

SEROPREVALENCE OF HEPATITIS C VIRUS INFECTION IN NIGERIANS WITH TYPE 2 DIABETES MELLITUS

*O.A. Adegoke , **B.A. Kolawole , **R.T. Ikem , ***A. Adediran , ****A.O. Aboderin, *A. Salawu

Departments of *Chemical Pathology, **Medicine, ***Haematology and ****Medical Microbiology.

Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife, Osun State, Nigeria.

ABSTRACT

Background: Several studies have suggested a strong epidemiologic association between Diabetes Mellitus (DM) and Hepatitis C Virus (HCV) infection in some populations. However, the reasons why chronic HCV infection is prevalent in DM remain unknown. Our aims were to determine the prevalence of HCV infection in a population of Nigerian diabetics compared with the general population as well as assess the influence of sex and age on HCV infection in the same diabetic population.

Design and methods: A total of 115 diabetic patients were compared with 2,301 blood donors matched by recognized risk factors to acquire HCV infection. Serologic testing for anti HCV was done using a commercial enzyme-linked immunosorbent assay (ELISA) kits.

Results: Sixty (60) type 2 diabetic patients were males while fifty-five (55) were females. Their mean age was 55.4 ± 9 years and mean blood glucose level was 8.5mmol/l. One subject tested positive for HCV infection. The control group consisted of 2,031 adults recruited from the blood donor's clinic. Forty five of them (2.2%) tested positive for HCV.

Conclusion: Our preliminary results suggest a low sero-prevalence of HCV infection among our patients with type 2 diabetes. Presently, routine screening for HCV infection in persons with diabetes may not be necessary.

Keywords: HCV infection, type 2 diabetes mellitus

(Accepted 7 May 2007)

INTRODUCTION

Diabetes mellitus is a major health problem world wide, occurring in about 2-7% of the Nigerian population.¹ Type 2 diabetes mellitus probably accounts for about 90-95% of all cases of diabetes worldwide and the current diabetes epidemic is attributable to rising cases of type 2 diabetes.² As at 2000, there were 7.5 million estimated cases of diabetes in the African continent. By 2030, this figure is expected to rise to around 18.2 million.² HCV is also prevalent worldwide, and there have been reports of its association with chronic disease of the liver in Nigerians.^{3,4}

The earliest evidence that Hepatitis C Virus (HCV) infection may be associated with diabetes became apparent during recruitment for antiviral clinical trials when a considerable proportion of patients with HCV infection had to be excluded because of diabetes.⁵ The association of HCV infection and diabetes has also been observed in cohorts of patients with diabetes in some populations.^{6,7} The reason for this association has not been fully elucidated but there has been a suggestion that diabetes mellitus

may be an extrahepatic manifestation of chronic HCV infection.⁸ In a previous study, 555 liver transplant recipients without preexisting diabetes from three U.S. centres were followed up for about 5years. 37.7% of the patients developed diabetes mellitus with hepatitis C Virus (HCV) infection being one of the most important risk factors.⁷

While these investigations suggest an epidemiological association between HCV infection and type 2 diabetes, no large controlled studies have been conducted to confirm this relationship. Even though previous studies from Nigeria have demonstrated HCV infection in patients with chronic liver disease, only one to the best of our knowledge has studied the relationship between HCV and diabetes mellitus.⁹ None of the 90 diabetic patients in that study tested positive for anti-HCV. We therefore determined the sero prevalence of HCV infection in our clinic patients with type 2 diabetes mellitus and compared this with the general population.

PATIENTS AND METHODS

Patient Selection

This was a cross-sectional study of the sero-prevalence of HCV infection in type 2 diabetic patients. Patients were recruited from the diabetes club as well as the diabetes and endocrine clinics

Correspondence: Dr O.A Adegoke
E-mail: adego3@yahoo.com

of the Obafemi Awolowo University Teaching Hospital, Ile-Ife, South-western Nigeria. The Teaching Hospital provides tertiary level health care for the Ife-Ijesa zone of Osun State, while also receiving referrals from adjoining states of Ondo and Ekiti. About 200 diabetics attend the twice weekly diabetes/endocrinology clinics run by two specialist physicians.

Laboratory Testing

Participants were screened for HCV infection after obtaining a verbal informed consent. The test was performed with a second generation ELISA test using Clinotech diagnostic Inc^R discs for detection of antibodies to Hepatitis C. Four drops of serum are put in an opening of the flat disc. The sample runs through a panel to the opposite side that has been colour-coded. One coloured band indicates a negative result, two coloured band indicates a positive result while no band or more than two bands indicate an invalid result. Each test is self controlled. Blood donors from the general population were recruited and similarly screened for HCV antibodies.

Data Analysis

The percentage of subjects testing positive for HCV and HBV were determined in both diabetics and controls and then statistically compared. Other data are presented as mean \pm SD.

RESULTS

A total of one hundred and fifteen (115) patients with diabetes comprising sixty (60) males and fifty five (55) females were screened for antibodies to hepatitis C. Their ages ranged from 35-80 years, mean 55 ± 9 years. They had mean disease duration of 5 years. 20(17.7%) of them were being treated with insulin. Only one subject (0.8%) was positive for hepatitis C Virus antibodies. 3 subjects (2.6%) tested positive for hepatitis B Virus antibodies. A total of 2,013 apparently healthy blood donors (mean age 36 ± 5 years) were similarly screened. Of these, 45 (2.2%) tested positive for HCV infection. HCV sero-prevalence did not differ between the two groups, $p=0.5132$ Fishers exact test.

