NONALCOHOLIC FATTY LIVER DISEASE (NAFLD) FREQUENCY IN DIABETES MELLITUS (DM) TYPE –II PATIENTS

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Abstract

The purpose of this study was to determine the frequency of nonalcoholic fatty liver disease (NAFLD) in the patients with diabetes mellitus (DM) type-II. A cross-sectional observational study was carried out at the Shaikh Zayed Hospital, Lahore for the duration of six months. A total of 130 cases of diagnosed cases of DM-II were evaluated for NAFLD. Out of 130 cases, there were 81 (62%) females and 49 (38%) males. The mean age of the patients was 52.31±5.96. The 61 % females were found to have nonalcoholic fatty liver disease, whereas, the 53 % males were found to have nonalcoholic fatty liver disease on ultrasound. The diabetic females (type-II) were more prone to have a nonalcoholic fatty liver disease than males. The type-II diabetes is the most common risk factor associated with NAFLD.

Introduction

Hepatic stenosis occurred if patients are symptomatic of a diffused collection of fat in liver cells. This condition won't persist long if left untreated. It can turn into more wrest condition like cirrhosis leading to hepatic carcinoma. A term nonalcoholic fatty liver disease (NAFLD) refers for that patients who possess a fatty liver without having a history of notable intake of alcohol. This incidence has a prevalence of 15-25 % (Barisio *et al.,* 2008). NAFLD comprises both nonalcoholic fatty liver (NAFL), and non-alcoholic steatohepatitis (NASH) (Sanyal, 2002). The history of NAFLD extends from steatosis to steatotic hepatitis (Maheshwari and Thuluvath, 2006) and to cirrhosis (Maheshwari and Thuluvath, 2006; Ekstedt *et al.,* 2006) and sometimes extends to the patients with hepatocellular carcinoma (Davila *et al.,* 2005). Many patients having NAFLD, usually come up only with minor symptoms, and report 'fatigue', 'malaise' and 'sense of fullness' in upper right quadrant. Among the majority of the patients, the finding hepatomegaly incurs (Madan *et al.,* 2006; Falck-Ytter *et al.,* 2001). The explicit diagnosis of NAFLD relates to the liver tissue samples' histological examination. This procedure is however is found to be pricey and invasive followed by various complications. Therefore, an ultrasound is the most widely available and cheap test for detecting NAFLD, with a high level of accuracy (Faiza *et al.,* 2005; Saadeh *et al.,* 2002).

Much of the work on NAFLD has been in the other parts of the world, but its occurrences and an etiology has not been well studied in the Asian countries (Barisio *et al.,* 2008). Keeping the change in the purpose of this study is to find out the frequency of NAFLD by ultrasound in patients with type-II DM. A Japanese study observed that among 3147 people, 308 (10 %) new cases of NAFLD were reported (Hamaguchi *et al.,* 2005). Another study of England reported an incidence rate: 29 cases per 100,000 person-years (Whalley et al., 2007). This current cross-sectional observational study was carried out at the Shaikh Zayed Hospital, Lahore for the duration of six months to determine the frequency of nonalcoholic fatty liver disease (NAFLD) in the patients with diabetes mellitus (DM) type-II

Materials and Methods

The diabetic patients with type-II (n=130) were screened for nonalcoholic fatty liver disease. All those patients who were enrolled in this study were informed prior to take the consent. This was a cross-sectional study carried out the Shaikh Zayed Hospital, Lahore for a period of 6 months. In order to control biasness, the age range was selected as between 40-60 years in both genders. All those patients who were having a history of chronic liver disease, alcohol intake, drugs and expected pregnancy were not enrolled in this study. The diagnosed cases of diabetes mellitus-DM (random blood glucose level > 140 mg/dl) were taken and all were subjected to ultrasonography. The fatty liver was diagnosed on the basis of 'increased echo-texture compared with kidneys', 'diffuse hyper-echoic echo texture', 'deep attenuation' and 'vascular blurring'. All of the information was collected through filling a Proforma for each patient included. The data was entered and analyzed using SPSS version 20.0.

Results

For all patients (n=130), the mean age was found to be 52.31± 5.96. The age range varied from 40 to 60 years out of which 81 were females and 49 were males. The 76 patients were found to have a fatty liver diagnosed by ultrasound while, 54 patients did not have ultrasonographic evidence of fatty liver (**Table 1**).

In the current study, the diabetic females (type-II) were more prone to have a nonalcoholic fatty liver disease than males. Out of 81 females, 50 females were found to have nonalcoholic fatty liver disease on ultrasound (61.7%), while remaining 31 females (38%) had a normal liver architecture. Out of 49 male diabetic patients, 26 males (53%) were found to have nonalcoholic fatty liver disease on ultrasonography while 23 males (47%) were free from this disease.

