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A Study to Assess Renal Function Tests Amongst Chronic Alcoholics at a Tertiary Care Hospital

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Abstract

Background: The WHO statistics show that 4.5% of the worldwide burden of disease and injury was due to alcohol. Globally, around 11.5% of drinkers usually have heavy episodic drinking situations. Apart from the estimated GFR, urinary albumin level can also be used to complement the classification of chronic kidney disease. Till now, only two prospective studies have found the association between alcohol consumption and both components of chronic kidney disease. The present study was conducted with the main aim to assess the renal function tests amongst chronic alcoholics.**Materials and Methods**: The present prospective study was conducted in the Department of Biochemistry, TeerthankerMahaveer Medical College and Research Centre, Moradabad, Uttar Pradesh (India) and a total of 50 alcoholics with the age range between 26 to 55 years were included in the study and were compared to 50 non-alcoholics and healthy controls. The qualitative urine analysis was done using DX urine reagent strips from the Piramal health care company. All the data was arranged in a tabulated form and analysed using SPSS software. Student t test was used for statistical analysis and p value of less than 0.05 was considered as significant. **Results**: The present study consisted of 100 participants. Out of these 50 were controls and 50 were cases. The mean age amongst the cases was 37.32+/-3.45 years and the mean age amongst the controls were 38.33+/-2.1 years. The mean urea level amongst the cases and controls was 20.24 ± 9.73 mg/dl and 24.17 ± 7.25 mg/dl. There was a significant difference amongst the cases and controls. The mean creatinine amongst cases was 0.83 ± 0.15 mg/dl while that amongst the controls was 0.86 ± 0.12 mg/dl. **Conclusion**: There was significant decrease in potassium level amongst the alcoholics. The mean eGFR was higher amongst the alcoholics while very few of them had traces of proteinuria.

Keywords: Renal, Urea, Kidney, Proteinuria.

Introduction

Alcohol intake is related with a variety of deleterious impacts on the kidney, that ranges from tubular dysfunction and forms of acute renal failure[1]. The WHO statistics show that 4.5% of the worldwide burden of disease and injury was due to alcohol. Globally, around 11.5% of drinkers usually have heavy episodic drinking situations [2]. Around 5.11 million users in Karnataka state have an intake 100.87 million litres of absolute alcohol annually. Per capita usage of alcohol in Karnataka is around 2.98 L of absolute alcohol annually [3]. Studies[4-6]have shown higher serum creatinine levels and an elevated risk of end-stage renal dysfunction to increased alcohol intake. Based on the few population-based surveys performed in India, the approximate prevalence of chronic kidney disease is 0.79 to 1.39%[7]. The association between alcohol usage and chronic kidney diseases is subject to little research. The glomerular filtration rate is a best indicator for renal disease than the serum creatinine. A survey found that males who consumed a minimum of seven drinks weekly had an odds ratio of around 0.71 for development of renal dysfunction[8].

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Apart from the estimated GFR, urinary albumin level can also be used to complement the classification of chronic kidney disease[9].Till now, only two prospective studies have found the association between alcohol consumption and both components of chronic kidney disease[10,11]. The present study was conducted with the main aim to assess the renal function tests amongst chronic alcoholics.

Materials and Methods

The present Prospective study was conducted in the Department of Biochemistry, TeerthankerMahaveer Medical College and Research Centre, Moradabad, Uttar Pradesh (India) and a total of 50 alcoholics with the age range between 26 to 55 years were included in the study and were compared to 50 non-alcoholics healthy controls. Written consent was taken from all the subjects in their vernacular language. Alcohol dependence was estimated by Alcohol Use Disorders Identification questionnaire. The score of more than 8 showed hazardous drinking level and there were around more than 12 in males that had alcohol dependence. Alcohol dependent subjects with score more than 10 were included for this study.

Alcoholics with other related co-morbidities like diabetes mellitus, liver disease, and subjects on prolonged medication that affect the renal function were not included in the study. Serum parameters were assessed in autoanalyzer. The eGFR was calculated with the MDRD formula that is based on serum creatinine levels. The qualitative urine analysis was done using DX urine reagent strips from the

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Piramal health care company. All the data was arranged in a tabulated form and analysed using SPSS software. Student t test was used for statistical analysis and p value of less than 0.05 was considered as significant.

Table 1: Sociodemographic characteristics of the study population

Feature	Cases	Controls	P value
Mean age	37.32+/-3.45 years	38.33+/-2.1 years	0.12
Males	31	19	0.23
Females	29	21	0.11
Associated co-morbidities	Absent	Absent	0.10

