

THE RELATIONSHIP OF SERUM AMINOTRANSFERASES WITH SODIUM AND CREATININE AND THEIR ASSOCIATION WITH INTERDIALYTIC WEIGHT GAIN (IDWG)Saliha Yousaf¹, Ayesha Irfan¹, Hafiz Usama Shibli¹, Dr. Aurangzaib Afzal² and Azhar Hussain*¹¹Ameer Ud Din Medical College, Lahore.²Associate Professor and Head of Nephrology Department, Lahore General Hospital, Lahore.***Corresponding Author: Azhar Hussain**

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ABSTRACT

Introduction: More than 500,000 people in the United States live with end-stage renal disease (ESRD). The development of chronic kidney disease (CKD) and its progression to this terminal disease remains a significant source of reduced quality of life and significant premature mortality. **Materials and Methodology:** Patients of end stage renal disease with hepatitis C infection were identified among patients visiting the hemodialysis center of Lahore General hospital and Sheikh Zayed hospital, Lahore. They were only positive for HCC antibodies by detecting HCV RNA by PCR. The patients that were coinfecting with HBV and HCV and negative for HCV and HbAg were not included. Total 56 patients were engaged in this process. **Results:** We studied on 56 patients. Paired sample T-test analysis shows a statistically significant relationship between blood flow speed and IDWG ($P < 0.01$). 37(66.1) had arthralgias, 19(33.9) had no arthralgias. 47(83.9) were fatigued and 9(16.1) had no fatigue. 17(30.4) had drowsiness, 39(69.6) had no drowsiness. 48(85.7) had dry skin, 8(14.3) had no dry skin. 33(58.9) had itchy skin, 23(41.1) had no itchy skin. 19(39.9) were easily bruised, 37(66.1) were not easily bruised. 18(32.1) had nail changes, 37(66.1) had no nail changes. 37(66.1) had cramps, 19(33.9) had no cramps. 37(66.1) had backache, 19(33.9) had no backache. 21(37.5) had chestpain, 35(62.5) had no chestpain. 37(66.1) had irritability, 19(33.9) had no irritability. **Conclusion:** This study augments the relationship of serum aminotransferases with sodium and creatinine and their association with IDWG.

KEYWORDS: Serum aminotransferases, sodium, creatinine, IDWG.**INTRODUCTION**

The decline of kidney function is gradual and initially may present asymptotically. The natural history of renal failure depends on the etiology of the disease but ultimately involves early homeostatic mechanisms involving hyperfiltration of the nephrons. As nephrons become damaged, the kidney increases the rate of filtration in the residual normal ones. As a result, the patient with mild renal impairment can show normal creatinine values, and the disease can go undetected for some time. This adaptive mechanism will run its course and will eventually cause damage to the glomeruli of the remaining nephrons.

More than 500,000 people in the United States live with end-stage renal disease (ESRD). The development of chronic kidney disease (CKD) and its progression to this terminal disease remains a significant source of reduced quality of life and significant premature mortality. Chronic kidney disease (CKD) is a debilitating disease, and standards of medical care involve aggressive monitoring for signs of disease progression as well as

early referral to specialists for dialysis or possible renal transplant. Kidney Disease Improving Global Outcomes (KDIGO) foundation guidelines define CKD using markers of kidney damage, specifically markers that determine proteinuria and glomerular filtration rate. By definition, the presence of both of these factors (glomerular filtration rate [GFR] less than 60 mL/min and albumin greater than 30 mg per gram of creatinine) along with abnormalities of kidney structure or function for greater than three months signifies chronic kidney disease. End-stage renal disease, moreover, is defined as a GFR less than 15 mL/min.^{[1][2]}

Dialysis remains the most commonly employed treatment option for patients with ESRD because not all patients are medically suitable for kidney transplantation, and the demand for kidneys far exceeds the supply.^[3] The total cost of dialysis is mostly composed of the costs of the treatment itself (including disposables, machines, accommodation, electricity, water and human resources) and the costs of medications, transportation,

complications, additional hospital admissions and interventions.^[4]

