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To analyze CKMB and Homocysteine level in CRF

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Abstract:
Background&Method: This study is done with an aim to analyze CKMB and Homocysteine level in CRF. In this study, 200 people over the age of 20 including both sexes who had chronic renal failure were selected. These patients (subjects) were attending OPD and admitted to the ward of general medicine. In addition, 200 normal healthy individuals (control) over the age of 20, staff members, patient attendants, and volunteers were included as controls. The patients were diagnosed as chronic renal failure by the department of general medicine at index medical college hospital and research centreindore (MP) and Amaltas institute of medical sciences, Dewas (M.P.).

Result: Our study was done in the clinical biochemistry laboratory with association of general medicine at index medical college hospital & research centreindore&Amaltas institute of medical sciences dewas (MP). The study included 200 chronic renal failure patients and the control group included 201 healthy individuals of both sexes between 20 to 70 years.Serum CPK-MB level in subjects and controls. It shows 41.91±16.80and 8.12±1.07 in subjects and controls, respectively. Blood Glucose level in Female subjects and controls. It shows 259.78±101.83 and 86.71±8.4 in subjects and controls, respectively.

Conclusion: The mean serum concentration Homocysteine of CRF patients was high (21.51±10.10) in comparison of healthy control mean (6.03 ± 1.19). It has been found that the difference between them was also statistically significant p-value is <0.001. The mean serum concentration total cholesterol of CRF patients was high (331.73±71.80) in comparison of healthy control mean (110.17 ± 10.12). It has been found that the difference between them was also statistically significant p-value is <0.001.
This study shows that there is a high risk of inflammation and cardiac diseases in CRF patients. It is very important to get tested annually to prevent CKD as well as reduce kidney failure.for cardiac and inflammatory markers, make lifestyle changes, and see your health care team regularly.

Keywords: CKMB, Homocysteine& CRF.

Study Designed: Observational Study

1. INTRODUCTION

Inflammation is common in Chronic Renal Failure (CRF). And due to persistent inflammation, it also affects the body's immune system, increasing the risk of infection. (Tbahriti HF et al. 2013)[1]. Continuous dialysis affects leukocyte activation Due to which there is an uncontrolled increase in cytokine levels, resulting in persistent inflammation, which in many cases is responsible for various diseases and mortality. (Zoccali et al. 2003)[2].

Inflammation markers we use to detect the activity of various cytokines in CRF such as Hs-CRP, TNF-α and IL-6,suggest the potential for regulation of metabolism and cardiovascular diseases (CVDs) in CRFs. The risk of diseases can be detected at the right time.(Tripepi G et al 2005)[3].

Early detection of cardiac disease in a patient with chronic renal failure, we analyze cardiac markers along with inflammatory markers because atherosclerosis is known to be an inflammatory disease. And inflammation is also responsible for accelerated arterial disease that leads to a higher risk of cardiovascular morbidity and mortality. (Stompor T et al. 2003) [4].

It has been found that the level of hs-CRP determines CVD by which CVD is detected in patients with CRF, in addition to other parameters that are responsible for inflammation, these parameters include vasodilation and endothelial Injury is correlated with CRP levels commonly associated with heart disease, which significantly increases the risk of heart disease. (Danesh J et al. 1998) [5] Its major cause of mortality and morbidity in CRF (Borazan et al 2004, Rifai et al.2001)[6].

Cardiovascular disease (CVD) is of great concern with chronic kidney disease patients and sudden death or early death in these patients with GFR below 60 ml / min / 1.72 m2 persistent loss of kidney functions is a matter of concern for many factors affecting kidney function, the main ones being uncontrolled diabetes, high blood pressure, obesity, lipid abnormalities, smoking, These factors contribute to the high incidence of cardiovascular complications with CKD, including anemia, oxidative stress, inflammation, and bone mineral disorders. Biomarkers may be used to determine cardiovascular risk in patients with CKD if this approach is used early. If adopted at an early stage, it would be very helpful and would enable accurate and timely assessment of cardiovascular risk thereby further facilitating the goal of reducing incidence rates. This study is designed to draw more attention to established and emerging laboratory biomarkers for risk assessment in CKD.

2. MATERIAL & METHOD

The study was carried out at the department of Biochemistry at Index Medical College Hospital & Research Centre, Indore (MP) and Amaltas Institute Medical Sciences, Dewas (MP) after obtaining Institutional Ethics Committee permission.

