plaques formed [6]. In more severe cases of coronary issues, NSTEMI (non-ST-segment myocardial infarction), STEMI (ST segment increase myocardial infarction), different restriction in coronary arteries and heart occur. However, in the kidney patients having CDK, the most common symptoms were pain in thoracic region, and different other issues observed [7-8]. The different kidney issues also disturb the necrosis of cardiac tissues and their

markers such as troponins of cardiac regions make the diagnosis of acute coronary syndrome difficult. In case of myocardial infarction, the level of biomarker troponin raises more than 99 %, which is quite higher than the normal condition. The raise of troponin induces pain in chest, and ECG graph alterations and cause ischemia of heart. Different protocol provided by international cardiac organization for the measurement of level of troponin [9-11]. Different kidney impairments also interfere with the normal function of the heart. As a result of kidney surgery revascularization of myocardial infarction was observed. The results of CKD and ACS have negative effects on different therapies such as thrombolytic therapy [12]. When therapeutic analysis of treatment of CKD and ACS considered, it also has a number of issues; there is no effective therapy, when patient has both kidney and coronary issue. For the treatment of this disease, aggressive reperfusion method was used which is a fibrinolytic therapy. Different trials begun to reduce the mortality rate by this combine kidney and coronary artery syndrome. There was an increase in the probability of bleeding, if a patient has more acute kidney issue or some kind of hemorrhage due to thrombolysis in case of coronary issue. The more effective therapy till date, for this syndrome is PCI (percutaneous coronary intervention). Several other therapies like syntax and bypass grafting, were also used for treatment [13-14]. The purpose of this study was to analyze the different parameters of ACS and CDK and to establish the management for emergency cases for the diagnosis.

## METHODS

It was an observational study conducted at Pir Abdul Qadir Shah Jeelani Institute of Medical Sciences Gambat. In this study, 301 patients were included. All of these patients declared for the disease ACS by the cardiology lab of the hospital. The patients selected from 2020 to 2021. For the inclusion of the patients, it was mandatory to do ECG of all the patients. After ECG, patients with the raise of troponin level were include. All of the patients have symptoms for the coronary artery disease as well as some kidney issues like disturbance of homeostasis. Those patients were excluded, who had constant changes in Electrocardiogram, and not diagnosed with acute disease level (not suffering from kidney function alteration). The patients were divided into two categories, one with only ACS (150 patients) and the second one with ACS as well as CKD (151 patients). The permission was granted to the study group by ethical committee, and consent from patients was also taken. For the measurement of kidney infection level, creatinine formula used for the prediction of kidney function; the function was estimated and compared with

the function of threshold levels defined by National kidney base. The lowering of GFR level observed in case of renal malfunction, the level of GFR observed for consecutive 4 months. For the measurement of cardiac function, abnormal ECG changes was observed along with other symptoms like pain in thoracic region, and elevation of the level of troponin, a necrotic enzyme of cardiac system. For myocardial infarction, angiography was done to diagnose about the cardiac function. For the assessment of the efficiency of left ventricle, Killip Kimball classification used. The level of urea and uric acid was also estimated by different methods. After obtaining results from all of the tests, for all patients, different parameters of each individual patient was calculated and compared by using biostatistics and number of other test like Mann-Whitney test, Chi square and Kolmogorov-simirnov test. The confidence level was kept 0.05.

## RESULTS

The incidence of the disease is similar in male and female. The calculated p-value for the gender based incidence don't show the significant difference. It was observed to be 0.76 for the control and experimental group. However, the data obtained after comparing the similar groups showed that the male are more prone to develop ACS. The p-value for the mean age was <0.01. The mean age of the reference lot was calculated to be 68.62. The significant p-value of the urban origin was <0.01, Table 1.

Features	Acute Coronary syndrome CKD group (n=151)		Acute Coronary syndrome without CKD group (n=150)		P-value
	Number	Percentage	Number	Percentage	
Women	102	67.54%	99	66%	0.76
Men	49	32.45%	51	34%	
<b>Age</b>					
Mean age	69 ± 9.9		64 ± 10.7		<0.01
Confidence level (95%)	48.78; 9		42.93; 86.1		

**Table 1:** The distribution of gender according to the AC syndrome with or without CKD group

The 97 patients were observed at the stage 3 of the glomerular filtration rate (GFR) in the ACS with CKD group. While 35 were observed at stage 4 and 18 at stage 5. The incidence of the MINOCA and STEMI is higher in the ACS group without CKD. The CKD group has the higher incidence of stable angina and chronic coronary syndrome, Table 2.

Characteristics	The ACS without CKD	P-value
STEMI	65	0.19
N-STEMI	42	0.04
Unstable angina	48	0.27
MINCOA	9	0.31

**Table 2:** The distribution of different characteristics in the ACS group without CKD

The associated comorbidities were studied for the both groups with or without CKD. The incidence of the heart failure in the CKD group is as higher as 41%. The incidence of diabetes mellitus and sequelae of myocardial infraction is also higher in this group. The incidence of thoracic pain was also greater in non-CKD group. The cardiogenic shock percentage was also higher in the CKD group, Table 3.

