Advances in Life Science and Technology
ISSN 2224-7181 (Paper) ISSN 2225-062X (Online)
Vol. 9, 2013

The Relationship between the Molecular Epidemiology of Hepatitis C and the Best Measures to Prevent and Combat Infection and to Identify the Causes

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Abstract
Hepatitis C is an infectious disease affecting the liver, caused by the hepatitis C virus. The infection is often asymptomatic, but once established, chronic infection can progress to scarring of the liver (fibrosis), and advanced scarring (cirrhosis) which is generally apparent after many years. The aim of our study are strengthening of surveys of the cases of Hepatitis C, more knowledge of the causes leading to epidemics of hepatitis C, also knowing the risk factors which caused delay in the treatment of patients in the acute phase, then evaluate the number of persons who have the hepatitis C virus, finally molecular characterization and epidemiology of the isolated hepatitis C . In order to reach those goals we carried out a survey of 1929 adult patients in the Department of virology at Central Laboratory of the Ministry of Health in Amman the capital of Jordan between january 2010 to December 2011 using a bioelisa HCV 4.**0** is an immunoenzymatic . Then total RNA have been extracted from the recovered HCV using standard protocols. After that molecular epidemiology was performed using standard methods for PCR . Finally detectable HCV RNA were submitted to treatment follow using Real Time PCR. a total of 1926 patients (1215 males, 711 females) were tested for anti-HCV antibodies, a total 149 patients were gave positive results for anti-HCV antibodies, with an overall prevalence of 9.%. The seroprevalence in males was approximately the double of that of females (66% vs 48%). The most commonly caused of HCV infection was blood transfusion(68%). Kidney dialysis (17%). Centre for addiction (6%). unknown cause (9%)Form last results we conclude that the most cause of HCV is blood transfusion then Kidney dialysis.
Keywords: Hepatitis C, HCV antibody, PCR, Jordan.

Introduction

Hepatitis C is an infection of the liver caused by the hepatitis C virus (HCV). **)[1]** It is difficult for the human immune system to eliminate the virus from the body, and infection with HCV usually becomes chronic. Over decades, chronic infection with HCV damages the liver and can cause liver failure in some people. **)[1]**
The hepatitis C virus is transmitted by blood-to-blood contact. In developed countries, it is that 90% of persons with chronic HCV infection were infected through transfusion of unscreened blood or blood products or via injecting drug use or sexual exposure.[2] In developing countries, the primary sources of HCV infection are unsterilized injection equipment and infusion of inadequately screened blood and blood products.[3]Although injection drug use is the most common route of HCV infection, any practice, activity, or situation that involves blood-to-blood exposure can potentially be a source of HCV infection. [4]The virus may be sexually transmitted, although this is rare, and usually only occurs when an STD that causes open sores and bleeding is also present and makes blood contact more likely.[5]
Methods: From January 2010 till June 2011, a total of 1926 individuals (1215 males and 711 females) Worked HCV test at Central Laboratory of the Ministry of Health in Amman . A second -generation Enzyme- Linked Immuno-Sorbent Assay (ELISA) test system using the commercial a bioelisa HCV 4.**0** is an immunoenzymatic (Biokit) kit, which was used to screen all patients for antibodies to HCV. is an immunoenzymatic method in which the wells of a microplate are coated with recombinant antigens representing epitopes of HCV: Core, NS3, NS4 and NS5. Serum samples are added to these wells. If antibodies specific for HCV are present in the sample, they will form stable complexes with the HCV antigens on the well. Excess sample is removed by a wash step and a rabbit anti-human IgG conjugated with peroxidase is then added and allowed to incubate. The conjugate will bind to any antigen-antibody complexes formed. After a second wash, a solution of enzyme substrate and chromogen is added. This solution will develop a blue colour if the sample is positive. The blue colour changes to yellow after blocking the reaction with sulphuric acid. The intensity of colour is proportional to anti-HCV antibodies concentration in the sample. Wells containing negative samples remain
Colorless.
Results of an assay are valid if the following criteria are accomplished:
1. Substrate blank: absorbance value must be less than or equal to 0.100.