Interdialytic weight gain (IDWG) is an easily measurable parameter in the dialysis unit, routinely assessed at the beginning of the dialysis session. It is used along with clinical symptoms and signs and predialysis blood pressure readings to make decisions regarding the amount of fluid removal during a dialysis session. IDWG is also used as a basis for fluid and salt intake recommendations. However, advising fluid and salt restriction based solely on IDWG may not be appropriate because of its status as a nutritional indicator, as well. Very few studies have been designed to determine the direct effect of IDWG on morbidity and mortality. Any such effect is confounded by residual renal function and various comorbidities, the effects of which might be difficult to separate from those of IDWG. Most attempts to control IDWG have concentrated on requiring patients to reduce fluid and dietary salt intake. Although there does not seem to be a consensus at this point, it is likely that within the lower values of IDWG (less than 5.7% of dry weight), tighter control of fluid and salt intake might not be warranted since these values may reflect higher protein and calorie intake, indicating better nutritional status.

Inflammation of the LIVER in humans caused by HEPATITIS C VIRUS, a single-stranded RNA virus. Its incubation period is 30-90 days. Hepatitis C is transmitted primarily by contaminated blood parenterally, and is often associated with transfusion and intravenous drug abuse. However, in a significant number of cases, the source of hepatitis C infection is unknown.

Out of 71 million affected people, Pakistan has the world's second-highest prevalence rate of Hepatitis C and among Pakistani Population majority of population is from rural areas i.e, more than 60%. Due to lack of awareness, health facilities and poor financial conditions people do not go for regular screening of specific tests like PCR, ELISA, LFTs and Fibro scan etc. As a result most of symptoms are left undiagnosed.^[5]

The hepatic complications of HCV infection including liver cirrhosis, hepatic decompensation, and hepatocellular carcinoma are well documented. However, 40% to 70% of cases of HCV infection are accompanied by extrahepatic manifestations such as autoimmune, metabolic, renal, cardiovascular, central nervous system, and lymphoproliferative disorders.^[6-8] Kidney disease in particular is a common extrahepatic manifestation of HCV infection. Chronic HCV infection is related not only to chronic kidney disease (CKD) but also accelerates renal deterioration, leading to end-stage renal disease (ESRD).^[9-11] In addition, HCV infection increases the morbidity and mortality rates of both

dialysis patients and kidney transplant (KT) recipients.^[12-14]

MATERIAL AND METHODOLOGY

The study was carried out at hemodialysis center, Lahore General Hospital/Ameer ud din medical college, Lahore Pakistan and sheikh zayed medical college, Lahore, Pakistan. The whole procedure about our study has been explained to the patients. Informed consent was obtained from the patients who were willing to be involved in research. It was a cross-sectional study. This study was carried out from 3 Jan 2020 to 18 Jan 2020.

Patients of end stage renal disease with hepatitis C infection were identified among patients visiting the hemodialysis center of Lahore General hospital and Sheikh Zayed hospital, Lahore. They were only positive for HCC antibodies by detecting HCV RNA by PCR. The patients that were coinfectd with HBV and HCV and negative for HCV and HbAsg were not included. Total 56 patients were engaged in this process. Quantitative determination of Hb, TLC, Platelets, blood urea levels, creatininelevels, bilirubinlevels, SGOT, SGPT, Alkalinephosphatase, sodium, potassium, calcium, POU, albuminlevels, Uric acids and chloride were done. We asked the patients about arthralgias, fatigue, chest pain, backache, dryskin, nail changes, cramps and irritability. The study was approved by institutional(ethical review board) LGH.

RESULTS

We studied on 56 patients.10(17.9) were govt. employers, 11(19.6) were labourer,35(62.5) were housewife.18(32.1) were having A+ bloodgroup, 16(28.6) were B+,7(12.5)were AB+,13(23.2) were O+ and 2(3.6) were A- . Descriptive statistics of our study population are given in Table 1.

