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Research Article

**ANALYSIS OF ARTERIAL STIFFNESS SUBSEQUENT
CORONARY ARTERY BYPASS GRAFT FOR PREDICTION OF
ACUTE KIDNEY INJURY**Dr. Shahzeen Aftab Alvi¹, Dr. Tahmina Sajjad¹, Dr. Rida Wakeel¹.¹Health department Punjab.

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Abstract:

Introduction: AKI (acute kidney injury) can affect twenty percent of the patients who have been hospitalised. It also contributes to major health implications which can as a result affect socioeconomic implications. Objectives of the study: The main objective of the study is to analyse the arterial stiffness subsequent coronary artery bypass graft for prediction of acute kidney injury.

Material and methods: This cross-sectional study was conducted in Health department Punjab during 2018 to 2019. Only the patients who due to have CABG were included in the study and all the others that had CKD stage 4 or 5 were excluded from the study. Blood and urine samples were collected of all the patients included in the study. Data regarding the demography, subject's medical history which included heart rate, blood pressure and other factors were collected. All the assessments were done in the same visit.

Results: The number of participants which were included in this study was 137 in a period of two years. In table 1, their demographic measurements are presented. 85 percent of the participants of the study were male (85% (n = 116)), the mean age of 66.3. Majority participants did not have a renal disease and were not unstable before surgery, but 29(40) percent of the patients developed AKI as defined by the criteria of KDIGO.

Conclusion: It is concluded that PWV was assessed erstwhile to CABGs which predicted AKI events post-operative in this exploratory study.

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INTRODUCTION:

AKI (acute kidney injury) can affect twenty percent of the patients who have been hospitalised. It also contributes to major health implications which can as a result affect socioeconomic implications. An incident of AKI is able to increase the chance of chronic kidney disease (CKD) and mortality shown by studies [1]. Coronary artery bypass graft (does not include valve repair) is shown in published data increases the incidence of AKI by 12 percent. An incidence of AKI was found in 19.6 percent patients through serum AKI criteria. In absence of specific therapy of AKI that can completely support the management of patients and the absence of specific biomarkers it can be considered that a minute event of AKI implicates a less prognosis that could bear greater risk development of CKD in patients [2]. The focus of our study is the prevention and early detection of risk. In various studies of patient outcomes and death reports it is identified that 30 percent of AKI patients were deficiently cured and could be prevented. Prevention of AKI could also save millions per annum, in economic terms. Low eGFR, diabetes and old age are factors that are associated with risk of AKI [3]. PWV is a technique that can assess arterial stiffness that is also non-invasive. Renal perfusion and vascular health are the factors of reliance in Kidney function. Studies emphasise this relationship of renal function decline and increased risk of death through cardiovascular events. Increased Arterial stiffness in renal transplant recipients is shown by some studies an independent factor [4]. We undertook this study to assess whether AS may possibly be branded as an independent factor of risk in post CABG coronary artery bypass graft which results in AKI through measuring Pulse Wave Velocity [5].

OBJECTIVES OF THE STUDY:

The main objective of the study is to analyse the arterial stiffness subsequent coronary artery bypass graft for prediction of acute kidney injury.

MATERIAL AND METHODS:

This cross-sectional study was conducted in Health department Punjab during 2018 to 2019. Only the patients who due to have CABG were included in the study and all the others that had CKD stage 4 or 5 were excluded from the study. Blood and urine samples were collected of all the patients included in the study. Data regarding the demography, subject's medical history which included heart rate, blood pressure and other factors were collected. All the assessments were done in the same visit. Patients were approached during early afternoon visits. Gold standard method of carotid femoral PWV has been used to quantify pulse wave velocity in patients.

STATISTICAL ANALYSIS:

T-test and chi-squared tests were used appropriately according to the data type and Pearson's correlation coefficient was used to assess correlations. To generate regression beta coefficients as well as odds ratio for variables that are baseline, logistic and linear regression analysis were used to determine independent factors of AKI risk.

RESULTS:

The number of participants which were included in this study was 137 in a period of two years. In table 1, their demographic measurements are presented. 85 percent of the participants of the study were male (85% ($n = 116$)), the mean age of 66.3. Majority participants did not have a renal disease and were not unstable before surgery, but 29(40) percent of the patients developed AKI as defined by the criteria of KDIGO. Contrast of the variables in patients who suffered AKI and who did not develop AKI after surgery is shown in table 1.

Table 1: Descriptive statistics as well as univariate tests to associate to acute kidney injury.

Variables factors	Negative Acute Kidney Injury	Acute Kidney Injury	p
Age	67 (61.0 to 73.7) ^b	71.5 (56.7 to 74.7) ^b	0.405 [*]
(BP)Blood pressure mm Hg	133.8 (17.3) ^a	136.0 (10.9) ^a	0.578 ^{\$}
Heart rate	65 (56.0 to 72.0) ^b	66.5 (59.0–76.2) ^b	0.645 [*]
Pulse wave velocity ms ⁻¹	8.3 (7.3 to 9.9) ^b	9.3 (8.4–10.7) ^b	0.049 [*]
eGFR ml ⁻¹ .min ⁻¹ .1.73 m ⁻²	78.5 (68.2 to 90.0) ^b	53 (42–65.2) ^b	< 0.001 [*]
Diabetes	21.4%	50%	0.007 [#]
Ejection fraction category	69.2%	65%	0.912 [#]
Gender	87.2%	70%	0.049 [#]

DISCUSSION:

The study in nature investigates post elective CABG surgery, the relationship of Pulse wave velocity and AKI data related to this study was also found previously that was published and supports and association between AS and kidney function. Younger males with higher levels of kidney function measured via eGFR were found to have lower risk of AKI development after the operation performed and that is consistent with studies done in the past [6]. Female sex and pre-operative renal injury (eGFR less than 60 ml/m and creatinine less than 2.1 mg/dl) are found to be the risk factors for developing AKI-CSA. A significant relation between vulnerability of developing AKI after surgery of CABG and arterial stiffness found in our study [7]. The development of AKI had an increased ratio of 1.5 with one-unit PWV increase. The prevention of AKI-CSA is found not to be substantive and are limited. PWV being a non-invasive AS measurement technique offers a reliable way that is quick to predict risk of AKI-CSA in patients in our study. Therapeutic strategies can potentially modify arterial stiffness and can shrink the risk of CSA-AKI [8]. The study has its limitations and that need be acknowledged specially the small number of patients. This means that the number of variables needed to be restricted in multivariate model [9, 10].

CONCLUSION:

It is concluded that PWV was assessed erstwhile to CABGs which predicted AKI events post-operative in this exploratory study. Pulse Wave Velocity is a simple technique that is non-intrusive which may be practised to potentially help with reduction in the danger of CSA and AKI instances subsequent to CABG.

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