



# Changing Epidemiology of Chronic Hepatitis C in Adana

## Adana İlinde Kronik Hepatit C'nin Değişen Epidemiyolojisi

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### ABSTRACT

**Objective:** Our study aimed to demonstrate the epidemiological data of hepatitis C virus (HCV) and changes in its genotypic distribution which was observed in Adana in time.

**Materials and Methods:** The data from 369 patients who were on follow up with the diagnosis of chronic hepatitis C between January 1996 and March 2013, were reviewed retrospectively. The differences between the gender, age, and routes of transmission among the HCV patients with different genotypes were reviewed. Changes in the mean age, gender, and virus genotypes of the patients in our region by the years were evaluated.

**Results:** Genotype 1 was identified in 289 (78.3%) patients, genotype 2 in 23 (6.2%) patients, genotype 3 in 54 (14.6%) patients and genotype 4 was identified in 3 (0.8%) patients. When the genotypic distribution over the years was assessed, the rate of the patients with genotype 2 or 3 was 2.7% between 1996 and 2008, this rate was observed to increase to 44% between 2012 and 2013. Sixty nine out of 77 (89.6%) patients with genotype 2 or 3 were intravenous drug addicts.

**Conclusion:** In our region intravenous drug use-related HCV infection was increased in recent years. Decrease in the mean age of the patients, higher probability of occurrence among males and increased rates of genotype 2 and 3 were associated with this reason. (*Viral Hepatitis Journal* 2014; 20(1): 15-18)

**Key words:** Hepatitis C, genotype, epidemiology

### ÖZET

**Amaç:** Bu çalışmada, Adana ilinde zaman içinde ortaya çıkan hepatit C virüsü (HCV) nün epidemiyolojik verileri ve genotip dağılımındaki değişikliklerin gösterilmesi amaçlanmıştır.

**Gereç ve Yöntemler:** Kronik hepatit C tanısıyla, Ocak 1996-Mart 2013 tarihleri arasında takip edilen 369 hastanın verileri retrospektif olarak değerlendirilmiştir. Çalışmada, farklı genotipe sahip hastalar arasındaki cinsiyet, yaş ve bulaş yolu farklılıkları ve yıllara göre bölgemizdeki hastaların yaş ortalaması, cinsiyetleri ve virüs genotiplerindeki değişimler ele alınmıştır.

**Bulgular:** Genotip 1, 289 (%78,3) hastada; genotip 2, 23 (%6,2) hastada; genotip 3, 54 (%14,6) hastada; genotip 4 ise 3 (%0,8) hastada tespit edildi. Yıllara göre genotip dağılımı incelendiğinde; 1996-2008 yılları arasında genotip 2 ve 3'e sahip hastaların oranı %2,7 iken, 2012-2013 yılları arasında bu oranın %44'e yükseldiği görüldü. Genotip 2 veya 3'e sahip 77 hastanın 69 (%89,6)'sında intravenöz ilaç bağımlılığı vardı.

**Sonuç:** Son yıllarda damar içi ilaç kullanımına bağlı HCV enfeksiyonu bölgemizde artış göstermiştir. Hastaların yaş ortalamasındaki düşüş, erkek cinsiyette daha sık görülür olması ve genotip 2 ve 3 oranlarındaki artış bu nedene bağlanmıştır. (*Viral Hepatit Dergisi* 2014; 20(1): 15-18)

**Anahtar Kelimeler:** Hepatit C, genotip, epidemiyoloji

### Introduction

Chronic hepatitis C virus (HCV) is the leading cause of chronic hepatitis and related complications around the world and is an important public health problem. Epidemiological studies have revealed an increase in the prevalence of HCV infection all around the world (1). The prevalence of HCV is reported as 1-1.9% in our country (2).

HCV is a single stranded RNA virus in the Flaviviridae family and since the genomic changes may develop with ease, various genetic sequences may occur. According to the analysis of nucleic acid sequences, at least 6 major genotypes and more than 100 subtypes of HCV were detected (3). The dominant HCV genotype was detected as 1b in the studies conducted in our country (4,5,6). However during the recent years, changes were reported in the age and in the HCV genotype distributions.

Intravenous drug abuse may be considered as responsible for the increase of HCV infection, particularly in young individuals. Furthermore the dominance of HCV genotype 3 among these individuals attracts attention (1,6,7).

Our study aimed at demonstrating the epidemiological changes in HCV epidemiology and in genotypic distribution among the causes of HCV infection over time.

