ANATOL J FAMILY MED

The Anatolian Journal of Family Medicine

Original Article

DOI: 10.5505/anatoljfm.2018.58066

Anatol J Family Med 2019;2(1):38–40

Prevalence of Non-Alcoholic Fatty Liver Disease in Patients with Parkinson Disease

Selahattin Vural,[1] Muhammed Ali Ayvaz,[2] Tuğrul Kesicioğlu,[1] Selim Turfan,[3] Arzu Ayraler,[4] Ahmet Cumhur Dülger[2]

[1]Department of General Surgery, Giresun University, Giresun, Turkey
[2]Department of Gastroenterology, Giresun University, Giresun, Turkey
[3]Department of Emergency Medicine, Giresun University, Giresun, Turkey
[4]Department of Family Medicine, Giresun University, Giresun, Turkey

ABSTRACT

Objectives: Non-alcoholic fatty liver disease (NAFLD) has presented as the most common cause of chronic liver disease in the Western world. Parkinson disease (PD) is these most common non-demyelinizan neurologic disase and its incidence is steadily increasing in the world. Our study aims to analyze the prevalence of ultrasonography-proven NAFLD among the PD patients.

Methods: A retrospective chart review was performed to identify PD patients who had at least two visits in the Liver Clinic from January 2017 to May 2018. Thus, 124 consecutive patients with PD was longitudinally screened for NAFLD which were diagnosed according to ultrasonographic criteria. Control subjects were selected from age-matched eldely subjects. Demographic and laboratory data, concurrent statin use and results of hepatobiliary ultrasonography were collected.

Results: Non-alcoholic fatty liver disease prevalence was significantly lower in the PD group than in the age-matched control group (21.0% vs. 36.9%, p=0.014). In multiple logistic regression analyses using baseline factors, statin use, elevated HbA1c, baseline fasting glucose below than 100 mg/dL, and elevated ALT levels were independently associated with NAFLD (p=0.040, p<0.001, p=0.030, and p<0.001, respectively).

Conclusion: While additional studies in large populations are needed to investigate the correlation between PD and NAFLD, further exploration of PD-related metabolic liver disease clinically appears warranted.

Keywords: Nonalcoholic fatty liver disease, nonalcoholic steatohepatitis, neurodegenerative diseases, parkinson disease

Please cite this article as: Vural Selahattin, Ayvaz MA, Kesicioğlu T, Turfan S, Ayraler A, Dülger AC. Prevalence of Non-Alcoholic Fatty Liver Disease in Patients with Parkinson Disease. Anatol J Family Med 2019;2(1):38–40.

Address for correspondence: Dr. Selahattin Vural. Giresun Üniversitesi, Genel Cerrahi Anabilim Dalı, Giresun, Turkey.

Phone: +90 454 310 20 00/1817

E-mail: mdsgsgir@gmail.com

Received Date: 02.09.2018
Accepted Date: 10.11.2018
Published online: 30.04.2019

INTRODUCTION

Non-alcoholic fatty liver disease (NAFLD) has presented as the most common cause of chronic liver disease in the Western world. NAFLD is the condition of hepatic steatosis when no other causes for secondary hepatic fat storage are considered. Hypercholesterolemia is main cause of the NAFLD and ultrasound-based imaging techniques are cheaper and more widely available to diagnose NAFLD in the field of gastroenterology.[1]

Parkinson disease (PD) is the second most common non-demyelinizan neurologic disase and its incidence is steadily increasing in the world. Although the etiology of PD remains unclear, detoriated cholesterol mechanism have been implicated in pathogenesis of PD.[2] There is still no data about the prevalence of NAFLD among patients with PD. Our study aims to analyze the prevalence of ultrasonography-proven NAFLD among the PD patients.

METHOD

A retrospective chart review was performed to identify PD patients who had at least two visits in the Liver Clinic from January 2017 to May 2018. Thus, 124 consecutive patients with PD was longitudinally screened for NAFLD which were diagnosed according to ultrasonographic criteria. Control group contents 65 patients were selected from especially older than 65 years without Parkinson disease. Control subjects had no any serious diseases. Demographic and laboratory data, concurrent statin use and results of hepatobiliary ultrasonography were collected from the hopitalarchivement data. Routine biochemistry values and complete blood count values were evaluated. The patients' hepatobiliary ultrasonography made by radiologists. Patients with history of chronic liver disease, liver transplant, past alcohol use or not enough data to stage NAFLD were excluded. Data analyzed using Pearson's chi-squared test with the Stata software. Our study was planned retrospectively together with patients informed consent.