Table 1. Frequency of Fatty Liver Disease

Gender	Frequency		Percentage	
	Yes	***No***	***Yes***	***No***
Male (n=49)	26	23	53 %	47 %
Female (n=81)	50	31	61.7 %	38 %

Discussion

Nonalcoholic fatty liver disease (NAFLD) is a symptoms free disease that leads to numerous other diseases. Moreover, it cannot be diagnosed clinically. There are reports that have been presented locally and internationally, have tried to explain the preventive measures for NAFLD related hepatocellular carcinoma. Major factors that can further enhance the progression of this disease are diabetes and obesity. In united stated approximately 30% of the population is affected by this disease (Choudhury and Sanyal, 2004). The NAFLD denotes a range of situations classified histologically by 'macrovesicular hepatic steatosis' and prevalent in those individuals who do not take alcohol in volumes considered noxious to liver (Sanyal, 2002). Prashanth *et al.,* (2009) have reported high prevalence of both NAFLD and NASH for DM type-II patients which further found to be increased with various components of 'metabolic syndrome'. The NAFLD is now considered an outstanding origin of abnormal liver enzymes and has been linked to diabetes as well as coronary artery disease (Rubinstein *et al.,* 2008).

The diagnosis of NAFLD in the current report was solely based on the ultrasonography. It was mentioned that the ultrasonography is the most famous and common clinical procedure to diagnose NAFLD which can precisely pinpoint steatosis with a sensitivity of up to 80 % (Cho et al., 2008). Demographically, it was clear that the mean age of the person to be getting endangered to have a victim of NAFLD was greater than 50 years. The mean age to be evaluated in our study was 52.31± 5.96 comparable to the study conducted by Luxmi *et al.,* (2008). A study by Targher *et al.,* (2007) reported 69.5% prevalence of NAFLD and it was stated that it was the most common source (81.5 %) of hepatic steatosis as examined by ultrasound. Further, it was reported that the prevalence of NAFLD used to increase with age. A cross-sectional study by Taseer *et al.,* (2009) concluded that NAFLD is associated with type-II diabetic patients with raised triglycerides and cholesterol levels. We reported 58.5 % prevalence of fatty liver disease, whereas, a high prevalence (60.8 %) of NAFLD was noted in a study by Luxmi *et al.,* (2008).

The prevalence 55 % was observed in patient of the Arab Peninsula (Akbar and Kawther, 2003). But it was a little bit higher, as per incidence in our neighboring country India, where the frequency was 49 % (Amarapurkar *et al.,* 2007). We observed that NAFLD is more common in women (61 %) that in men. Other different studies have also been evaluated that the female gender was at more risk for developing NALFD as indicated by Akbar and Kawther (2003). But a study by Williams *et al.,* (2011) described that the male patients were having higher rates of both NAFLD and NASH as compared to female patients. Moreover, they reported that diabetic patients are at strong risk for both NAFLD and NASH and this prevalence are increasing with time. Targher *et al.,* (2005) has reported that NAFLD is greatly correlated with a moderate cardiovascular disease increased risk among type-II risk among diabetic patients.

Summary and Conclusion

Out of 130 cases, there were 81 (62%) females and 49 (38%) males. The mean age of the patients was 52.31±5.96. The 61 % females were found to have nonalcoholic fatty liver disease, whereas, the 53 % males were found to have nonalcoholic fatty liver disease on ultrasound. The diabetic females (type-II) were more

prone to have a nonalcoholic fatty liver disease than males. The type-II diabetes is the most common risk factor associated with NAFLD.

NAFLD is a major health problem worldwide. It is a burden to the health care providers and to the community at large. The type-II diabetes is the most common risk factor associated with NAFLD. Other major factors are obesity and dyslipidemia. Prevention by proper education and creating awareness regarding risk factors is the most effective means to control NAFLD incidence. Keeping in view the high incidence of NAFLD in type-II diabetic patients, we recommend that each such patient should get a regular checkup and ultrasound for an early detection of this disease.

References

Akbar, D. H., and Kawther, A. H. (2003). Nonalcoholic Fatty liver disease in Saudi type 2 diabetic subjects attending a medical outpatient clinic prevalence and general characteristics. *Diabetes care*. 26(12): 3351-3352.

Amarapurkar, D., Kamani, P., Patel, N., Gupte, P., Kumar, P., Agal, S., . . . Deshpande, A. (2007). Prevalence of non-alcoholic fatty liver disease: population based study. *Ann Hepatol*. 6(3): 161-163.

Barisio, D., Mariel, A. A., and Outomuro, D. (2008). [Non alcoholic fatty liver. A frequent entity with an unknown outcome]. *Revista de gastroenterologia del Peru: organo oficial de la Sociedad de Gastroenterologia del Peru*. 29(1): 44-50.