2. Negative control: absorbance value must be less than 0.100 after subtracting the blank.
3. Low positive control: each individual absorbance value must not vary more than 30% over the mean of three replicates. The mean absorbance of low positive control must be higher than 0.200 after subtracting the blank.
4. High positive control: absorbance must be higher than or equal to 0.800 after subtracting the blank.
5. Ratio high positive control/Low positive control: must be higher than 2.5.
6. Ratio negative control/Low positive control: must be lower than 0.5.

A repeatedly positive result is indicative of HCV infection. The clinical history of the patient were taken in consideration. Data were collected from the Central Laboratory database. Samples of HCV positive serology. After that total RNA have been extracted from the recovered HCV using standard protocols and detectable HCV RNA were submitted to treatment follow using Real Time PCR.

Results: A total of 1926 patients (1215 males, 711 females) were tested for anti-HCV antibodies, a total 149 patients were gave positive results for anti-HCV antibodies, with an overall prevalence of 92 %.table 1.

Table 1.The number of anti-HCV tests, number of abnormal results and percentage of positive results.

months	N^0 of Test	N^O OF Abnormal results	%of abnormal results
January	233	22	9
February	84	6	7
March	222	20	9
April	137	11	8
May	156	12	8
June	170	16	9
July	193	8	4
August	74	6	8
September	150	11	7
October	249	17	7
November	103	8	8
December	155	12	8
Total	1926	149	9%

The seroprevalence in males was approximately the double of that of females (66% vs 48%). The most commonly caused of HCV infection was blood transfusion(68%). Kidney dialysis (17%). Centre for addiction (6%). unknown cause (9%). tables 2.

Table. 2. The seroprevalence of male vs female and the most commonly caused of HCV infection

Months	Female N^O OF Abnormal results	Male N^O OF Abnormal results	Blood transfusion	Kidney dialysis	Centre for addiction	Unknown cause
January	7	15	15	1	4	2
February	2	4	3	2	0	1
March	6	14	14	3	1	2
April	3	8	7	2	0	2
May	4	8	8	3	1	0
June	7	9	10	4	1	1
July	2	6	5	2	0	1
August	2	4	4	1	0	1
September	4	7	8	2	1	0
October	7	10	10	4	1	2
November	3	5	8	0	0	0
December	3	9	9	2	0	1
Total	72	99	101	26	9	13
Percentage	48%	66%	68%	17%	6%	9%

Discussion

In a high-risk population (those with elevated ALTs or a risk factor such as history of injection drug use, multiple sexual partners, or blood transfusion before 1992), a reactive HCV EIA-2 or -3 is(enzyme immunoassay) often sufficient to confirm HCV infection. [3]The next logical step would be either a qualitative HCV RNA PCR to differentiate acute versus chronic infection or a quantitative2 HCV RNA PCR. [2]The objective of this systematic review is to characterize hepatitis C virus (HCV) epidemiology in Jordan

The reported prevalence of HCV infection varies between 9% of 149 patients at Central Laboratory of the Ministry of Health in Amman were found to have evidence of HCV infection, Blood transfusion seems to be the major route of infection. The reported prevalence of HCV infection in long-term dialysis patients varies between 1-48% around the world, with higher rates being reported from areas where the incidence in general population is high. [10],[11]In Jordan, the first study to be conducted among dialysis population and showed a prevalence of 24.5%, a value similar to what has been reported in the neighboring countries in the Mediterranean basin. [12] our study shows aprevalence of 17%.

conclusion

We note that with the introduction of screening for HCV antibodies in blood donors, started in May 1994, a decline in the prevalence and incidence of HCV infection in our population will occur. Finally our patients received interferon alpha and submitted to treatment follow using Real Time PCR.

Acknowledgments: I would like to express thanks and deepest gratitude and faithfulness to Department of virology at Central Laboratory of the Ministry of Health in Amman the capital of Jorda especially mrs san' alsafadi

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