## Material and Methods

The data from 369 patients who were admitted to the infectious diseases clinics of three large hospitals (Cukurova University Balcali Hospital, Adana Numune Training and Research Hospital, Adana State Hospital) in Adana and who were on follow up with the diagnosis of chronic HCV between January 1996 and March 2013, were reviewed retrospectively. The demographic data of the patients such as age and gender, HCV genotypes and potential routes of transmission were investigated and recorded. Genotype detections were conducted with different methods in the various hospitals. The differences between the routes of transmission, age, gender among the patients with different genotypes were reviewed. Changing in virus genotypes, gender and the mean age of the patients by the years in our region were evaluated. Statistical analysis was performed using the SPSS software version 15. The variables were investigated using Kolmogorov-Smirnov test to determine whether or not they are normally distributed. Descriptive analyses were presented using means and standart deviations. Student's t-test was used to compare mean ages and HCV-RNA values between the genotype 1,4 and genotype 2,3 groups. Odds ratios (OR) were calculated for gender and iv drug abuse between the groups. A p-value of less than 0.05 was considered to show a statistically significant result.

## Results

Two hundred twenty-two out of 369 patients who were included in the study were (60%) male and 147 patients were (40%) female. The mean age was  $47 \pm 16$  years. The genotypic distribution among the patients was as follows: Genotype 1 was identified in 289 (78.3%) patients, genotype 2 was in 23 (6.2%) patients, genotype 3 in 54 (14.6%) patients and genotype 4 was identified in 3 (0.8%) patients.

When the genotypic distributions were divided into groups, 292 (79%) patients were genotypes (1,4) and 77 (21%) were

genotypes (2,3). The mean age of group of genotype 2 and 3 patients was significantly lower than that of the group of genotype 1 and 4 patients ( $p < 0.0001$ ). When assessed in terms of gender distribution, the numbers of males and females were close in the genotypes 1 and 4 patients. A statistically significant male dominance was observed in the group of genotype (2,3) patients (OR: 7.8; 95% CI: 3.6-16.8;  $p < 0.001$ ). When the two groups were compared, 69 out of 77 (89.6%) patients were intravenous drug addicts and the probability of drug addiction in this group was statistically significantly higher than that of the group of genotypes (1,4) patients (OR: 237.2; 95% CI: 83.1-677.1;  $p < 0.0001$ ). No difference was detected between the groups in terms of HCV RNA values (Table 1).

When the genotypic distribution over the years was assessed, while the rate of the genotype 2 and 3 patients was 2.7% between 1996 and 2008, this rate was observed to increase by 44% in 2012-2013 (Figure 1). Similarly, while the ratio of male patients was 47.8% between 1996-2008, this rate was increased by 69.2% between 2012-2013. Furthermore the mean age of the patients decreased over the years and while the mean age was  $49 \pm 12$  years between 1996-2008, it was detected as  $42 \pm 17$  years during the period of 2012-2013 (Table 2, Figure 2).

## Discussion

HCV genotypes reveal different distributions in different geographic regions. Genotypes 1, 2 and 3 are the most common types and were observed in Europe, North America, China, Japan

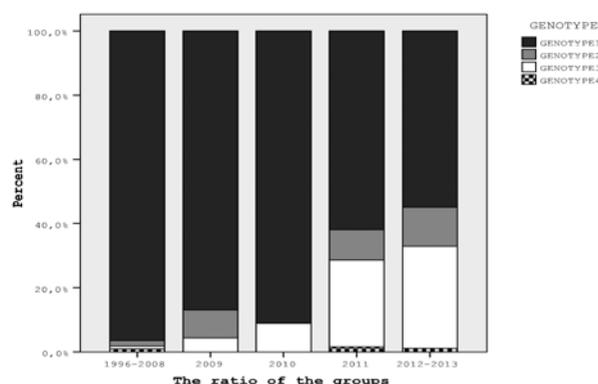
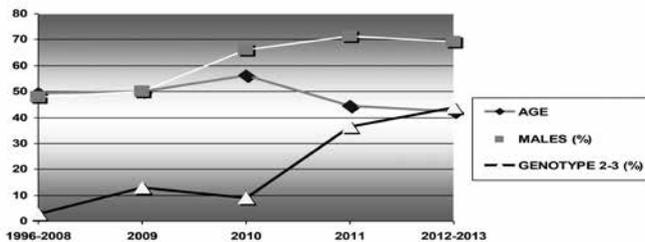


Figure 1. HCV genotypic distribution by the years.