Descriptive Statistics.

	Minimum	Maximum	Mean	Std. Deviation
Age	17.00	72.00	42.7857	13.52938
Dry Weight	30.00	86.50	58.2330	13.34327
Hb	6.50	15.00	10.2654	1.91725
TLC	2.00	42.00	7.7457	5.68504
Platelets	73.00	2810.00	245.2679	355.89449
SGOT	10.00	191.00	46.6250	37.65372
SGPT	10.00	147.00	42.1786	32.52026
Alkaline Phosphatase	12.20	2673.00	574.6464	583.93256
Total Bilirubin	.20	9.00	1.2679	1.78958
Serum Creatinine	4.30	22.90	9.6439	3.37317
Blood Urea	36.00	346.00	144.0222	49.60594
Sodium	24.00	148.00	134.6786	15.58217
Potassium	3.30	13.70	4.8745	1.40426
Calcium	7.30	10.90	9.2455	.81259
Phosphate	2.90	14.10	6.9700	2.59050
Serum Albumin	2.90	40.00	4.6167	4.95876
Uric Acid	2.50	12.50	6.9863	1.91355
Chloride	95.00	108.00	102.4524	2.48117
Blood Flow Speed	100.00	350.00	285.0000	53.86853
Dialysate Flow Speed	500.00	500.00	500.0000	.00000
Predialytic SBP	110.00	200.00	154.6786	21.01870
Predialytic DBP	60.00	120.00	87.2857	11.79632
Mid-Dialytic SBP	106.00	220.00	150.9821	22.24368
Mid-Dialytic DBP	42.00	130.00	84.6250	12.26015
Pre-dialytic Weight	36.35	94.00	60.0527	13.96913
Post-Dialytic Weight	34.90	84.80	57.1250	13.26261
IDWG	.50	22.00	2.9277	2.78985
Valid N (listwise)				

Paired sample T-test analysis shows a statistically significant relationship between blood flow speed and IDWG ($P < 0.01$).

Paired Samples Statistics.

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Blood Flow Speed	285.0000	56	53.86853	7.19848
	IDWG	2.9277	56	2.78985	.37281

We studied on 56 patients. 37(66.1) had arthralgias, 19(33.9) had no arthralgias. 47(83.9) were fatigued and 9(16.1) had no fatigue. 17(30.4) had drowsiness, 39(69.6) had no drowsiness. 48(85.7) had dry skin, 8(14.3) had no dry skin. 33(58.9) had itchy skin, 23(41.1) had no itchy skin. 19(39.9) were easily bruised, 37(66.1) were not easily bruised. 18(32.1) had nail changes, 37(66.1) had no nail changes. 37(66.1) had cramps, 19(33.9) had no cramps. 37(66.1) had backache, 19(33.9) had no backache. 21(37.5) had chest pain, 35(62.5) had no chest pain. 37(66.1) had irritability, 19(33.9) had no irritability.

DISCUSSION

We studied on 56 patients. (66%) had arthralgias, (84%) had fatigue, (30%) had drowsiness, (85%) had dry skin, (59%) had itchy skin, (40%) were easily bruised, (32%) had nail changes, (66%) had

cramps, (66%) had backache, (37%) had chest pain, (66%) had irritability.

Paired sample T-test analysis shows a statistically significant relationship between blood flow speed and IDWG (< 0.01).

Our study further supports existing data showing the relationship of serum aminotransferases with sodium and creatinine and their association with IDWG.

In IDWG, liver function is disturbed there is no formation of angiotensin and consequently no sodium retention. If the liver function is disturbed, renal function also gets disturbed and there is an increase in the levels of creatinine. An increase in aminotransferases increases the creatinine and high levels of creatinine is an indicator of renal function.

