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Hepatitis C Infection in the District of Aveiro (Portugal): An Eleven-Year Surveillance Study (2002–2012)

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Hepatitis C virus (HCV) is a major cause of liver disease worldwide and causes substantial morbidity and mortality. The common absence of symptoms associated leads to uncertainty to the geographic distribution of this disease. In the absence of a vaccine and effective treatment, prevention is extremely important, especially for at risk groups. The hepatitis C infection rate was surveyed throughout an eleven-year period by sex and age group in Aveiro District. In this retrospective study, blood samples from patients of Aveiro District, in ambulatory regime, collected at the Clinical Analysis Laboratory Avelab between 2002 and 2012 were screened for the presence of antibodies against HCV antigen using a chemiluminescence immunoassay. Approximately 4% of the patients presented positive anti-HCV antibodies. The HCV infection was age-dependent and varied between sexes ($p < 0.05$). The number of infected patients decreased during the study period ($p < 0.05$). The results presented in this study indicated that middle-aged males are more affected than women which may indicate that this group is more prone to risky behaviors. Moreover, the decrease in positive cases during study period may indicate a decrease in exposure to risk factors.

Keywords: Hepatitis C, infection, surveillance study.

HCV infection is associated with a wide spectrum of liver damage, which can range from minimal histological changes to liver cirrhosis, hepatocellular carcinoma or eventually death. The development of cirrhosis is age-dependent and the risk is higher when the infection occurs after 40 years old[1]. Nowadays the illicit use of injectable drugs is the main source of HCV transmission[2].

The main serological marker is anti-HCV, the presence of anti-HCV antibodies cannot be confirmed until 12-27 weeks after exposure. The most recently licensed treatment ABT-450/r–Ombitasvir and Dasabuvir with Ribavirin is the most effective treatment with a sustained virologic response in 90% of cases but the high costs associated to this therapy difficult its applicability[3,4].

In Portugal, the combination of Pegylated interferon alpha (PEG IFN- α) and ribavirin (RBV) therapy is approved for the treatment of chronic HCV infection. The effectiveness of the combined PEG IFN-α and RBV therapy is less than 50% for genotype 1, the most prevalent genotype[5].

In the European region, 1.1-1.3% of population is infected with HCV[6]. In Portugal it is estimated that the prevalence of HCV is 1-1.5% (100.000-150.000 individuals). Also, 60% of infected people have chronic hepatitis C[7]. In Portugal it is attributed to HCV 20% of the total number of deaths due to liver cirrhosis and 50% of the total number of deaths from hepatocellular carcinoma (HCC)[7].
In this study the hepatitis C infection rate was surveyed throughout an eleven-year period by sex and age group in Aveiro District, Portugal.

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MATERIALS AND METHODS

Samples

In this retrospective study all serum samples analysed for anti-HCV antibodies from patients of the District of Aveiro, in ambulatory regime, collected at the Clinical Analysis Laboratory Avelab (Aveiro, Portugal) during the period 2002-2012, were analysed. The age and sex of each patient were registered.

Sampling

Samples were collected, using the Avelab Laboratory protocol. The venous blood of the patients was collected and reserved. The samples were centrifuged at 1381 x g for 10 minutes.

Antibodies Detection

The samples were analyzed in an automated Siemens ADVIA Centaur® XP immunoassay analyzer.

The most important screening marker is anti-HCV antibody that must be required systematically in individuals who have been exposed to any risk situation considered for this infection and is part of laboratory studies for pregnant woman. Positive result for anti-HCV antibodies correspond to current or past infection (prevalence of infection). It was not possible to distinguish current from past infection.

Statistical analysis

The data were treated using the Statistical Package for the Social Sciences (SPSS) 20.0 for Windows. To simplify the statistical analysis the patients were grouped by age ranges: 0-5, 6-15, 16-25, 26-35, 36-45, 46-55, 56-65 and >66. The absolute (n) and relative (%) frequencies were presented for qualitative variables. The normality of data was checked before analysis. As all the variables failed this statistical method assumption, the non-parametric Chi-square (X^2) test was used to check if the distribution of variables was similar in the different groups for immunity. The significance level established was 0.05.

RESULTS AND DISCUSSION

Results

Characterization of the sample

The annual average of analyzed samples was 5403. It was observed a decrease of about 9% on the number of analysis performed between 2009 and 2012 (Fig. 1A). From the total of 59440 serum samples analyzed between 2002 and 2012, 18092 (30.4%) were performed in male patients and 41348 (69.6%) in females. The age of the patients ranged between 0 and 99 years. Patients aged between 26-35 years represented the age group that carried out more analysis (Fig. 1B).

From the total serum samples analyzed, 3.7% had positive anti-HCV antibodies.

Characterization of infected or past infected patients

The age of patients with positive anti-HCV antibodies ranged from 0 to 99 years, with a mean age of 37 years. Anti-HCV antibodies were detected in 2203 patients (636 females and 1567 males).

The higher incidence of HCV infection was observed in male patients aged from 36 to 45 years and in female patients older than 66 years. The incidence of infection was significantly different ($p < 0.05$) among age groups and between genres (Fig. 2A) and varied over the study period (Fig. 2B).

