THE PREVALENCE OF HEPATITIS C VIRUS INFECTION AMONG DIABETIC PATIENTS IN SIBIU COUNTY

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Abstract: *The liver has a central position in intermediary metabolism and plays an essential role in the pathogenesis of insulin resistance. HCV infection affects about 3% of the world's population. A large number of HVC - infected patients have various extrahepatic manifestations. Age, obesity, dyslipidemia, and a family history of DM are associated with a higher incidence of diabetes in HCV – infected patients. The pathogenesis of DM developing against a background of HVC infection is very much debated. Suggested mechanisms include: insulin resistance and hyperinsulinemia; insulin deficiency or decreased insulin secretion; liver steatosis; inflammation and proinflammatory cytokines; direct pancreatic HCV infection; autoimune ß- cell damage; and iron overload. Diabetes was observed in 21% of HCV-infected. HCV genotype 2a was observed in 29% of HCV-RNA-positive diabetic patients,being more possible that HCV infection, especially genotype 2a, may serve as an additional risk factor for the development of diabetes, beyond that attributable to chronic liver disease alone.*

INTRODUCTION

Hepatitis C virus infection (HCV) is associated with diabetes mellitus (DM); metabolic disease frequency is significantly higher in HCV – positive patients compared with healthy subjects.

It is estimated that 72.3% of HCV – positive diabetic patients have abnormal liver function tests.(1)

The intrinsic mechanism of the link between HCV and diabetes is unknown, the alteration of glucose metabolism due to chronic liver disease, the autoimmune response directed against pancreas or direct damage of pancreatic beta cells by hepatitis C virus may be some of the pathogenic pathways.(2)

Diabetes mellitus is found in 21% of HCV infected subjects, and only in 12% of subjects with chronic hepatitis B virus infection (HBV). Genotype 2a was observed in 29% of the HCV – RNA positive cases, considering the possibility that HCV, particularly genotype 2a, represents the additional factor for developing diabetes, rather than that glucose alteration is the result of liver disease.(3,4)

Diabetes is associated in particular to HCV infection and less to HBV, and HCV is correlated with immune system manifestations; this suggests that autoimmune destruction of endocrine pancreas may be secondary to HCV antigens or immune complexes induced by HCV infection. Some authors consider that the change in glucose metabolism is due to increased insulin resistance.(5,6) Fasting hyperinsulinemia in these patients appears as a result of decreased insulin extraction in the affected liver, and less because of increased pancreatic secretion or decreased insulin sensitivity at specific hormone receptor binding site. A high prevalence of HCV infection in patients with type 2 diabetes compared to the general population was found.(7,8)

In a US survey (NHANES III), a significant association between HCV infection and type 2 diabetes compared to general population has been demonstrated, suggesting that people over 40 years infected with HCV, have a three times higher risk of developing type 2 diabetes.

The mechanisms through which HCV may cause diabetes are:(7,9)

- hepatocyte dysfunction - given the role of hepatocyte in glucose metabolism;
- virus characteristics - in particular 2a genotype appears to be involved in the association or production of DM in patients infected with HCV;
- virus - induced autoimmunity: could be involved in the association of HCV infection with DM (Latent Autoimmune Diabetes of the Adult, LADA), similar to other autoimmune manifestations occurring in HCV infection (mixed cryoglobulinemia);
- iron accumulation - could be involved in the production of DM by analogy with hemochromatosis;(10)
- multifactorial etiology.

PURPOSE

The assessment of HCV (chronic viral hepatitis C) prevalence in patients with DM hospitalized in Diabetes, Nutrition and Metabolic Diseases Department, between January 2013 - September 2013.

MATERIALS AND METHODS

It is a retrospective – descriptive study, using data from the observation charts of patients hospitalized in Diabetes Department in the first 9 months of 2013. Antibodies against HCV (anti-HCV) were tested for all participants using micro-ELISA method.

The study group consisted of 420 patients with diabetes hospitalized between January 2013 - September 2013, excluding those who were previously diagnosed with HCV.

RESULTS

Study group description

In the study group 420 patients were registered: 260

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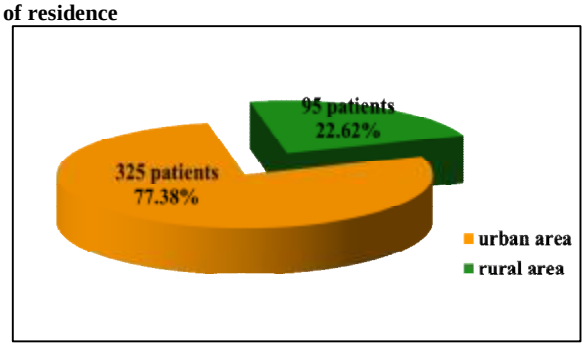
women (62%) and 160 men (38%).

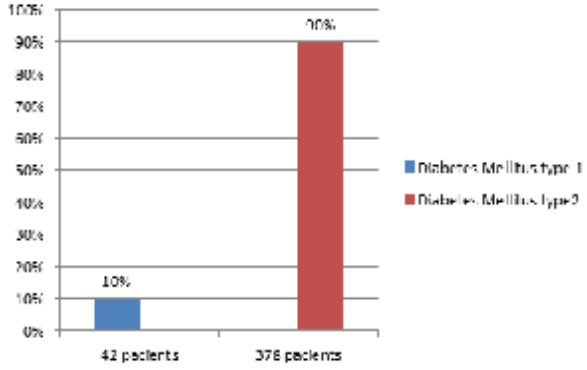
When comparing the patients according to the place of residence we found 325 patients (77.38%) living in urban areas, and 95 patients (22.62%) in rural areas (figure no. 1).

