Prevalence of Hepatitis B and C Viruses Infection in Premarital Screening Test in General Public Health Laboratory/ Kirkuk City

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Abstract:

Viral hepatitis is responsible for more premature deaths worldwide. The virus killed 1.34 million people in 2016; it is one of the top ten killers in the world. Transmission of hepatitis virus B and C results from exposure to infectious blood or body fluids containing the virus. Since most people with hepatitis B and C virus are asymptomatic, timely diagnosis is important for prevention of complication and transmission. This study has evaluated the prevalence of HBs Ag and HCV Ab seromarkers beside liver function test in pre marriage candidates.

Objectives: To find out the prevalence of the HBs Ag and HCV Ab in premarriage candidates in Kirkuk city along with estimation of liver function test and prothrombine time. And so as to increase the awareness and augment preventive measures against this viral hepatitis related morbidity.

Methods: A total of 22000 apparently healthy young adults were screened from January 2017 to December 2017 at the premarital consultation clinic in general public health laboratory/ Kirkuk city for hepatitis B surface antigen (HBsAg), hepatitis C virus antibody (HCV Ab). Along with alanine aminotransferase (ALT), aspertate aminotransferase (AST), alkalin phosphatase (ALK P) levels, total bilirubine, and prothrombine time were estimated and statistical analysis was done by mini tab version 11.

Results: Out of the 22000 subjects screened, 52(0.24%) were positive for HBsAg and 9(0.04%) for HCV Ab, there was no statistical significant difference according to age and sex, but the infection rates peaked at age (21-30) years for both types. Mean ALT and AST levels were significantly elevated of positive HBsAg and HCV Ab cases (29 I U/L, 23, I U/L and 56.3 I U/L, 33.5 IU/L) respectively. In addition two fold elevation of ALT level estimated in (19%) of HBsAg positive and (66%) of HCV Ab positive cases. However all positive subjects were having normal ALK P level normal prothrombine time with slight elevation of total billirubin.

Conclusion: The prevalence of HBsAg and HCV Ab among premarital subjects in Kirkuk city is lower than that previously reported. A positive relationship between asymptomatic positive cases with aminotrans- ferase level was reported.

Keywords: Hepatitis B and C virus, Prevalence, Premarital screen test, Iiver function test, Aminotransferase enzyme.

Introduction:

Viral hepatitis is a growing public health concern, especially in Middle East countries where transmission rate is very high, the hepatitis B virus (HBV) and hepatitis C virus (HCV) infections account for most chronic liver disease and hepatocellular carcinoma (HCC) [(1)]. According to the World Health Organization (WHO), HBV infect approximately two billion people in the world and more than 240 million have chronic HBV infection [(2)] and about

500,000 to 780,000 patients die every year from HBV-related liver disease and most of these deaths occur in developing countries [3, 4]. In addition similar estimation done by WHO show that around (3%) of the world's population have chronic HCV infection, with more than one million new cases detection every year [4, 5, 6]. Common routes of transmission of these viruses include: Sexual (heterosexual and homosexual) route; transfusion of blood and its derivatives; perinatal infections; hemodialysis; and unsterilized instrument use for intravenous, subcutaneous and intramuscular injections.

The infected person or asymptomatic carriers with viral hepatitis B and C are only source of infection [6, 7], there for premarital screening is an important examination carried out to detect viral infections, these tests are mandatory for the control and prevention of infectious diseases, also will create awareness between the couples lead to the protection of the prospective spouse by early vaccination [8], the end result is universal health in families [9].

The liver has many vital functions and biochemical tests are used for the diagnosis of chronic hepatitis [10]. A plasma aminotransferase (alanine aminotransferase ALT and aspartate aminotransferase – AST) activity exceeding 400 IU/L, even before jaundice develops, is the most striking abnormality, and sensitive indicator of liver cell injury and this test dose not correlates with the degree of liver cell damage [11]. According to 'European Association for the Study of the Liver Disease (EASL 2012)', ALT is considered as a classification criteria for the phases of chronic hepatitis B [12, 13]. ALT is a good indicator of health and meets most of the accepted criteria for a screening test [14].

The plasma bilirubin reflects the severity of the jaundice. The alkaline phosphatase activity rarely exceeds 250 IU/L unless marked cholestasis develops. The albumin concentration is normal, and decreased when the chronic liver disease developed. Prolongation of the prothrombin time is a reliable indicator of severe liver damage [15].