RESULTS

The mean age of PD group was 74.2±11.9years; 65 (52.4%) female. In PD group, the rate of ultrasonograpy-proven NAFLD was 25 (21.0%) and in control group, the rate of ultrasonograpy-proven NAFLD was 24 (36.9%) (p=0.014). At diagnosis, there were significantly differences between groups in terms of AST, ALT, ALP and GGT levels (Table 1). As an important point, there was no significant difference in cardiometabolic risk markers like triglycerides, LDL-cholesterol and HDL-cholesterol levels. There was no statistically significant difference in demographic features and diabetes prevalence (12.0% vs 16.0%) (p=0.170). Moreover, no significant difference was also seen in HbA1c levels between the PD patients and control groups during the course of this study (p=0.960). The independent variables with a p<0.05 were integrated into multiple logistic regression analysis. It was found that elevated HbA1c (p<0.001), baseline fasting glucose below than 100 mg/dL (p=0.030), and elevated ALT levels (p<0.001) were independently associated with NAFLD in both groups.

Table 1. Comparison of Parkinson Disease patients (PD) with age-matched control group according to biochemical test results and NAFLD.

Parameters	PD group n=124	Control group n=65	p
Age (years)	74.28±11.98	68±3.41	0.06
Glucose (mg/dL)	125.15±45.0	136±75	0.197
AST (U/L)	28.23±75.48	27±38	0.03
ALT (U/L)	15.13±20.71	28±64	0.01
Total Protein (g/dL)	7.05±0.67	10.7±4.7	0.368
Albumin (g/dL)	4.28±0.59	4.6±0.82	0.99
ALP (U/L)	84.76±39.04	104±76	0.004
GGT (U/L)	25.69±31.81	58±101	0.001
Urea (mg/dL)	45.63±25.79	44.5±18.3	0.28
Creatinine (mg/dL)	0.95±0.57	1.09±0.98	0.079
Calcıum (mg/dL)	9.41±0,58	9.17±0.61	0.37
HBA1C	6.1±1,08	6.2±0.58	0.96
HB (g/dL)	12.66±2.19	12.50±2.02	0.37
HCT (%)	39.92±9.21	37.20±5.6	0.42
HDL (mg/dL)	43.86±14.19	44.77±16.22	0.96
LDL (mg/dL)	102.62±36.12	105±44.1	0.77
Cholesterol (mg/dL)	174.34±45.49	192±36	0.07
Triglycerides (mg/dL)	139.1±70.12	140±65	0.08
NASH (%)	21	36	0.014

DISCUSSION

In the current study, the prevalence of NAFLD was lower in patients with PD compared to otherwise healthy subjects. Moreover, many biochemical parameters including AST, ALT, ALP, GGT, cholesterol and trigliceride levels have been found to be significantly different between two groups. On multivariate analyses; HbA1c, fasting glucose levels (<100 mg/dl) and elevated ALT levels were independently associated with NAFLD in both groups.

PD is characterised by dopamin depletion in the substandianigra and inhibition of the thalamus and motor cortex, resulting in bradykinesia. The underlying mechanisms of neurodegeneration in Parkinson Disease are not completely understood. The prevalence of Parkinson disease is about 0.3% in the general population of 40 years and older. The key elements of PD are tremor, bradykinesia and rigidity.[3]

Postmortem studies involvingfrontal cortexes of the patients with PD showed that progression of PD was associated with downregulation of polyunsaturated fatty acids and constitutive activation of stearic acid pathway.[4]Thus, impaired cholesterol metabolism might lead to decreased cholesterol accumulation in the liver in PD. Otherhand,the role of these metabolites as potential biomarkers for PD requires validation.

A recent study revealed that apolipoprotein E which is a key component of several lipoproteins and plays a pivotal role in lipid metabolism has not been contributed to cognitive status in PD patients.[5]

Excess free fatty acids are thought to be a critical feature in the progression of NAFLD. A recent study reported that fatty acids metabolites including valeric acidand docosene as well as long-chain fatty acids have decreased in patients with PD,

indicating that the disturbance of lipid metabolism has been contributed to lower rates of NAFLD in study patients.[6]

Fatty acids have been reported playing a role in PD. For example, one study emphasized that the supplementation of omega-3 polyunsaturated fatty acids presented a potential neuroprotective action in hemiparkinsonism model.[7] One study reported most PD patients losing weight during the evolution of their disease but the triggers for weight loss in PD remain incompletely understood.[8] The low body weight- related cholesterol levels may also have been contributed to low prevalence of NAFLD in patients with PD.

