Research Article

Association between Non-alcoholic Fatty Liver and Cardiovascular disease in Hemodialysis Patients in Minia Governorate

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Abstract

Introduction: Nonalcoholic fatty liver disease (NAFLD) is the term used for various broad-spectrum liver disorders caused by lipid accumulation in the parenchyma. **Aim of the study:** The aim of our study is to determine association between NAFLD and cardiovascular diseases inpatients on hemodialysis. **Material and methods:** The current study is cross sectional retrospective study conducted on 70 end stage renal failure patients on regular hemodialysis. **Results:** In the present case observational retrospective study, the socio-demographic. **Discussion:** Chronic renal failure (CRF) is a common health problem worldwide. The prevalence of chronic renal failure is on the rise, since it is a consequences of the increased development of diseases causing renal function disturbances, principally diabetes mellitus and arterial hypertension. **Recommendations:** Based on results of the present study, the following can be recommended:

Keywords: A/C Ratio: Allbumin creatinine ratio, ACE: angiotensin converting enzyme, ACP: American college of physicians

Introduction

Nonalcoholic fatty liver disease (NAFLD) is the term used for various broad-spectrum liver disorders caused by lipid accumulation in the parenchyma. It resembles alcoholic liver disease, but occurs in people who drink little alcohol. Most people with NAFLD feel well and are not aware that they have a liver problem.[(1)]

NAFLD is defined by the accumulation of liver fat >5 %per liver weight, in the presence of <20 g/d for women, and <30 g/d for men of daily alcohol intake; viral or other causes of liver disease must be excluded. Patients with NAFLD usually present no manifestation of liver disease and are often identified by elevation of liver enzymes or ultrasonographic evidence of liver steatosis.[(2)]

It is often accidentally discovered and is characterized by increased serum triglycerides, aspartate aminotransferase (AST), alanine aminotransferase (ALT) and gamma glutamyl transpeptidase (gamma-GT) concentrations in addition to fatty infiltration manifested by enhanced echogenic liver parenchyma and hepatorenal contrast[(3)] Important comorbidity factor in patients on hemodialysisis, liver disease metabolically conditioned, or secondary from infection by hepatotropic viruses (Slack A et al., 2015). NAFLD patients are at higher risk of cardiovascular diseases, and given the close association between NAFLD and classical cardiovascular risk factors. it is perhaps not surprising that, when compared to controls, patients with NAFLD have increased prevalence of atherosclerosis, as shown by increased carotid wall intimal thickness and increased numbers of atherosclerotic plaques[(4)]

Aim of the study

The aim of our study is to determine association between NAFLD and cardiovascular diseases inpatients on hemodialysis.

Material and Methods

The current study is cross sectional retrospective study conducted on 70 end stage renal failure patients on regular hemodialysis. age range:22-67 years old; 36 male and 34 females, recruited from the renal and dialysis unit at urology and nephrology hospital, minia general hospital, minia insurance hospital.

The duration of haemodialysis (HD) ranged from 1 to 17 years The frequency of HD was three sessions /week. The type of dialyzer

membrane was polysulphone with bicarbonate dialysate with the dialysate flow rate was 500 ml/min, and blood flow ranged from 250 to 300m1/min.

Based on ultrasound criteria, patients were devided into groups with NAFLD (35 patients 17 females & 18 males), and group without NAFLD(35 patients 17females & 18 males). All participants are subjected to thorough history taking, full clinical examination, and anthropometric measurements including weight, height and BMI. Blood samples for all patients were drawn before the beginning of dialysis. After centrifugation to yield platelet-poor plasma from samples on anticoagulant (3.8% sodium citrate) and serum from clotted blood samples, serum and plasma samples were stored in aliquots at -20°C until assay. Hemolysed samples were excluded. Peripheral hemogram was performed on whole blood samples on EDTA using Beckman Coulter Hmx, USA. Liver Enzymes (SGPT, SGOT), and kidney function tests measured by standard methods using Hitachi 911 autoanalyser. levels of TC,TG, TC, HDL-c, LDL-c were measured by standard kits. Parathyroid hormone (PTH) was measured by the DIA source hPTH-EASIA (which is a solid phase enzyme amplified sensitivity immunoassay performed on micro-titerplates). Calibrators and samples react with the capture polyclonal antibodies (PAb, goat anti 1-34 PTH fragment) coated on microtiter well. After incubation, the excess of antigen is removed by washing then monoclonal antibodies (MAb, mouse anti 44-68 PTH fragment) labeled with horseradish peroxidase (HRP) are added.

