Distribution of Genotype 3 in Hepatitis C Patients & its Association with Gender and Age


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Abstract

Background: Hepatitis C is an escalating public health issue affecting Pakistani population and presents with genomic variations, genotype 3 being the commonest one. This study was conducted to assess the distribution of Genotype 3 in Hepatitis C patients presenting to a tertiary care health facility and to determine association between HCV genotype 3 with age and gender.

Methods: This cross-sectional study was conducted in 2016 and on 200 randomly selected patients of Hepatitis C, presenting to Liver centre of Holy Family Hospital. Their ages in years at the time of first diagnosis of Hepatitis C, gender and their Genotypes were recorded from their records.

Results: Amongst 210 patients, Genotype 3 was observed in 188 (89.5%) patients, while 4% had genotype 1, 1.5% type 2, 0.5% type 4 and 3% were un-typable. The genotype 3 was observed in 90.1% of patients above 35 years of age compared to 86.2% of patients below 36 years of age and this difference was not statistically significant (p value 0.51). Genotype 3 was observed to be slightly higher in males (92.4%) compared to females (84.6%) with statistically insignificant difference (p value 0.07).

Conclusion: Genotype 3 is the commonest genotype in Pakistani population and no association existed between genotype 3 and gender or age in Hepatitis C patients.

Key Words: Genotype, Hepatitis C, Age, Gender, Association

Introduction

Looking back into the history, the outbreaks of hepatitis C haunt us. 3% of World population has been its victim. According to WHO Pakistan with a prevalence rate of 4.8% have almost 10 million Hepatitis C patients. Worldwide hepatitis C infected population is estimated about 170 million individuals while each year 3-4 million persons are diagnosed with HCV infection. Starting from Nebraska Hepatitis C outbreaks in USA almost a decade ago till the recent outbreak at Singapore general hospital, HCV has proved to be a silent storm for humanity. Due to genomic variations HCV is divided into 6 main genotypes and multiple subtypes. Some patients presented with untype able genotype. A new genotyping system based on PCR was also developed with genotype specific PCR primers 1a, 1b, 2a, 2b, 3a, 3b, 4a, 5a and 6a. Genotype 1, 2 and 3 are distributed almost worldwide. Half of the hepatitis C patients from South of Brazil were infected by genotypes 2 and 3. Types 4, 5 and 6 have been found in other geographical regions of Brazil. Genotype 5 is mainly dominant in South Africa and present in less percentage in other countries. Genotype 6 is common in South East Asia.

Pakistan is one of those developing countries where the prevalence of hepatitis C is 2-4%. In Swat district of Pakistan HCV genotype 3a have been reported to be predominant followed by mixed genotype infection and then 3b. A study conducted by Ali A etal showed 26.17%, HCV patients had Genotype 3. A lot of research has been conducted in different cities of Pakistan. A research was conducted in Lahore concluded the genotype 3 (80%), the most prevalent. In 2010, another study conducted in Lahore which showed that genotype 3a was 80.77% in less than 50 years of age group. Ahmed et al also reported genotype 3a as 55.9% in Pakistani population. Another study by Butt et al. in 2010 showed prevalence of 3a(62%), 3b(9%), 1a(3%), 2a(2.14%), mixed (4.71%) and un-typeable (17.16%). Hepatitis C is a great threat to and needs to be addressed as soon as possible to get it eradicated. An insight is required to every aspect of this disease so that adequate and timely prophylactic or preventive measures could be taken. By determining the most susceptible age group, adequate attention can be provided to root out the cause of susceptibility in that particular age groups. An idea about the total inflicted individuals can help to save other individuals who are at risk of getting infected. The objectives of our study were to determine the distribution of genotype 3 in
HCV patients and also to assess any existing association between genotype 3 with gender and age of patients presenting to a tertiary care health facility of Rawalpindi.