STUDY TYPE:
The present study was anobservational, analytical with case control study. The selection of sample was done by convenient sampling.

STUDY GROUPS

Inthisstudy,200peopleovertheageof20includingbothsexeswhohadchronicrenalfailureweresele cted.Thesepatients(subjects)wereattendingOPDandadmittedtothewardofgeneralmedicine.Ina ddition,200normalhealthyindividuals(control)overtheageof20,staffmembers,patientattendant s,andvolunteerswereincluded as controls.Thepatientswere diagnosedaschronicrenalfailurebythedepartmentofgeneralmedicineatindexmedicalcollegehos pitalandresearchcentreindore(MP)and Amaltas instituteofmedicalsciences, Dewas(M.P.).

The Participants were divided into two separate groups:

1. Group 1 (Subjects): Chronic Renal Failure Patients
2. Group 2 (Control): Healthy individuals

Inclusion Criteria

The study was included patients diagnosed by clinician, with known history of chronic renal failure, on dialysis, diabetes, hypertension, etc.

1. Chronic renal failure
2. Patients on Dialysis

Exclusion criteria

The study was excluded patient with known history of cardiac diseases, pregnancy, any infectious diseases, any surgical history, etc. Terminally ill patients, non-co-operative and non-willing patients.

BLOOD SAMPLE COLLECTION, SEPARATION AND STORAGE:

Unique ID number was given to each participant of the study and same ID was given on sample container. After obtaining informed consent from all patients and healthy control, 5 ml Blood was drawnunder all aseptic precautions from antecubital vein in plain vial. After samples collection, samples were centrifuged in REMI centrifuge at 3000 RPM for a period of 15 minutes at central clinical laboratory of Hospital. Serum was separated after centrifugation. Serum was kept frozen at -20^0C (for IL-6) until assayed.

3. RESULTS

Table 01: Age wise distribution of Subjects and control

Age	**Mean ± SD (Years)**	**P-Value**
Subjects	49.79 ± 12.38	0.09 ns
Control	47.74 ± 12.46	

Our study was done in the clinical biochemistry laboratory with association of general medicine at index medical college hospital & research centreindore&Amaltas institute of medical sciences dewas (MP). The study included 200 chronic renal failure patients and the control group included 201 healthy individuals of both sexes between 20 to 70 years.

Table02: CPK-MB level of subjects and control

Study groups	**Mean ±SD**	**t-test**	**p-value**
Subjects	35.20±6.80	28.3867	0.0001
Control	8.12±1.07		

Table shows serum CPK-MB level in subjects and controls. It shows 41.91±16.80and 8.12±1.07 in subjects and controls, respectively.

Table 03: Serum Homocysteine level of subjects and control

Study groups	Mean ±SD	t-test	p-value
Subjects	29.13 ±5.14	21.5264	0.0001
Control	6.03±1.19		

Table shows serum Homocysteine level in subjects and controls. It shows 21.51±10.10 and 6.03±1.19 in subjects and controls, respectively.

Table 04: Hs-CRP level of Male subjects and male control

Study groups	**Mean ±SD**	**t-test**	**p-value**
Subjects	6.41±3.67	7.2394	0.0001
Control	0.45±0.26		

Table shows Hs-CRP level in Male subjects and controls. It shows 6.41±3.67 and 0.45±0.26 in subjects and controls, respectively.

Table 05: Blood Glucose level of female subjects and female control

Study groups	**Mean ±SD**	**t-test**	**p-value**
Subjects	259.78±101.83	15.9798	0.0001
Control	86.71±8.4		

Table shows Blood Glucose level in Female subjects and controls. It shows 259.78±101.83 and 86.71±8.4 in subjects and controls, respectively.

4. DISCUSSION

In present study shows Age wise distribution of subjects and control. We were decided number of control and subjects as per numeric calculation. We have found mean age of subjects and controls as 49.79 ± 12.38 and 47.74 ± 12.46, respectively. The age difference between both groups was not statically significant. In this manner we were ensure our finding are good for comparisons for both groups. Our study was similar with the study of Agarwal and verma et al. they have found mean age of 45 ± 13 and 45 ± 15.2. (Agarwal SK et al. 2005, Singh NP et al. 2009)[7]. Our study is also in line with the study on the diseases of CKD by K Singh AK et al 2013168 in which the mean age of CKD patients was 45.22 ± 15.20.The average age of an Indian at this time was 66 years (in 2013) as against 41.38 years (in 1960)(CIA World factbook)[8]. Along with this, diabetes, hypertension and chronic diseases are also increasing continuously, due to which CKD is expected to increase in India like western countries.