Features	ACS group with CKD (n=151)		ACS group without CKD (n=150)		P-value
	Number	Percentage	Number	Percentage	
Stable angina	59	39.07	38	25.33	<0.01
Chronic coronary syndrome	68	45.03%	38	25.33	<0.01
<b>Angina pectoris Grading</b>					
Degree I	9	5.96	7	4.6	0.59
Degree II	33	21.85	25	16.66	0.37
Degree III	19	12.58	7	4.61	0.01
NYHA II	36	23.84	17	1.33	<0.01
NYHA III	28	18.54	13	8.66	0.02
Previous heart failure	63	41.72	29	19.33	<0.01
Sequelae of myocardial I nfraction	33	21.85	17	11.33	0.01
Inferior territory	16	10.59	3	2	<0.01
Anterior territory	16	10.59	12	8	0.42
Lateral territory	0	0.00	1	0.66	0.31
Anterior and inferior territories	1	0.66	0	0.00	0.31
Peripheral artery disease	2	17.88	17	11.33	0.17
Previous ischemic stroke	72	18.54	2	1.33	<0.01
Diabetes mellitus	88	56.95	53	35.33	<0.01
Thoracic pain at admission	68	56.95	130	86.66	<0.01
Dyspnoea at admission	66	41.72	20	13.33	<0.01
Syncope at admission	33	1.98	0	0.00	0.16
Cardiogenic shock	20	13.24	10	6.66	0.07

**Table 3:** Percentage comorbidities in the ACS group with or without CKD

The biomarker that attest the cardiac origin of dyspnoea was considered as its prognosis predictor. The patients with impaired renal functions has higher mean values of marker while lower mean values were observed in the patients with proper renal functioning. The 89% cases included in the ACS with CKD group underwent coronary angiography while 99% cases of the ACS with non-CKD group underwent angiography. In the non-CKD group, the single vessel CAD was observed with the higher percentage, Table 4.

Features	ACS (n=150)		ACS/CKD (n=151)		P-value
	Number	Percentage	Number	Percentage	
CAD (single -vessel)	44	29.33	16	10.59	<0.01

CAD (double -vessel)	49	32.66	42	27.81	0.33
CAD (three-vessel)	34	22.66	42	27.81	0.42
LMCA	13	8.66	22	14.56	0.13
MINOCA	9	6	13	8.60	0.36
Patient without coronary angioplasty	1	0.66	18	11.92	<0.01

**Table 4:** The percentage characteristics of coronary artery disease in the CKD and non-CKD group

## DISCUSSION

The atypical symptoms are observed in ACS. The higher number of cardiovascular diseases are associated with chronic kidney disease. The mortality rates of the patients having ACS with CKD are still unknown. It is the most prevalent disease now a day [15]. The biomarkers and echocardiography play important role in determining the prognosis of the patients. The worst prognosis of ACS is observed in the patient with associated CKD. CKD is also a predictor of the outcomes of ACS. The worst cardiac events are seen in the patients with associated cardiovascular diseases. The poor long/short term outcomes are associated with the CKD. The ACS in the CKD patients complicate the management of the patients. There is a need to develop the treatment strategies for the patients having CKD with ACS is highly [16-17]. The renal functioning must be considered before developing the treatment strategies. The congestive heart failure and cardiogenic shocks are predictor of mortality in the CKD patients with ACS. With the increase in the impaired renal functioning the incidence of non-traditional risk factors also increases. The patients with ACS having normal kidney functioning have characteristics thoracic pain predominantly. While in the patient having CKD with ACS has higher incident of dyspnea. The patients with retarded renal functions have ischemia predominantly. A study was conducted in which 356 patients were included, it was concluded that the incidence of myocardial infraction in the patient with CKD group is higher than the patients without CKD. It is observed that the diabetic neuropathy is associated with the phenomena. It is most highly observed pathology in the patients with CKD [18]. A similar study was conducted by the Sosnov et al., depicted that the incidence of thoracic pain is much higher in the patients included in the non-CKD group. It is not dependent on the diabetic neuropathy. Study also revealed that the CKD group has higher incidence of shortness of breath. Few studies indicated that the cardiovascular risk factors are not dependent on the renal functions. The ischemic CAD and obliterative CAD are highly influenced by the impairment of the renal function. Because of the presence of left ventricular hypertrophy, the CKD patients are not

characterized by the ischemia. Our study also revealed that the QS waves are generally observed in the patients with CKD [19-20]. Other studies were also conducted on the different people that also depicted that incidence of left bundle branch block is higher in the CKD group. The chronic inflammatory process leads to the ventricular remodeling that are more common in the CKD group. The patients having CKD with proper renal functioning have poor prognosis after ACS. During the drug eluting stents, the Chan et al., study depicted that the cardiac and cerebrovascular events ratio was lower. The CABG versus PCI also decreases the rate of myocardial revascularization. The myocardial revascularization do not affect the death significantly [21-22]. The CKD patients also have the higher incidence of stroke and myocardial infraction. The PCI group has higher incidence of repeated revascularization as compared to the CABG group. The same treatment was given to the patients diagnosed with the STEMI and CKD. CKD group has the higher incidence of cardiogenic shocks and other complication like left ventricle impairment and papillary muscle ischemia. The prognosis rate improves in the CKD patients that has undergone myocardial revascularization. The hemodynamic instability risks are also lower in such patients. The survival rates of the patients with CKD and STEMI, are influenced by the myocardial reperfusion [23].

## CONCLUSIONS

CAD and CKD shared the strong association. The pathological conditions such as heart failure and ischemic stroke were associated with the CKD patients with coronary events. For evaluation of prognosis of such patients the elements like echocardiography and NT-pro BNP must be considered. The patients with the impaired renal functions have the characteristics of proximal CAD. For evaluation of the clinical characteristics of the patient new trial must be conducted on the patients with the CKD and ACS group. There is need to develop the strategy for improvement of outcomes of the ACS patients with CKD.

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