Cho, C. S., Curran, S., Schwartz, L. H., Kooby, D. A., Klimstra, D. S., Shia, J., . . . DeMatteo, R. P. (2008). Preoperative radiographic assessment of hepatic steatosis with histologic correlation. *Journal of the American College of Surgeons*. 206(3): 480-488.

Choudhury, J., and Sanyal, A. J. (2004). Clinical aspects of fatty liver disease. Paper presented at the Seminars in liver disease.

Davila, J., Morgan, R., Shaib, Y., McGlynn, K., and El-Serag, H. (2005). Diabetes increases the risk of hepatocellular carcinoma in the United States: a population based case control study. *Gut*. 54(4): 533-539.

Ekstedt, M., Franzén, L. E., Mathiesen, U. L., Thorelius, L., Holmqvist, M., Bodemar, G., and Kechagias, S. (2006). Long-term follow-up of patients with NAFLD and elevated liver enzymes. *Hepatology*. 44(4): 865-873.

Faiza, A. Q., Fa, Q., and Al-ghamdi, A. (2005). Fatty liver in overweight and obese patients in western part of Saudi Arabia: A study of sonological prevalence. *Pakistan Journal of Medical Sciences*. 2(21).

Falck-Ytter, Y., Younossi, Z. M., Marchesini, G., and McCullough, A. J. (2001). Clinical features and natural history of nonalcoholic steatosis syndromes. Paper presented at the Seminars in liver disease.

Hamaguchi, M., Kojima, T., Takeda, N., Nakagawa, T., Taniguchi, H., Fujii, K., . . . Shimazaki, M. (2005). The metabolic syndrome as a predictor of nonalcoholic fatty liver disease. *Annals of Internal Medicine*. 143(10): 722-728.

Taseer, I.H., L. H., Safdar, S., Mirbahar, A. M., and Ahmad, I. (2009). Frequency of non alcoholic fatty liver disease (nafld) and its biochemical derangements in type-2 diabetic patients. *Pakistan Journal of Medical Sciences*. 5 (25).

Luxmi, S., Sattar, R. A., and Ara, J. (2008). Association of non-alcoholic fatty liver with type 2 diabetes mellitus. *Jlumhs*. 188-193.

Madan, K., Batra, Y., Gupta, S. D., Chander, B., Anand Rajan, K., Tewatia, M., . . . Acharya, S. (2006). Non-alcoholic fatty liver disease may not be a severe disease at presentation among Asian Indians. *World Journal of Gastroenterology*. 12(21): 3400.

Maheshwari, A., and Thuluvath, P. J. (2006). Cryptogenic Cirrhosis and NAFLD: Are They Related&quest. *The American journal of gastroenterology*. 101(3): 664-668.

Prashanth, M., Ganesh, H., Vima, M., John, M., Bandgar, T., Joshi, S. R., . . . Thakkar, H. (2009). Prevalence of nonalcoholic fatty liver disease in patients with type 2 diabetes mellitus. *J Assoc Physicians India*. 57(3): 205-210.

Rubinstein, E., Lavine, J. E., and Schwimmer, J. B. (2008). Hepatic, cardiovascular, and endocrine outcomes of the histological subphenotypes of nonalcoholic fatty liver disease. Paper presented at the Seminars in liver disease.

Saadeh, S., Younossi, Z. M., Remer, E. M., Gramlich, T., Ong, J. P., Hurley, M., . . . Sheridan, M. J. (2002). The utility of radiological imaging in nonalcoholic fatty liver disease. *Gastroenterology*. 123(3): 745-750.

Sanyal, A. J. (2002). AGA technical review on nonalcoholic fatty liver disease. *Gastroenterology*. 123(5): 1705-1725.

Targher, G., Bertolini, L., Padovani, R., Rodella, S., Tessari, R., Zenari, L., . . . Arcaro, G. (2007). Prevalence of nonalcoholic fatty liver disease and its association with cardiovascular disease among type 2 diabetic patients. *Diabetes care*. 30(5): 1212-1218.

Targher, G., Bertolini, L., Poli, F., Rodella, S., Scala, L., Tessari, R., . . . Falezza, G. (2005). Nonalcoholic fatty liver disease and risk of future cardiovascular events among type 2 diabetic patients. *Diabetes.* 54(12): 3541-3546.

Whalley, S., Puvanachandra, P., Desai, A., and Kennedy, H. (2007). Hepatology outpatient service provision in secondary care: a study of liver disease incidence and resource costs. *Clinical medicine,* 7(2): 119-124.

Williams, C. D., Stengel, J., Asike, M. I., Torres, D. M., Shaw, J., Contreras, M., . . . Harrison, S. A. (2011). Prevalence of nonalcoholic fatty liver disease and nonalcoholic steatohepatitis among a largely middle-aged population utilizing ultrasound and liver biopsy: a prospective study. *Gastroenterology.* 140(1): 124-131.