**Patients and Methods**

This cross sectional study was undertaken from March 2016 to August 2016, at Liver centre of Holy Family Hospital. All the patients diagnosed for the first time with detectable HCV viremia by qualitative PCR a Hepatitis C in year 2016 were included. Using WHO sample size calculator, minimally required sample size was calculated keeping 95% level of confidence, absolute precision 6% and anticipated population proportion of Genotype 3 as 26.17%13 and it calculated to be 207. However we included 210 patients randomly selected using the list of total registered patients of HCV in 2016 at liver centre, as the sampling framework. The inclusion criteria were patients having detectable HCV viremia by PCR and patients with detected genotype. Their ages and genders were confirmed through their patients record and also for genotype 3 determined at the time of their diagnosis. Since the genotype/subtype of a person remains the same throughout the course of the disease unless they become re-infected with another genotype. All the information extracted from the records of the patients was entered and analyzed using Statistical Package of Social Sciences (SPSS version 22) and descriptive statistics like frequencies and percentages were presented for categorical variables for age, mean, modes, ranges, highest and lowest values along with standard deviations were calculated. Pearson's Chi square test was applied at 5% level of significance to determine any existing association between genotype 3 with gender and age.

**Results**

Out of 210 patients, 78(37.1%) were females and 132(62.9%) were males. Mean age of the patients was 47.83 years (Std. Deviation 10.87, Median & Mode 50 and Range 73 years).181 (86.2%) patients were above ages 35 years while 29 (13.8%) were aged below 35 years. Amongst 210 patients, Genotype 3 was observed in 188 (89.5%) patients, the distribution of its subtypes is displayed in figure 1. When the genotypes of these 22 patients were observed 8 (4% of total 210 patients) had genotype 1, 3 (1.5%) had genotype 2, 1 patient had (0.5%) had genotype 4, while in 6 (3%) the genotype was not type able. Remaining 22 (10.5%) had non 3 genotype.

**Table 1:** Association of Age And Gender With Genotype 3

<table>
<thead>
<tr>
<th>Genotype</th>
<th>MALE</th>
<th>FEMALE</th>
<th>AGES UPTO 35 YEARS</th>
<th>AGES ABOVE 30 YEARS</th>
</tr>
</thead>
<tbody>
<tr>
<td>GENOTYPE 3</td>
<td>122</td>
<td>66</td>
<td>25 (86.2%)</td>
<td>163 (90.1%)</td>
</tr>
<tr>
<td>OTHERS</td>
<td>10</td>
<td>12</td>
<td>4 (13.8%)</td>
<td>18 (9.9%)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>132</td>
<td>78</td>
<td>29 (100%)</td>
<td>181 (100%)</td>
</tr>
</tbody>
</table>

P-values 0.07 0.51

*P(%)= f=frequencies, %=percentages

The mean ages of patients with genotype 3 was 48.10±10.85 years while those patients who had Genotypes other than type 3 had mean ages of 45.55±10.97 years.

When the presence of genotype 3 was looked into the gender groups, it was slightly higher in males (92.4%) compared to females (84.6%) and again no statistically significant difference was there with a p-value of 0.07. (table 1)

**Discussion**

It is clear that HCV infection varies considerably regarding severity, disease progression and efficacy of treatment according to genotypes17. The knowledge of prevalence of genotype of hepatitis C is essential for health care workers.
Geographical distribution of HCV genotype varies among not only in the world but also in different regions of Pakistan. A study was undertaken in Iran to find out distribution of various HCV genotypes in Isfahan province in 2010. In this study, no significant relationship was found between HCV genotype with age, thus findings consistent with our study. In another study conducted in Baluchistan that included only 40 patients, no statistically significant association between age and HCV genotype was found. There is a shift in genotype distribution with increasing prevalence in genotypes 3a, 1a and 4 in Pakistan and some other countries due to migration. It was found that HCV male patients were more affected than females which also relates to data of a study conducted at Jinnah Postgraduate Medical Centre, Karachi. Idrees and Riazuddin conducted the most comprehensive study from different areas of Pakistan. The results showed that the predominant HCV genotype in Pakistan is genotype 3 (49.05%). Both male and female were equally affected, no particular age group (p<0.29) was affected by any particular genotype. Our study has displayed the highest proportion of genotype 3 i.e. 89.5%, not observed previously in any other study.

Conclusion

Genotype 3 is the commonest in Pakistani population and no association exists between genotype 3 with gender and age in patients.

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