CPK-MB -: In present study 19 shows the level of CPK-MB in subjects and controls. The mean was 41.91±16.80 and 8.12±1.07, respectively in subjects and controls. A statically significant difference was observed($p<0.001$) in both groups. Mean in male subjects for CPK-MB was 45.28±17.7 and for controls 14.38±6.0. Serum CPK-MB mean and SD in female subjects. The mean was37.78±14.62and13.64±4.7, respectively for subjects and controls. During comparisons of this parameter in MS- excel for t-test we have found a significant p- value for the same. It was < 0.001. We have found a positive correlation between Urea and CPK-MB. (r=0.065884).

Cardiac biomarkers are used in conjunction with symptoms, electrocardiographic (ECG) changes, and cardiac imaging to diagnosis acute myocardial infarction (AMI) in patients with chronic kidney disease. Cardiac biomarkers are also used to predict short- and long-term adverse outcomes.

Sobki SH. et al. 2001[9]Studieshave observed increase level of CK-MB were relatedof CKD and skeletal muscle injury. Which complicates the accurate diagnosis of myocardial injury. This is mainly due to the higher concentration of CK in skeletal muscle, which is eight times increase in each gram of tissue than in cardiac tissue. Simultaneously high serum CKMB concentration can result in injury or disease of skeletal muscles. And it has also been observed that levels of CK-MB with CKD and this increased level is found in patients with kidney myopathic or injured skeleton.CK MB is not excreted in the urine because big size that cleared by the reticuloendothelial system. In acute coronary syndrome and other cardiovascular disorders, CK MB levels are measured, which is useful in most conditions for accurate diagnosis. has been proved(Thygesen K. et al. 2012)189.

Jeff AS et al. 2005[10] study found in patients with CKD that patients with high CK-MB had low HDL and dyslipidemia and no association was observed with cardiac troponin, but CK-MB is a traditional cardiovascular risk factor. The same cardiac troponinhighly specific biomarker of cardiac injury. In addition, anotherstudyobserve that CK-MB is one of the relatively low sensitivity markers to accurately identify myocardial injury in patients with uremia.

Alam GK. At al. 2002[11] reported the possibility of CVD in their study on patients with CKD. They noted that CKD patients having cardiovascular risk population. whose association with CAD is responsible for their observed morbidity and mortality, with a declineGFR increasing the incidence of cardiovascular morbidity and mortality. Wang et al. noted that CKD patients found increased levels of CK-MB with the severity of renal dysfunction, which correlated with GFR.

Hs-CRP -: Our study shows level of Hs-CRP in subjects and controls. The mean value was 12.09 ±3.78 and 1.03±0.12, respectively in subjects and controls. There was observed statistically significant difference between the two groups. ($p<0.0001$). Hs-CRP in male subjects was 6.41±3.67and for control mean was 0.45±0.26. Serum Hs-CRP mean and SD in female subjects. The mean was 7.07±3.38 and 0.41±0.21, respectively for subjects and controls. During comparisons of this parameter in MS- excel for t-test we have found a significant p- value for the same. It was < 0.0001. We have found positive association between Urea and Hs-CRP. (r=0.062816).

Our study also is similar to Wang S. et al, 2014 [12] found high levels of highly sensitive CRP in a study on patients with CKD and ESRD as a recent indicator of future vascular events in adults without any previous history of heart disease. Useful for sensitive identification. Elevated levels of Hs-CRP are found to be higher in stages 3–5 of CKD. It has also been associated with increased decline in GRF, which is one of the hallmark markers of cardiovascular disease in CKD but for the detection of cardiac disease. Many other markers are also used for cardiovascular events.

In our study, we find out that patients with CKD had elevated level of Hs-CRP, which was similar to the previous study. The mean and standard deviation (SD) of Hs CRP levels in CKD patients was 26.08 ± 5.73, from 19.46 ± 2.31 in CKD stage III, to 26.96 ± 3.48 in CKD stage IV, and it eventually increased. CKD was 32.76 ± 3.24 in stage V and it was 0.83 ± 0.15 in the control group. And obtained values were statistically significant, with the P values in the n study being much higher than in the previous studies by Ortega et al. 2002133 in which they observed an increase in hs CRP levels (8.3 ± 14.2 mg/L) in pre-dialysis patients. Menon V. Another study by et al also found an increase in hs CRP levels (2.2 mg/L) reported prior to dialysis in dialysis patients.