After an incubation period allowing the formation of of a sandwich: coated PAbs human PTH MAb HRP, the microtiterplate is washed to remove unbound enzyme labelled antibody. Bound enzyme-labeled antibody is measured through a chromogenic reaction. The chromogenic solution (TMB) is added and incubated. The reaction is stopped with the addition of stop solution and the microtiterplate is then read at appropriate wavelength. The amount of substrate turnover is determined colourimetrically by measuring the absorbance, which is proportional to the PTH concentration. Carotid duplex (intima media thickness) was performed on GE Logic P5 (GE Healthcare, Milwaukee, WI) ultrasound machines using 7.5 MH, linear probe, Matched imaging and Doppler frequency transducer. The assessment of carotid vessels was done while the patient lying supine using anterior or posterior approach assessing the common carotid artery CCA. The protocol consisted of obtaining grey scale images of the common carotid artery. The aim is to assess the intimal medial thickness of the common carotid artery.

Results

In the present case observational retrospective study, the socio-demographic and, anthro-pometric measures of the studied patients are presented in Table (1) and table (2) Table (1) shows comparison between the two groups of the studied patients that devided to group of patients with ultrasound characteristics of non alcoholic fatty liver disease (NAFLD) and group without NAFLD, there is no difference significant regarding age , sex where the studied patients were classified into 35 with NAFLD (18 males 51.4%, 17 females 48.6%) and 35 without NAFLD (18 males 51.4% and 17 females 48.6%) Age of the patients in NAFLD group ranges from 22 years to 66 years with mean age of 46.7±12.15. Age of group NON-NAFLD ranges from 22 to 67 years with mean age of 46.4±13. Table (2) shows no difference significant of the studied 2 groups of patients regarding weight ,height and body mass index (BMI). Weight of the group patients of NAFLD ranges from 44 kilogram to 90 kilogram with mean weight of 66.2±11.1. Weight of the group patients of NON -NAFLD ranges from 48 to 90 kilogram with mean weight of 65.6±10.Height of the group patients of NAFLD ranges from 1.47 meter to 1.78 meter with mean height of 1.65±0.07. Height of the group patients of NON-NAFLD ranges from 1.5 meter to 1.75 meter with mean height 1.65±0.05. the body mass index of the group patients of NAFLD ranges from 18.3 to 29.7 with mean of 24.2±3.1. the body mass index (BMI) of the group patients of NON- NAFLD ranges from 17 to 29.9 with mean 24.1±3.4.

Table (1): Comparison between the two groups regarding some demographic data

Demographic data	NAFLD (n= 35)	Non-NAFLD (n= 35) T	P - value
Age			
Range	22 – 66	22 – 67	0.977
Mean ± SD	46.7± 12.15	46.4± 13	
Median	48	46	
Sex			1
Male	18 (51.4%)	18 (51.4%)	
Female	17 (48.6%)	17 (48.6%)	

Table (2): Comparison between the two groups regarding to some anthropometric measures

Anthropometric measures	NAFLD (n= 35)	Non-NAFLD (n= 35) T	P - value
Weight (Kg)			
Range	44 - 102	48 - 91	0.934
Mean ± SD	66.5± 12	65.9± 10.6	
Median	65	65	
Height (m)			
Range	1.47-1.78	1.5-1.75	0.633
Mean ± SD	1.65± 0.07	1.65± 0.05	
Median	1.66	1.65	
BMI			
Range	18.3 — 29.7	17-29.9	0.801
Mean ± SD	24.2±3.1	24.1±3.4	
Median	23.9	24.1	