Patients and Methods:

This is across sectional study conducted in premarital consultation clinic in general public health laboratory/ Kirkuk city from first of January 2017 to last of December 2017. All couples who visited this clinic during this period which comprise 22 thousands apparently healthy subjects (11000 males and 11000 females) were evaluated.

All subjects were interviewed; history had been taken from each case by using special questionnaire form, including demographic data (name, age, and gender) & occupation.

From each subject, 5 ml of blood was drawn, screening test done which include HCV Ab and HBsAg test. Identification was done by using ELISA technique according to the manufacture instruction all positive results were rechecked and further laboratory investigation done for positive cases including liver function tests (ALT, AST, ALK P and total bilirubin) and prothrombin time.

Results:

In our study, 22000 healthy premarital couples were evaluated, 11000 (50%) male and 11000 (50%) females. Their ages ranged from 16 to 60 years. The prevalence of HBsAg positivity among the premarital couple was (0.24%) [52 person, 34 male and 18 female] figure

(1), also in this study prevalence of HCV Ab positive was (0.04%) [9 person, 4 male and 5 female] figure (2).
Age and gender distribution of positive cases which detected in this study is clearly shown in table (1). The results demonstrated no statistical significant difference for positive cases according to age and gender. The highest seroprevalence of HBs Ag was seen in the age group (21-30) years 37/52 (71.2%) and lowest seroprevalence 2/52 (3.8%) was detect in the age group of (41-50) years. HCV Ab was detected in 6/9 (66.6%) at age group (21-30), while in the age group (10-20) it was 3/9 (33.3%).

A plasma aminotransferase [alanine aminotransferase (ALT) and aspartate aminotransferase (AST)] sensitive indicator of liver cell injury. In our study we found significant elevation of ALT and AST of previously undiagnosed HBsAg and HCV Ab positive patients, in addition we identified two fold rise ALT in (19%) and (66%) of HBsAg and HCV positive cases respectively. There was none significant elevation of alkaline phosphatase (ALK P) and no prolongation of PT time, however there was significant slight elevation of total billirubin for both HBsAg and HCV Ab positive cases table (2, 3).

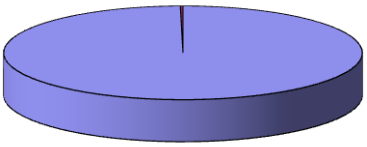

Fig.(2):HCV Ab positive cases among premaritally screening test (0.04%)

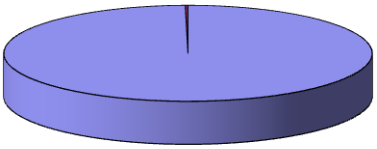

Fig.(1):HBsAg positive cases among premaritally screening test (0.24%)

Table (1): Distribution of positive HBV and HCV cases among couples by age and gender.

Age	HBV +ve cases			HCV +ve cases		
	No.%	female	male	No.%	female	male
10-20	4	2	11.5%	1	2	33.3%
21-30	21	16	71.2%	3	3	66.6%
31-40	7		13.5%			
41-50	2		3.8%			
Total	34	18		4	5	

Table (2): Liver function test in cases with HBsAg positive.

Liver function test	mean	SD	P-value
ALT (I U/L)	29	16.7	0.000
AST (I U/L)	23	9.4	0.000
ALK P (I U/L)	178	144	0.7
Total Bilirubin (mg/dl)	1.18	0.41	0.000
Prothrombine time (sec.)	`13	1.64	0.72

Table (3): Liver function test in cases with HCV Ab positive.

Liver function test	mean	SD	P-value
ALT (I U/L)	56.3	22.5	0.0004
AST (I U/L)	33.5	11.9	0.0014
ALK P (I U/L)	126	40	0.92
Total Bilirubin (mg/dl)	1.051	0.224	0.0010
Prothrombine time (sec.)	`12	1.5	0.73

Discussion:

In this study we screened 22000 (11000 male & 11000 female) person in premarital consultation clinic. HCV and HBV infections are associated with high risk of transmission to the spouse and off spring, and this may predispose them to hepatitis which often results in chronic viral hepatitis and may increase the risk of liver cirrhosis and HCC.