Other hand, a huge number of patients with PD have reportedly used many lipid lowering drugs including statins.[9]

There is some evidence that Parkinson's Disease (PD) patients have lower body weight and lower fat mass when compared to healthy subjects and that lower body weight and fat mass influence disease risk and progression.[10] Although there was no difference between the two groups of patients, the group with PD may have low body weight for many years and long-term low body weight also reduces fatty liver development. In the current study, the mean body mass index (BMI) of the patients with PD was lower than control subjects (p=0.04). Our study was in line with other studies involving patients with PD. Altered regulation of lipid and glucose homeostasis, most often in the setting of insulin resistance and obesity, is central to the pathogenesis of NAFLD.[11] However, even in this relatively small number of patients, for the first time PD was associated with significantly lower rates of NAFLD independent of the relationship of HbA1c and BMI as well as other metabolic risk factors.

In conclusion, NAFLD is seen significantly lower in PD group than controls. But the small study group, cross-sectional design and confounding factors related with PD pathogenesis limited the study conclusions to generelaze. On the other hand, this study is one of the scare study on PD and NAFLD association in the literature.

Disclosures

Ethics Committee Approval: Local Ethic Comittee received.

Peer-review: Externally peer-reviewed.

Conflict of Interest: None declared.

Financial Disclosure: This study did not receive any specific institutional and financial support.

Authorship Contributions: Concept – S.V.; Design – M.A.A.; Supervision – A.C.D.; Materials – S.T.; Data collection &/or processing – T.K.; Analysis and/or interpretation – A.A.; Literature search – S.V.; Writing – S.V.; Critical review – A.C.D.

REFERENCES

1. Dharmalingam M, Yamasandhi PG. Nonalcoholic Fatty Liver Disease and Type 2 Diabetes Mellitus. Indian J Endocrinol Metab 2018;22(3):421-8. [CrossRef]
2. Fernandez HH. 2015 Update on Parkinson disease. Cleve Clin J Med 2015;82(9):563-8. [CrossRef]
3. Bizzarri BM, Tortolini S, Rotelli L, Botta G, Saladino R.Current Advances in L-DOPA and DOPA-Peptidomimetics: Chemistry, Applications and Biological Activity. Curr Med Chem 2015;22(36):4138-65. [CrossRef]
4. Martín MG, Pfrieger F, Dotti CG. Cholesterol in brain disease: sometimes determinant and frequently implicated. EMBO Rep 2014;15(10):1036-52. [CrossRef]
5. Pierzchlińska A, Białecka M, Kurzawski M, Sławek J. The impact of Apolipoprotein E alleles on cognitive performance in patients with Parkinson's disease. NeurolNeurochir Pol 2018;52(4):477-82. [CrossRef]
6. Zhao H, Wang C, Zhao N, Li W, Yang Z, Liu X, et al. Potential biomarkers of Parkinson's disease revealed by plasma metabolic profiling. J Chromatogr B Analyt Technol Biomed Life Sci2018;1081-1082:101-8. [CrossRef]
7. Barros AS, Crispim RYG, Cavalcanti JU, Souza RB, Lemos JC, Cristino G, et al. Impact of the chronic omega-3 fatty acids supplementation in Hemiparkinsonism model induced by 6-Hydroxydopamine in rats. Basic ClinPharmacolToxicol2017;120:523–31. [CrossRef]
8. Rieu I, Boirie Y, Morio B, Derost P, Ulla M, Marques A, et al. The idiopathic Parkinson's disease: a metabolic disease? Rev Neurol (Paris)2010;166:822–8. [CrossRef]
9. Zhang J, Zhang X, Wang L, Yang C. High Performance Liquid Chromatography-Mass Spectrometry (LC-MS) Based Quantitative Lipidomics Study of Ganglioside-NANA-3 Plasma to Establish Its Association with Parkinson's Disease Patients. Med Sci Monit 2017; 23:5345-53. [CrossRef]
10. Bernhardt D, Müller HP, Ludolph AC, Dupuis L, Kassubek J. Body fat distribution in Parkinson's disease: An MRI-based body fat quantification study. Parkinsonism RelatDisord2016;33:84-9.
11. Doycheva I, Issa D, Watt KD, Lopez R, Rifai G, Alkhouri N. Nonalcoholic Steatohepatitis is the Most Rapidly Increasing Indication for Liver Transplantation in Young Adults in the United States. J Clin Gastroenterol 2018;52(4):339-46. [CrossRef]