Mann-Whiteny test was used for quantitative data

Discussion

Chronic renal failure (CRF) is a common health problem worldwide. The prevalence of chronic renal failure is on the rise, since it is a consequences of the increased development of diseases causing renal function disturbances, principally diabetes mellitus and arterial hypertension[5] Chronic hemodialysis (HD) patients have a high risk to develop atherosclerotic cardiovascular disease. The available data, even though limited, suggest that some of the traditional cardiovascular risk factors do not play an important role in the HD population.[6] Nonalcoholic fatty liver disease (NAFLD) is recognized as one of the leading causes of a wide spectrum of liver diseases, ranging from simple steatosis to nonalcoholic steatohepatitis (NASH), fibrosis, and end-stage liver failure.[7] The metabolic predictors of NAFLD are likely to vary based on sex[8]. Compared to women, men are at higher risk of developing NAFLD in most published studies[9] in recent years, NAFLD has been considered to be the liver manifestation of MS. The current importance of NAFLD and its link to MS has encouraged an interest in its possible role in the development of atherosclerosis[10] Recent data supports the hypothesis that NAFLD itself might contribute to a higher risk of CVD independent of other prognostic risk factors. So, the development of NAFLD and fibrosis identifies an at-risk group with increased risk of cardiovascular and liver-related deaths[11]

Recommendations

Based on results of the present study, the following can be recommended: Low number of patients sample was the limitation of our study, so these results should be confirmed in future studies with more patients. Low financial facilities was an limitation of our study, so these should be confirmed in future studies with goog financial support. A regular follow up common carotid artery duplex for CIMT may help in early detection of cardiovascular complications and so decrease mortality and

morbidity in ESRD patients on HD. Regular follow up of abdominal ultrasonography can detect NAFLD earlier for early detection of cardiovascular complications In ESRD patients on HD.

5- This study had some limitations that should be considered.

The cross-sectional format of these studies, in fact, does not allow correct conclusions about the real impact and correlation between cardiovascular morbidity and NAFLD in the elderly patients on hemodialysis. There is a lack of liver biopsy. However, liver biopsy cannot be performed routinely in everyday clinical practice, especially for patients with end-stage kidney disease, primarily due to a disorder of coagulation factors in these patients.

References

1. Barcenilla, A., Pryde, S. E., Martin, J. C., Duncan, S. H., Stewart, C. S., Henderson, C., & Flint, H. J. (2000). Phylogenetic relationships of butyrate-producing bacteria from the human gut. Applied and environmental microbiology, 66(4),1654-1661.
2. Barchetta, I., Angelico, F., Del Ben, M., Baroni, M. G., Pozzilli, P., Morini, S., & Cavallo, M. G. (2011): Strong association between non alcoholic fatty liver disease (NAFLD) and low 25 (OH) vitamin D levels in an adult population with normal serum liver enzymes. BMC medicine, 9(1), 85
3. Barclay L. CKD: ASN Recommends Screening, Rejects ACP Statement. Medscape Medical News. Oct 23 2013.
4. Bashiardes, S., Shapiro, H., Rozin, S., Shibolet, 0., &Elinav, E. (2016). Non-alcoholic fatty liver and the gut microbiota. Molecular metabolism, 5(9), 782-794.
5. Benedetto, F. A., Mallamaci, F., Tripepi, G., & Zoccali, C. (2001). Prognostic value of ultrasonographic measurement of carotid intima media thickness in dialysis patients. Journal of the American Society of Nephrology, 12(11), 2458-2464.
6. Berger, A. K., Duval, S., & Krumholz, H. M. (2003). Aspirin, beta-blocker, and angiotensin-converting enzyme inhibitor therapy in patients with end-stage renal disease and an acute myocardial infarction. Journal of the American College of Cardiology, 42(2), 201-208.
7. Boursier, J., Mueller, 0., Barret, M., Machado, M., Fizanne, L., Araujo-Perez, F., ... & Hunault, G. (2016). The severity of nonalcoholic fatty liver disease is associated with gut dysbiosis and shift in the metabolic function of the gut microbiota. Hepatology, 63(3), 764-775.
8. Brea, A., Mosquera, D., Martin, E., Arizti, A., Cordero, J. L., & Ros, E. (2005). Nonalcoholic fatty liver disease is associated with carotid atherosclerosis: a case—control study. Arteriosclerosis, thrombosis, and vascular biology, 25(5), 1045-1050.
9. Byrne, C. D., & Targher, G. (2015). NAFLD: a multisystem disease. Journal of hepatology, 62(1), S47-S64.
10. Byrne, C. D., Olufadi, R., Bruce, K. D., Cagampang, F. R., & Ahmed, M. H. (2009). Metabolic disturbances in non-alcoholic fatty liver disease. Clinical science, 116(7), 539-564.
11. Canaud B, Bragg-Gresham JL, Marshall MR, et al., Mortality risk for patients receiving hemodiafiltration versus hemodialysis: European results from the DOPPS. Kidney Int 2006; 69: 2087-93.