Our study proposes hepatic function with renal function by establishing a relationship of serum aminotransferases with sodium and creatinine. As early as possible, Hepatitis C should be treated with antiviral drugs so that the derangement of LFT's can be tackled and so renal function should be optimized atleast.

It is a cross-sectional study of hepatitis C+ patients of ESRD. It is one of the few studies that augment the relationship of serum aminotransferases with sodium and creatinine and their association with IDWG. There is decreased sample size so we suspect a large sample size of various confounding factors controlled.

CONCLUSION

This study augments the relationship of serum aminotransferases with sodium and creatinine and their association with IDWG.

REFERENCES

1. Scott IA, Scuffham P, Gupta D, Harch TM, Borchi J, Richards B. Going digital: a narrative overview of the effects, quality and utility of mobile apps in chronic disease self-management. *Aust Health Rev.*, 2018 Nov 13.
2. Sgambat K, Cheng YI, Charnaya O, Moudgil A. The prevalence and outcome of children with failure to thrive after pediatric kidney transplantation. *Pediatr Transplant*, Feb, 2019; 23(1): e13321.
3. Abecassis M, Bartlett ST, Collins AJ, et al. Kidney transplantation as primary therapy for end-stage renal disease: a National Kidney Foundation/Kidney Disease Outcomes Quality Initiative (NKF/KDOQIM) conference. *Clin J Am Soc Nephrol*, 2008; 3: 471–80. 10.2215/CJN.05021107
4. Vanholder R, Van Biesen W, Lameire N. Renal replacement therapy: how can we contain the costs? *Lancet*, 2014; 383: 1783–5. 10.1016/S0140-6736(14)60721-2
5. European Association for the Study of the Liver. "EASL-ALEH Clinical Practice Guidelines: Non-invasive tests for evaluation of liver disease severity and prognosis." *Journal of Hepatology*, 2015; 63(1): 237-64.
6. Cacoub P, Poynard T, Ghillani P, et al. Extrahepatic manifestations of chronic hepatitis C. MULTIVIRC Group. Multidepartment virus C. *Arthritis Rheum*, 1999; 42: 2204–2212.
7. Cacoub P, Gragnani L, Comarmond C, Zignego AL. Extrahepatic manifestations of chronic hepatitis C virus infection. *Dig Liver Dis.*, 2014; 46(5): S165–S173.
8. Cacoub P, Comarmond C, Domont F, Savey L, Desbois AC, Saadoun D. Extrahepatic manifestations of chronic hepatitis C virus infection. *TherAdv Infect Dis.*, 2016; 3: 3–14.
9. Fabrizi F, Verdesca S, Messa P, Martin P. Hepatitis C virus infection increases the risk of developing chronic kidney disease: a systematic review and meta-analysis. *Dig Dis Sci.*, 2015; 60: 3801–3813.
10. Park H, Adeyemi A, Henry L, Stepanova M, Younossi Z. A meta-analytic assessment of the risk of chronic kidney disease in patients with chronic hepatitis C virus infection. *J Viral Hepat*, 2015; 22: 897–905.
11. Park H, Chen C, Wang W, Henry L, Cook RL, Nelson DR. Chronic hepatitis C virus (HCV) increases the risk of chronic kidney disease (CKD) while effective HCV treatment decreases the incidence of CKD. *Hepatology*, 2017 Sep 5; [Epub]
12. Bang BK, Choi BS, Kim HW, et al. Retrospective study on the impact of hepatitis B and hepatitis C virus infection on renal transplant recipients over 15 years. *Korean J Nephrol*, 2002; 21: 423–434.
13. Fabrizi F, Martin P, Dixit V, Messa P. Meta-analysis of observational studies: hepatitis C and survival after renal transplant. *J Viral Hepat*, 2014; 21: 314–324.
14. Scott DR, Wong JK, Spicer TS, et al. Adverse impact of hepatitis C virus infection on renal replacement therapy and renal transplant patients in Australia and New Zealand. *Transplantation*, 2010; 90: 1165–1171.