DISCUSSION

Our results suggest a low HCV sero prevalence among an indigenous Nigerian diabetic population. Though some data of interest such as history of blood transfusion and liver histology were not available, we are presenting perhaps one of the earliest set of HCV sero-prevalence data amongst diabetics in Nigeria.

Several studies have demonstrated an increased

frequency of HCV infection among patients with type 2 DM, in comparison with either the general population or blood donors.¹⁰⁻¹² In a study of 176 consecutive patients with diabetes and 6,172 blood donors, Shintani et al,¹¹ reported that 11.5% and 2.5% of diabetics and blood donors respectively tested positive for HCV infection. They concluded that HCV may have a direct role in the development of diabetes and that testing routinely for HCV infection in diabetic patient should be mandatory. These sero prevalence data should however be interpreted with caution in view of the fact that diabetic patients have an additional risk of developing HCV infection because of compromised immunity and increased exposure to medical intervention and instrumentation. Temporal effects of HCV infection on diabetes and vice-versa may also be difficult to demonstrate because of the insidious onset of both disorders.

It has also been observed that HCV does not contribute significantly even to hepatic disease in Nigeria. Ojo et al³ had previously reported that HCV infection plays a very minor role in the pathogenesis of chronic liver disease in Nigerian patients. Also, in a study of biopsy proven cases of chronic hepatitis patients, Ndububa et al⁴ screened 17 patients (9 males, 8 females) with only one testing positive for HCV antibody. HBV Viral hepatitis is the most common cause of chronic hepatitis world wide with HBV predominating in sub-Saharan Africa and HCV more prevalent in US and Europe. This may explain in part the low sero-prevalence of HCV infection in our type 2 diabetic patients.

Several possible mechanisms have been postulated to link HCV to diabetes. Hepatitis C virus infection has been shown to produce insulin resistance (because of liberated cytokines), and insulin secretory defects (by viral infection or auto-immune damage).¹³ Hepatitis C virus infection also leads to non-alcoholic fatty liver disease (a probable component of insulin resistance syndrome) and increased iron increased iron storage in the body.¹⁴ All these factors may explain the contribution of hepatitis C virus infection to the development of diabetes mellitus.

In concluding, our preliminary results suggest a low sero-prevalence of HCV infection among our patients with type 2 diabetes. Larger studies are needed to answer this important question in our locality. Perhaps, it may change our approach to managing this common endocrine disorder. Presently routine screening for HCV infection in persons with diabetes may not be necessary.

REFERENCES

1. The Expert Committee on Non-communicable Disease. Non-Communicable Disease in Nigeria. Final report of a national survey, Federal Ministry of Health, Lagos 1997.

2. Diabetes cases in Africa to double in next 25 years. Bull World Health Organization, ISSN 0042-9686, May 2004, vol.82, no.5, p.397-398
3. **Ojo OS, Thursz M, Thomas HC, Ndububa DA, Adeodu OO, Rotimi O et al.** Hepatitis B virus markers, hepatitis D virus antigen and hepatitis C Virus antibodies in Nigerian patients with chronic liver disease *E. Afr. Med. J.* 1995; 72; 719-21.
4. **Ndububa DA, Ojo OS, Adetiloje VA , Duresimi MA, Olasode BJ, Famurewa OC et al** Chronic hepatitis in Nigerian patients, a study of 70 biopsy proven cases *WA JM* 2005; 24: 107-111.
5. **Mehta SH, Moore RD, Thomas DL, Chaisson RE, Sulkowski MS.** The effect of HAART and HCV infection on the development of hyperglycaemia among HIV-infected persons. *JAIDS* 2003; 33: 577-584.
6. **Bahtiyar G, Shin JJ, Ataman A, Sowers RJ, Mcfarlane SI, et al.** Association of diabetes and hepatitis C infection, Epidemiologic evidence and pathophysiologic insights: *Curr Diab. Rep.* 2004; 4: 194-8
7. **Khalili M, Lim. JN, Bass N, Ascher NL, Roberts JP, Tenault NA et al.** New onset diabetes mellitus after liver transplantation: the critical role of hepatitis infection: *Liver Transpl.* 2004, 10: 349-55.
8. **Zignego AL, Ferri C, Pileri SA, Caini P, Bianchi FB.** Extrahepatic manifestations of Hepatitis C Virus infection: A general overview and guidelines for a clinical approach. *Dig Liver Dis.* 2006 Jul 31; [Epub ahead of print]
9. **Balogun WO, Adeleye JO, Akinlade KS, Kuti M, Otegbayo JA.** Low prevalence of hepatitis-C viral seropositivity among patients with type-2 diabetes mellitus in a tertiary hospital. *J Natl Med Assoc.* 2006; 98:1805-8.
10. **Simo R, Hernanderz C, Genesca J.** High prevalence of hepatitis C Virus infection in diabetic patients: *Diabetes care* 1996; 19: 998-1000.
11. **Shintani Y, Fujie H, Miyoshi H, Tsutsumi T, Makuudi M, Kimura S et al.** Hepatitis C Virus infection and diabetes: Direct involvement of the virus in the development of insulin resistance. *Gastroenterology* 2004; 126: 917-9
12. **Wilson C.** Hepatitis C infection and type 2 diabetes in American-Indian women. *Diabetes care* 2004; 27: 2116-9.
13. **Narita R, Abe S, Kihara Yeta I.** Insulin resistance and insulin secretion in chronic hepatitis C virus infection. *J. Hepatol* 2004; 41:132-8.
14. **Metwally MA, Zein CO, Zein NN.** Clinical significance of hepatic iron deposition and serum iron values in patients with chronic hepatitis C infection. *Am. J. Gastroenterol* 2004; 99: 286291.