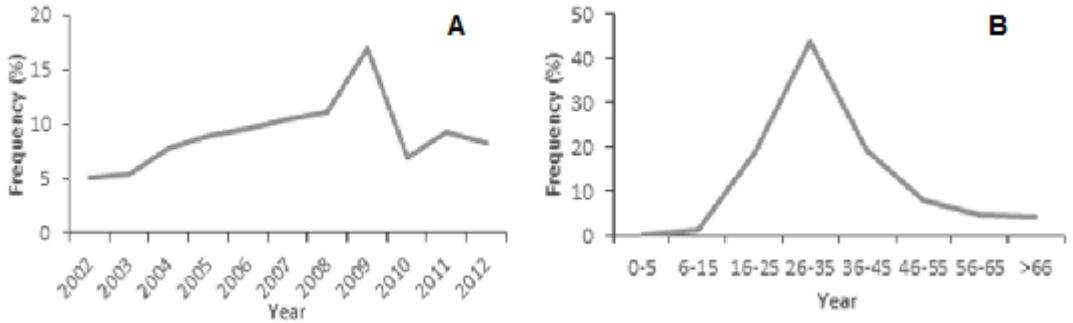

Fig. 1. Frequency (%) of the samples by year (A) and age group (B) during the study period

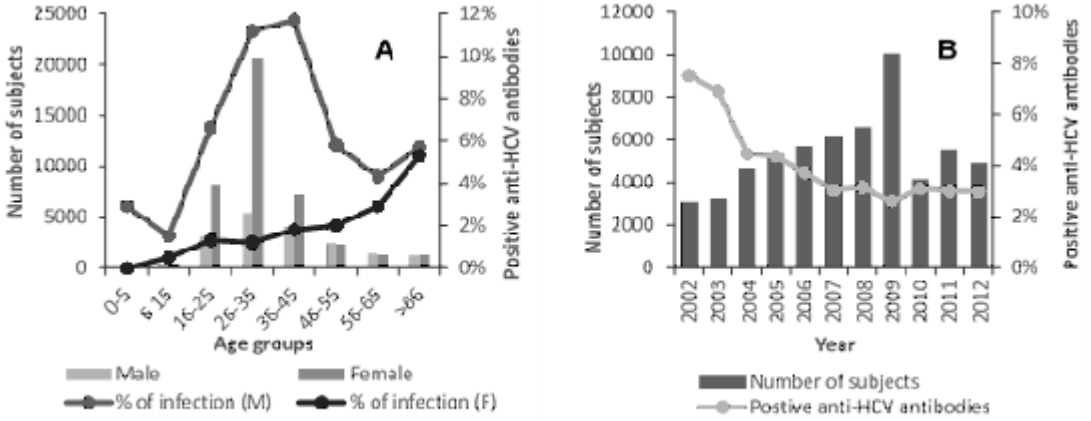

Fig. 2. Percentage of positive anti-HCV antibodies by genre and age group (A). Percentage of anti-HCV antibodies by year (B)

DISCUSSION

During the study period there was a considerable decrease in the percentage of positive results for anti-HCV antibody. Anti-HCV antibodies do not distinguish acute from chronic or resolved infection thus it is not possible to assess the chronic Hepatitis C in the district of Aveiro. These results are consistent with what has been happening in other industrialized countries, presumably reflecting a decrease in percutaneous exposures[8]. This results may also indicate that HCV infection is becoming more deadly[9].

In studies carried out in Portugal was estimated an incidence of 1-1.5%, which is significantly below to that found in Aveiro[7]. This difference can be explained by the fact that in this study active and past infection are not differentiated. The quantification of viral RNA should be necessary to confirm these results.

The incidence rate in males and females was significantly different. Although the number of females presented in this study were higher than men, the percentage of incidence of the virus was greater for males in all age groups. The fact that this analysis belongs to the general framework of analysis performed by pregnant women may explain this difference between male and female incidence. Nevertheless the rate of incidence in the 26-35 and 36-45 age groups was 11.2% (603 individuals) and 11.7% (478 individuals), respectively, which must not be ignored. The higher incidence in these age groups can be explained by the risk behaviors associated with younger people such as drug addiction. In United Stated, where the highest prevalence is also among middle aged people, injection drug use is responsible for 68% of infections[4, 10]. About 40% of people infected older than 40 years old will develop cirrhosis in 20 years, whereas for younger patients this value decrease to 20% but it is possible that the fibrosis progression in someone infected younger than age 40 years could accelerate as that person ages and reaches the age group for which progression to cirrhosis after 20 years of infection is higher[8].

CONCLUSIONS

In the future more accurate epidemiological data on hepatitis C would be helpful in order to characterize the disease. The prevalence estimates will need to be updated as it is estimated that this values may be decreasing with the adoption of more efficacious therapies. Ideally these studies should be accompanied by more information regarding risk factors and other information relating to patients. Despite these difficulties, it can be concluded that there was a decline in the prevalence of the disease in the District of Aveiro throughout the study period, however, the prevalence is still high when compared with values observed in other European countries. It is important to invest more in prevention and public awareness as existing treatments, even though effective, are still very expensive.

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Conflict of interests
The authors declare no conflict of interests

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