



A Study of Cardiac Troponin T in Patients with end Stage Renal Disease

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Introduction

- End stage renal disease /Chronic Kidney Disease is a clinical syndrome caused by different underlying renal pathology.
- The cardio vascular disease is the leading cause of death in End stage renal disease/Chronic Kidney Disease (Chronic Kidney Disease stages 3-5). These patients develop clinically silent myocardial injury.
- Hence, a clinically silent Cardiac pathology underlies these cardiac troponin T elevations. This elevated cardiac troponin T is a specific marker of myocardial cell injury in patients of End stage renal disease/Chronic
- Kidney Disease because of high organ specificity of cardiac troponin T.
- The Increase in plasma concentration of the cardiac troponin T protein, clearly indicates myocardial cell injury.
- Cardiovascular complications like myocardial injury in End stage renal disease/Chronic Kidney Disease (Chronic Kidney Disease stages 3-5) occurs very early in the progression of Chronic Kidney Disease.

- Hence early detection of myocardial injury by measuring cardiac troponin T will help to detect and treat the cardiac complications in End stage renal disease/Chronic Kidney Disease (Chronic Kidney Disease stages 3-5).
- Cardiac Troponin T, a Tropomyosin-binding protein of the regulatory complex located on the contractile apparatus of cardiac myocytes.
- It is elevated in non ischemic type of chronic myocardial injury and can be used as a marker of cardiac myocytes injury.

Aims & Objectives

- To determine whether serum cardiac Troponin T is elevated in patients with End stage renal disease/Chronic Kidney Disease (Chronic Kidney Disease stages 3-5).
- Early detection of myocardial cell injury by estimating serum cardiac Troponin T levels in patients with End stage renal disease/Chronic Kidney Disease (Chronic Kidney Disease stages 3-5).

Materials and Methods

Source of Data

Patients hospitalized for End stage renal disease/Chronic kidney disease (Chronic kidney disease stages 3-5) in Great Eastern Medical School & Hospital, Srikakulam, AP, India from October 2020 to July 2021.

1. Stage 3 of chronic kidney disease, 15 patients.
2. Stage 4 of chronic kidney disease, 17 patients.
3. Stage 5 of chronic kidney disease/ End stage renal disease 32 patients.

Method of data collection:

Inclusion Criteria

Patients hospitalized for End stage renal disease/Chronic kidney disease (Chronic kidney disease stages 3-5).

1. Stage 3 of chronic kidney disease, 15 patients.
2. Stage 4 of chronic kidney disease, 17 patients.
3. Stage 5 of chronic kidney disease/ End stage renal disease 32 patients

Exclusion Criteria

- a Myocardial infarction
- b Unstable angina
- c Cardiac surgery
- d Cardiac contusion
- e Cardio version
- f Skeletal muscle diseases
- g Heart failure.
- h Severe sepsis.
- i Myocarditis.
- j Pulmonary diseases-Asthma, chronic obstructive pulmonary disease, Chronic bronchitis.

Investigations Required

1. Complete haemogram & Erythrocyte sedimentation rate.
2. Fasting blood sugar, Post prandial blood sugar, Random blood sugar.
3. Blood urea, Serum creatinine.

4. Serum electrolytes.
5. Abdominal ultra sonography.
6. Urine examination.
7. Cardiac Troponin T.
8. Electrocardiography.
9. 2D-Echocardiogram.

Results and Statistical Analysis

Study Population

- Descriptive statistical analysis carried out in hospitalized CKD Stage 3-5 pts.
- A total of 64 patients who were confirmed to be suffering from End stage renal disease / Chronic kidney disease constituted the study population.
- Patients hospitalized for End stage renal disease /Chronic kidney disease (Chronic kidney disease stages 3-5) in GEMS Srikakulam, AP.

Patients & Stages of Chronic Kidney Disease

Diagnosis	Number of patients(n=64)	%
Stage III CKD	15	23.4
Stage IV CKD	17	26.6
Stage v CKD	32	50.0

Demographic Profile

Age Distribution

Age distribution of patients studied:

Age in years	Number of patients	%
Up to 50 years	7	10.9
51-60	38	59.9
61-70	19	29.7
TOTAL	64	100.0

- The Mean age of the patients was 57.25 +/- 5.54 years.
- The youngest patient was 45 years old and the oldest patient was 68 years old.

Gender Distribution**Gender distribution of patients studied**

Gender	Number of patients
Male	45
Female	19
TOTAL	64

- Among these patients 45 were male and 19 were female.
- Among these male patients constituted 70.3% and female patients constituted 29.7%

Past History

When both Diabetes mellitus & Hypertension are present in patients, they are more prone to progress to chronic kidney disease/End stage renal disease state.