	GENOTYPES 1-4	GENOTYPES 2-3	P value (OR)
Patients' number	292	77	-
Mean age $\pm$ SD	$52 \pm 13$	$29 \pm 12$	$p < 0.0001$
Gender			
Male	153 (52.4%)	69 (89.6%)	OR: 7.8 (3.6-16.8)
Female	139 (47.6%)	8 (10.4%)	$p < 0.0001$
IV Drug Abuse			
Yes	5 (1.7%)	62 (80.5%)	OR: 237.2 (83.1-677.1)
No	287 (98.3%)	15 (19.5%)	$p < 0.0001$
HCV RNA (IU/ml) $\pm$ SD	$2010388 \pm 3171142$	$1508701 \pm 3336689$	$p = 0.2275$

**Table 2.** The changes by the years in the mean ages, male gender and the rates of HCV genotype 2-3 among overall patients

	1996-2008	2009	2010	2011	2012-2013
Mean age ± SD	49±12	50±15	56±14	44±19	42±17
The rate of male patients (%)	47.8%	50%	66.1%	71.4%	69.2%
Genotype 2-3 (%)	2.7%	13%	8.9%	36.5%	44%



**Figure 2.** The changes in the mean age; the rates of male patients in the overall number of patients; and at the rate of genotype 2-3.

and Australia. Genotype 3 is particularly found in Scots blood donors, Southeastern Asia countries and young patients (2). Changes were reported on the distribution of HCV genotypes over years in certain regions of Europe and Africa. This change is assumed to be related to the differentiation of the migration and route of transmission of HCV (8).

The HCV genotype 1 viruses those are commonly encountered in Turkey were suggested to enter Turkey between 1920 and 1930 and it was asserted that the use of non sterile injectors might contribute to the spread of this virus. Therefore, it is suggested that the use of disposable injectors and scanning of the blood and blood products for HCV may initiate a decrease in the genotype 1 infection (4). In our study, genotype 1 was also found at the highest rate similarly to the medical literature (78.9%). Genotype 1b was found as the most common genotype in various studies conducted in our country (90-100%). (4,5,6,9).

In a study of 72 cases of HCV conducted by Yarkin et al. in our region in 2000, genotype 1 was found at a rate of 96.7% and genotype 2 was detected at a rate of 3.3% (10). In a study of 236 patients conducted in Mersin by Tezcan et al. in 2012, the rate of genotype 1 was reported as 92.3%, genotype 3 was 4.2%, genotype 2 was 2.1%, genotype 4 was 0.8% and genotype 6 was reported as 0.4% (11). In our study the rate of genotypes 2 and 3 was found as 2,7% between 1996 and 2008. However the rate was rapidly increased from 2009 and reached by 44% in 2012 and the first months of 2013. This rate has never been reported before from any region in our country.

It is not always possible to determinate the route of transmission of HCV infection (9). Intravenous drug abuse has been implicated as the main route of transmission of HCV infection in developed countries (1). In a large study on the prevalence of HCV infection in the United States of America (USA) a history of intravenous drug abuse was detected in 48.4% of the anti-HCV positive cases (12). The most common risk factor was defined as intravenous drug abuse in the European countries such as Norway, Italy and Great Britain (9). Intravenous drug abuse related HCV transmission has been very rarely reported in our country (2,13).

In a study conducted by Karaca et al., investigating the

routes of transmission of HCV infection in 320 patients with HCV infection, the rate of intravenous drug abuse was detected as 3.1% (13). However, a history of syringe sharing and intravenous drug abuse was present in a rate of 80.5% among the patients infected by the genotypes 2 and 3 viruses. The rate intravenous drug abuse was only 1.7% among the genotype one patients.

HCV infection shows the differences by geographical regions as well as by certain age groups. Although USA, Australia, Spain, Japan and Turkey show big differences in terms of HCV infection, they have a similar HCV incidence (1.0%-1.9%). (2,14). However age specific prevalences were significantly different among these countries. The prevalence is highest between 30 and 49 years of age in the USA and between 20 and 29 years of age in Canada. Similarly, the prevalences were highest in the age range of 20 to 40 in Australia and North European countries (9,14). In the studies conducted in Turkey, the prevalence was reported higher over the age of 50 compared to the younger population (13,15). Similarly to the data from our country, while the prevalence was higher over the age of 50 in our study in the past years, in the recent years, a significant decrease was discerned in the age range of the disease (Figure 2).

In the HCV epidemiology; we believe that the main determinant factor is the route of transmission in terms of the differences between the age groups, genotypes and gender. Namely, in the countries such as USA where the intravenous drug abuse ranked first among the routes of transmission of HCV, the highest prevalence was found between 20 and 40 years of age. In a similar way, in the geographical regions where intravenous drug abuse is the essential route of the transmission of the disease, it is observed that the male/female ratio increases due to the higher rates of intravenous drug addiction among males (2,9,15). In the countries such as Turkey where intravenous drug abuse does not rank first among the routes of transmission, the disease develops in the older ages and no difference was detected between the prevalences among the males and females (13). All of the our patients were citizens of Turkey and any immigration activities were not reported in recent years in Adana.

In conclusion, our study results showed that the increased rate of genotype 2 and 3 in patients with HCV infection may be related to the increased prevalence of HCV among the intravenous drug user. Besides, the significant decrease in the mean age of the patients and higher prevalence of HCV among the males may be related to this change in the route of transmission of the virus.

**Conflict of interest: None declared.**

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