The patient with CKD and ESRD shows elevated hs-CRP levels in keeping with the underlying chronic inflammatory status. It also increases the level of HS-CRP during inflammatory processes. It is mainly produced by macrophages and also by adipocytes. In acute inflammation, which increases the CRP level manifold. And so, its level is mainly determined by the rate of production. CRP binds to phosphorylcholine on microbes and helps complement binding to foreign cells(Mora S. et al. 2009)[13].

5. CONCLUSION

The mean serum concentration Homocysteine of CRF patients was high (21.51±10.10) in comparison of healthy control mean (6.03 ± 1.19). It has been found that the difference between them was also statistically significant p-value is <0.001. The mean serum concentration total cholesterol of CRF patients was high (331.73±71.80) in comparison of healthy control mean (110.17 ± 10.12). It has been found that the difference between them was also statistically significant p-value is <0.001.

This study shows that there is a high risk of inflammation and cardiac diseases in CRF patients. It is very important to get tested annually to prevent CKD as well as reduce kidney failure.for cardiac and inflammatory markers, make lifestyle changes, and see your health care team regularly.

6. REFERENCES

[1] Bastos, M. G., &Kirsztajn, G. M. et al. chronic kidney disease: importance of early diagnosis, immediate referral and structured interdisciplinary approach to improve outcomes in patients not yet on dialysis. Jornalbrasileiro de nefrologia, 2011, 33(1), 93-108.

[2] Zoccali C, Mallamaci F, Tripepi G. Inflammation and atherosclerosis in end-stage renal disease. Blood Purif. 2003; 21(1):29-36.

[3] Tripepi G, Mallamaci F, Zoccali C. Inflammation markers, adhesion molecules, and all-cause and cardiovascular mortality in patients with ESRD: searching for the best risk marker by multivariate modeling. J Am SocNephrol. 2005; 16 Suppl 1: S83-8.

[4] Stompor T, Pasowicz M, Sullowicz W, et al. An association between coronary artery calcification score, lipid profile, and selected markers of chronic inflammation in ESRD patients treated with peritoneal dialysis. Am J Kidney Dis. 2003; 41:203–211.

[5] Danesh J, Collins R, Appleby P, Peto R et al: Association of fibrinogen, C-reactive protein, albumin, or leukocyte count with coronary heart disease: Meta-analyses of prospective studies. JAMA 279:1477–1482, 1998.

[6] Borazan A, Usteun-H, Ustundag Y, et al. The effects of peritoneal dialysis and hemodialysis on serum tumor necrosis factor-alpha, interleukin-6, interleukin-10 and C-reactive-protein levels. Mediators Inflamm. 2004; 13:201–204.

[7] Agarwal SK, Dash SC, Irshad M, Raju S, Singh R, Pandey RM. Prevalence of chronic renal failure in adults in Delhi, India. Nephrol Dial Transplant. 2005; 20:1638–42.
[8] Life expectancy at birth – Male (years) 2013 Country Ranks, By Rank SOURCE: CIA World Factbook. 2013.
[9] Iseki K, Oshiro S, Tozawa M, Iseki C, Ikemiya Y, Takishita S: Significance of hyperuricemia on the early detection of renal failure in a cohort of screened subjects. Hypertens Res 2001 24: 691 –697.
[10] Jaffe AS, Babuin L. Troponin: The biomarker of choice for the detection of cardiac injury. CMAJ. 2005; 173:1191- 1202.
[11] Alam GK, Lieb DB. Biochemical markers of myocardial ischemia in renal failure. Hosp Physician. 2002; 1:27-31.
[12] Wang S, Qin L, Wu T, Deng B, Sun Y, Hu D, et al. Elevated cardiac markers in chronic kidney disease as a consequence of hyperphosphatemia-induced cardiac myocyte injury. Med SciMonit. 2014; 20:2043-2053.
[13] Mora S, Musunuruand K, Blumenthal RS. The clinical utility of high sensitivity C-reactive protein in cardiovascular disease and the potential implication of Jupiter on current practice guidelines. Clinical chemistry. 2009; 55: 219-28.