Figure no. 1. Distribution of patients according to the place of residence



378 (90%) of the patients had type 2 diabetes mellitus and 42 (10%) of them had type 1 diabetes, similar to the global prevalence of type 1 and 2 diabetes (figure no. 2).

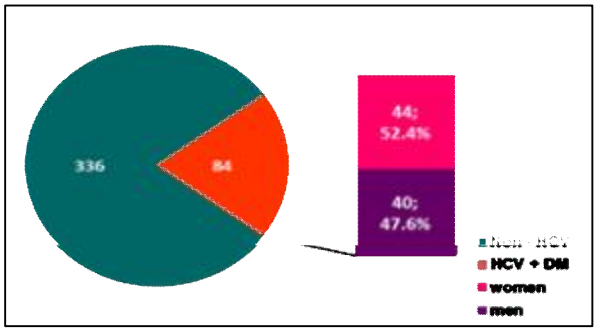
Figure no. 2. Diabetes mellitus type distribution in the study group.



HVC - positive diabetic patients group

HCV testing was positive for 84 (20%) of the 420 diabetic patients enrolled in the study, of which 44 were women (52.4%) and 40 males (47.6%) (figure no. 3).

Figure no. 3. HVC positive diabetic patients distribution in the study group



The age of patients in this group varied between 35-65 years. There were no significant differences in the age group 45-55 years between HVC - positive women and men diabetic patients. In the age group under 40 years only 2 patients, both men, were found, and with age over 60 years, 3 patients (1 male and 2 females) (table no. 1).

Table no. 1. HCV-positive patients distribution by age

Age group	35-40 years	40-45 years	45-50 years	50-55 years	55-60 years	60-65 years
Women	0	1	2	31	8	2
Men	2	3	1	27	6	1

Of the 84 diabetic patients HCV positive, 65 (77.38%) came from urban areas, and 19 (22.62%) from rural areas. 78 patients (92.85%) had type 2 diabetes mellitus and 6 (7.15%) had type 1 diabetes, similar to the study group.

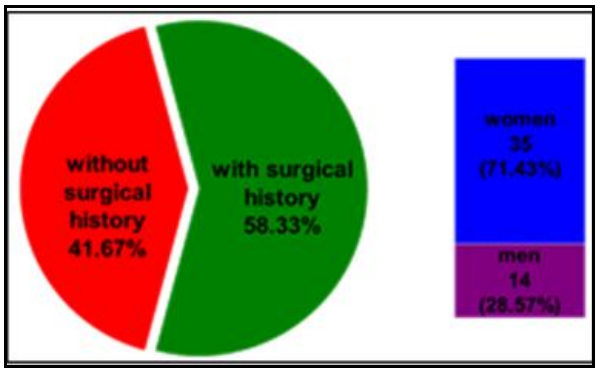
In the HCV positive diabetic patients group the following factors were monitored: surgical history, blood transfusion history and ALT (alaninaminotransferase) value. 49 of them (58.33%) underwent surgery previously (figure 3a), 37 (44.04%) had received blood transfusions (figure 3b) and 32 (38.09%) showed increased blood transaminases (ALT) values (table 2).

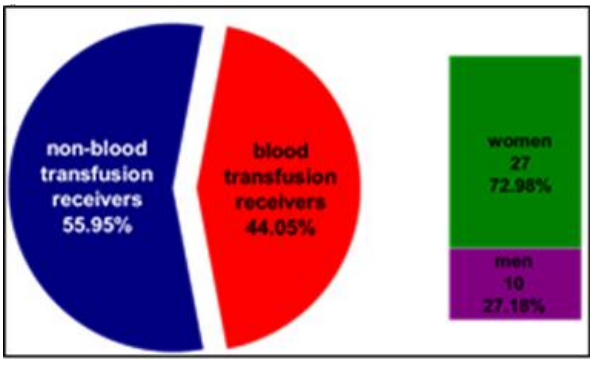
Table no. 2. HCV-positive patients distribution (according to the monitored characteristics)

HCV positive patients / sex	Surgical history	Blood transfusion	Increased ALT
Men	14	10	7
Women	35	27	25
Total	49 (58,33%)	37 (44,05%)	32 (38,09%)

ALT = alaninaminotransferase

Figure no. 3. Distribution of HCV - positive diabetic patients with surgical (a) and blood transfusion (b) history





DISCUSSIONS

The prevalence of HCV infection is higher in patients with type 2 DM - 78 patients (92.85%) compared to those with type 1 diabetes - 6 patients (7.15%).

The majority of HCV – positive diabetic patients had a history of surgery (49 – 58.33%) or blood transfusion (37 – 44.05%).

65 (77.38%) of the HCV – positive diabetic patients came from urban areas.

The most affected group age was between 50 – 55 years, respectively 58 patients – 69.04%, while least affected were those under 40 years (2 cases) and over 60 (3 cases).

Most HCV infections were found in women with diabetes, 44 cases (52.4%), but the difference between sexes was small and without significance.

CONCLUSIONS

Patients with diabetes should be tested for HCV infection, especially if they have a history of risk factors for this infection (transfusion, surgery etc.), knowing that it is associated with metabolic syndrome components, causes insulin resistance and hepatic steatosis.

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