Past history	Number of patients
Nil	4
Diabetes mellitus	5
Hypertension	10
Both DM & HTN	41
Others	4

ULTRASONOGRAPHY: USG Abdomen findings

USG abdomen findings	Number of patients(n=64)
Normal	8
Medical renal disease Gr II	44
Medical renal disease Gr III	12

- In this study 44 patients Out of 64 had grade II Medical renal disease i.e 68.8 % of patients.
- In this study 12 patients Out of 64 had grade III Medical renal disease i.e 18.8 % of patients.
- Overall 87.6 % patients had either grade II or grade III Medical renal disease present in stage 3, stage 4 & stage 5 of chronic kidney disease, combined together.

Troponin T levels in the study patients

Troponin T Levels	Number of patients (n=64)	%
Negative	28	43.8
Positive	36	56.3

Correlation of Troponin T levels with Stage of disease: As the Stage level increases the Troponin T level also increased.

Troponin T levels	Number of patients (n=64)	CKD Stage III	CKD Stage IV	CKD Stage V
Negative	28	8(28.6%)	6(21.4%)	14(50.0%)
Positive	36	7(19.4%)	11(30.7%)	18(50.0%)
TOTAL	64	15(23.4%)	17(26.6%)	32(50.0%)

Discussion

- End stage renal disease / Chronic kidney disease is a clinical syndrome caused by different underlying renal pathology.
- The cardio vascular disease is the leading cause of death in End stage renal disease / Chronic kidney disease (CKD stages 3-5)
- These patients develop clinically silent myocardial injury. Hence, a clinical, silent Cardiac pathology underlies these cardiac troponin T elevations.

Age & Total No of the Patients

- Total no of patients 64 only in our study and the Mean age of patients was 57.25 +/-5.54 years.
- The youngest patient was 45 years and the oldest patient was 68 years.
- In my study there were 45 male and 19 females patients.
- Among these, male patients constituted 70.3% and female patients constituted 29.7%.

Diabetes Mellitus and Hypertension

- In my study only Diabetes mellitus was present in 7.8% of patients and hypertension in 15.6% of patients.

- But Diabetes mellitus & Hypertension was present in 64.1% of patients.
- When both Diabetes mellitus & Hypertension are present, patients are more prone to develop chronic kidney disease/End stage renal disease state ANAEMIA:
- As chronic kidney disease/End stage renal disease is a chronic condition all the patients were anemic in my study at the time of admission to the hospital.

LEFT Ventricular Hypertrophy

- In my study 2D Echocardiography was normal in 23 (35.9%) of cases.
- There was mild Left ventricular hypertrophy in 20 (31.3 %) Patients and moderate Left ventricular hypertrophy in 21(32.8 %) of patients.
- Overall 41 patients out of 64 had Left ventricular hypertrophy.
- Overall 64.1% had Left ventricular hypertrophy.

Ultrasonography of Abdomen

In this study, Overall 87.6% patients had either grade II or grade III Medical renal disease.

Cardiac Troponin T

- In my study 36 patients are positive for serum cardiac Troponin T out of 64 patients.
- Serum Cardiac Troponin T differed significantly ($P = 0.0001$) between chronic kidney disease stages.
- More commonly increased in the presence of more advanced chronic kidney disease.
- In my study 36 patients are positive for serum Cardiac Troponin I concentrations out of 64 patients.
- In stage 3 chronic kidney disease, 19.3 % of The study population are positive for serum Cardiac Troponin T levels of > 0.1 ng/ ml.

- In stage 4 chronic kidney disease, 30.7 % of the study population are positive for serum Cardiac Troponin T levels of > 0.1 ng/ ml.
- In stage 5 chronic kidney disease / End stage renal disease, 50.0 % of study population are positive for serum Cardiac Troponin T levels of > 0.1 ng/ ml.
- Combined together, overall 56.25 % of the study population are positive for serum Cardiac Troponin T levels of > 0.1 ng/ ml in chronic kidney disease stage 3, stage 4, stage 5.

Conclusion

- Elevated Cardiac troponin T (>0.1 ng/mL) identifies a subgroup of End stage renal disease patients who have poor survival and a high risk of cardiac death despite being asymptomatic.
- Elevated Cardiac troponin T (>0.1 ng/mL) concentrations are relative, common in predialysis chronic kidney disease patients.
- Total no of patients 64 only in my study. The cases included belongs to the various stages of chronic kidney disease as shown below.
- Stage 3 of chronic kidney disease, 15 patients.
- Stage 4 of chronic kidney disease, 17 patients.
- Stage 5 of chronic kidney disease/ End stage renal disease, 32 patients.
- In my study 36 patients are positive for serum Cardiac Troponin I concentrations out of 64 patients.
- Cardiovascular complications like myocardial injury in End stage renal disease/Chronic kidney disease (Chronic kidney disease stages 3-5) occurs very early in the progression of Chronic kidney disease.
- Increased cardiac troponin T concentrations may occur early in chronic kidney disease, including among a

significant number of pts. with moderate (stage 3) chronic kidney disease, and is more common as chronic kidney disease advances.

- Hence early detection of myocardial injury by measuring cardiac troponin will help to detect and treat the cardiac complications in End stage renal disease/Chronic kidney disease (Chronic kidney disease stages 3-5).

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