Table 2: Parameter analysis amongst cases and controls

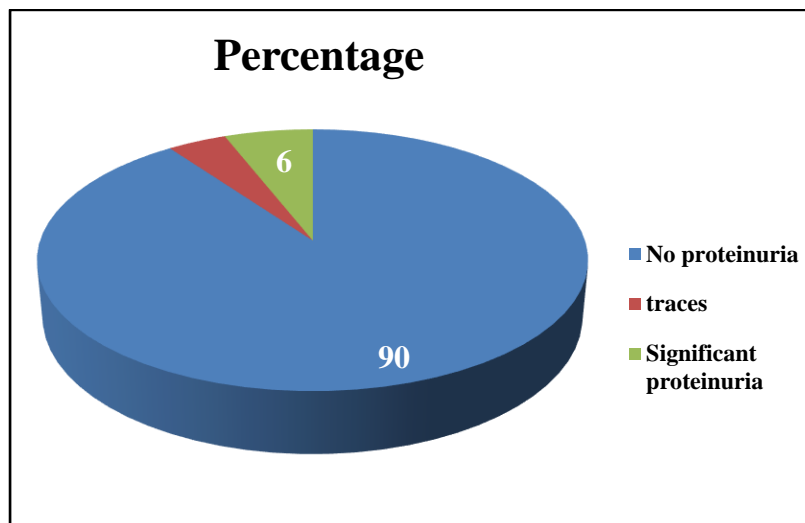| Parameter	Cases (n=50)	Controls (n=50)	P value
eGFR (ml/min)	112.04 ± 24.97	108.43 ± 21.02	0.11
Urea (mg/dl)	20.24 ± 9.73	24.17 ± 7.25	0.03
Creatinine (mg/dl)	0.83 ± 0.15	0.86 ± 0.12	0.10
Uric acid (mg/dl)	5.53 ± 1.23	5.19 ± 1.30	0.18
Sodium (mEq/L)	137.44 ± 4.5	138 ± 4.2	0.09
Chloride (mEq/L)	101.6 ± 5.2	98.7 ± 4.4	0.07
Bicarbonate (mEq/L)	23.02 ± 3.24	23.5 ± 2.4	0.33
Phosphate (mEq/L)	3.73 ± 1.02	4.03 ± .62	0.21
Potassium (mEq/L)	3.7 ± 0.39	4.4 ± 0.8	0.02

Fig 1: Incidence of proteinuria amongst alcoholics

Results

The present study consisted of 100 participants. Out of these 50 were controls and 50 were cases. The mean age amongst the cases was 37.32+/-3.45 years and the mean age amongst the controls were 38.33+/-2.1 years. There was no significant difference amongst the mean age. There were 31 males and 29 females amongst the cases and 19 males and 21 females amongst the controls. There were no associated co-morbidities amongst the cases and the controls.

Table 2 shows the parameters that were analysed amongst the cases and controls. The mean eGFR amongst cases was 112.04 ± 24.97 ml/min while that amongst the controls was 108.43 ± 21.02 ml/min. The p value came out to be more than 0.05 so the difference was not significant. The mean urea level amongst the cases and controls was 20.24 ± 9.73 mg/dl and 24.17 ± 7.25 mg/dl. There was a significant difference amongst the cases and controls. The mean creatinine amongst cases was 0.83 ± 0.15 mg/dl while that amongst the controls was 0.86 ± 0.12 mg/dl. The p value came out to be more than 0.05 so the difference was not significant. The mean uric acid level amongst the cases and controls was 5.53 ± 1.23 mg/dl and 5.19 ± 1.30mg/dl. There was no significant difference amongst the cases and controls. The mean sodium level amongst cases was 137.44 ± 4.5 mEq/L

while that amongst the controls was 138 ± 4.2 mEq/L. The p value was more than 0.05 so the difference was not significant. The mean potassium amongst the cases and controls was 138 ± 4.2 mEq/L and 4.4 ± 0.8 mEq/L. There was a significant difference amongst the cases and controls.

Fig 1 clearly demonstrates that amongst majority of alcoholics there was no proteinuria observed while only a small percentage of cases showed traces of proteinuria.

Discussion

Although alcohol usage, especially in moderation, has been associated to a decrease risk of cardiovascular disorder[12]and diabetes,[13] its relation with the risk of chronic kidney disease has been given relatively lesser importance. So far, cohort studies that have studied the effect of alcohol intake on the development of kidney disease have found a mostly inverse relation,[11,14]although some variation still exists[15]. Four observational studies have tried to find the relation between alcohol intake and incidence of kidney disease[10,11,14]. As per our study, the mean eGFR amongst cases was 112.04 ± 24.97 ml/min while that amongst the controls was 108.43 ± 21.02 ml/min. The p value came out to be more than 0.05 so the difference was not significant. The mean urea level amongst

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the cases and controls was 20.24 ± 9.73 mg/dl and 24.17 ± 7.25 mg/dl. There was a significant difference amongst the cases and controls. The mean creatinine amongst cases was 0.83 ± 0.15 mg/dl while that amongst the controls was 0.86 ± 0.12 mg/dl. The p value came out to be more than 0.05 so the difference was not significant. The mean uric acid level amongst the cases and controls was 5.53 ± 1.23 mg/dl and 5.19 ± 1.30 mg/dl. There was no significant difference amongst the cases and controls. The mean sodium level amongst cases was 137.44 ± 4.5 mEq/L while that amongst the controls was 138 ± 4.2 mEq/L. The p value was more than 0.05 so the difference was not significant. The mean potassium amongst the cases and controls was 138 ± 4.2 mEq/L and 4.4 ± 0.8 mEq/L. There was a significant difference amongst the cases and controls.These studies predominantly evaluated GFR with a creatinine-dependent MDRD relation, which is obtained from a selected population suffering from renal disease[16] and has no assured validity in cohort studies in which the filtration rate is 460 ml/min per $1.73m^2$[17]. An inverse relation has been found between alcohol usage and risk of renal disease amongst 11203 US male doctors and 6259 Australian males and females[11], with top alcohol usage categories of 47 drinks per week and 430 g per day, respectively. Alcohol consumption of 20 g/day was also inversely related with renal disease amongst 41012 men and 82752 women Japanese adults, with no apparent action of an intake of 20 g/day, compared with abstention cases[10].A study by Shankar et al[15] found a more U-structured associated with a marginal increased renal disease risk starting from approximately 4 drinks/day amongst 3392 subjects. Two longitudinal surveys simultaneously evaluated the action of alcohol on newer-onset albuminuria or proteinuria, apart from the GFR-based renal disease[10,11].

Conclusion

Alcohol greatly impacts human body in different ways. There was significant decrease in potassium level amongst the alcoholics. The mean eGFR was higher amongst the alcoholics while very few of them had traces of proteinuria.

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