In our study HBsAg prevalence was (0.24%) include (52 cases, 34 male & 18 female) of the people entered the study; the obtained result is lower than that reported by other studies including studies in Duhok (Prevalence of hepatitis B and C viruses among blood donors attending blood bank in Duhok, Kurdistan Region), also in Sulaimania (Prevalence of hepatitis B virus infection among premarital people in sulaimani governorate) and in Basra (Prevalence of hepatitis B seromarkers and hepatitis C antibodies in blood donors in Basra) were reported prevalence of HBsAg positivity (0.78%) (0.67%) (2.3%) respectively [16, 17, 18]. This prevalence rate differs with available registered data and some surveys in which the prevalence rates are greater than(2%) as study in Saudia Arabia (Prevalence of hepatitis B and C in donated blood from the Jazan Region of Saudi Arabia) [27]; it seems that the lower prevalence of HBV in most recent researches is because of the effectiveness of national vaccination program implemented from 1992 for neonates, adolescents, voluntaries, and high risk groups such as health care workers also application of control measures include effective blood screening, disposable syringes use and health education. In addition, it might be due to increasing in the people's education and knowledge with improvement in awareness about prevention and risk factors.

In addition the present study estimated that HCV Ab prevalence was (0.04%) include (9 cases 4 male and 5 female) which was lower than that reported in studies in Duhok (0.2%), in Baghdad (0.26%) (Prevalence of hepatitis B and C among blood donors attending the National Blood Transfusion Center in Baghdad from 2006-2009), also in Basra (0.1) and in samara District (0.54%) (Seroprevalence of Hepatitis C Virus in Iraqi Population) [16, 19, 18, 20], also lower than that reported in a national normal population study (0.4%) [21]. In general environmental, social, educational factors and life style play a role in variation in prevalence of HBV and HCV in different countries.

The results demonstrated no statistical significant difference for positive cases according to age and sex table (1), actually this finding is similar with that reported in a study on Marriage Candidates in the Southeast of Iran [22], but we saw the peak incidence of HBs Ag and HCV Ab prevalence at age group (21-30) years, a positive association between age with prevalence of HCV Ab is similar to the that other

reports [23]. The positive association of prevalence of HCV Ab and HBsAg with age may be due to multiple exposures during life and non vaccination. in addition our results showed no statistical significant according to sex, while other studies in Nigeria (Hepatitis B, Human Immunodeficiency Virus and Hepatitis C Virus Infections among Marriage Intending Couples in Calabar, Nigeria) [24] detected statistical difference according gender this may be due to the hormonal differences between them and in turn, their effects on the immune responses.

The clinical presentations of chronic viral hepatitis are variable and most patients are diagnosed because of unexplained abnormalities of ALT or AST level results on screening tests, whereas results of most other tests are normal.

In the present study mean ALT and AST level in HBsAg and HCV Ab positive subjects were significantly more than in HBsAg and HCV Ab negative subjects table (2, 3) only (19%) HBsAg positive cases were found to have two fold elevated ALT values but (26.9%) HBsAg positive subjects were found to have abnormal ALT values and (54.1%) within the normal value. In case of HCV Ab positive subjects (66.7%) were found to have two fold raised ALT values and remained (33.4%) have abnormal values. The similar finding reported in study done in Sylhet District [14], this result also supported by Wolffram [25], who found elevated ALT in HBsAg and HCV Ab positive cases (82%) and (83%) respectively, there for ALT is a good indicator of health and act as most important criteria for a screening test [14], in addition ALT should be the preferred laboratory parameter with viral serological marker and raised value should be confirmed for further evaluation. Treatment of positive viral hepatitis patients with raised ALT are more likely to respond to treatment than those with normal ALT values [26].

Significant slight increase was noted in the mean bilirubin level in HBV and HCV infected persons than non infected persons table (2, 3) in contrast to other study demonstrated no significant change in bilirubin level [14].

Furthermore, the current study demonstrated no significant elevation ALK P or prolongation of PT may indicate that inflammatory liver injury in asymptomatic viral hepatitis not severs [25].

Conclusion:

There is a low prevalence of HCV and HBV infection among our study participants, the results may provide some epidemiological evidence for mandatory premarital testing. A break in transmission of HBV and HCV infection may occur as a result of vaccination of negative partners and by increase partner education about rout of transmission to prevent future transmission and spread of the viruses to the negative spouse and their children. [Health belief model (HBM) is one of the health education models which is widely used to assess people' beliefs about preventive behaviors].

Screening for the chronic hepatic injury is not cost effective and aminotransferase should be the preferred biochemistry parameter besides viral serology and increased activity should be confirmed before further evaluation.

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