Research Article

Seroprevalence of hepatitis C virus infection in surgical patients in Quetta, Pakistan

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Abstract

Viral hepatitis is one of the conspicuous causes of hepatitis causing serious losses all over the world especially Pakistan. This cross-sectional study was aimed to screen preoperative general surgery patients in Quetta Balochistan, Pakistan. A total of 1000 (male = 627; female = 373) individuals were screened through one step Immunochromatography (ICT) and the positive samples were reconfirmed through ELISA during 2016. Overall, 48/1000 (4.8 %) and 55/1000 (5.5 %) patients were found positive with ICT and ELISA, respectively. On ethnic basis, Hazara community were the most affected one viz, 3/25 (12.0 %), followed by Pashtuns 35/559 (6.2%), Punjabi/ Urdu Speakers 4/86 (4.6%) and Baloch 13/330 (3.9 %) patients were positive. Similarly, on sex basis 29/627 (4.6%) and 26/373 (6.9 %) anti-Hepatitis-C virus antibodies were detected in male and female patients, correspondingly. On age basis, more productive age (51-60 years) patients were found more susceptible to the disease than younger age with highest prevalence of 5/21 (23.8 %) followed by 17/188 (9.0 %) in 41-50 years age patients. While least prevalence of 3/162 (1.85 %) followed by 14/406 (3.44 %) and 16/223 (7.17 %) in 0-15, 16-30 and 31-40 years patients were recorded. Similarly, ELISA was found more sensitive than ICT kit method. This study highlights the circulation of viral hepatitis in public of the province equally in both sexes and all ages. The data collected will help in making strategic policies to control the infection in the community in future.

Keywords: ELISA; ICT; Hepatitis C; Quetta; Surgery patients

Introduction

Hepatitis C virus (HCV) infection is a widespread health issue in global population. More often, it is asymptomatic in acute stage

of infection and is responsible for chronic hepatitis causing severe morbidity and mortality [1]. The personal age, gender and race affects the prevalence ratio of HCV

infection at chronic stage whereas viral immune response has also a great influence. It is estimated as 3% chronic HCV infection rate in the world population. The persons develop chronic infection from acute HCV are noted as 50-85% chance of conversion. It is also investigated that 15% of HCV infection is automatically eradicated from the infected patient [2]. The HCV infection has comparatively low progression in large number of patients. Therefore, it is hard to calculate the accurate frequency and occurrence of HCV at acute phase of infection. Several different reports on the prevalence of HCV infection in different areas of Pakistan are available as in Mardan 9% [3], DI Khan 13.33% [4], Faisalabad 17.77% [5], Karachi 4- 6% [6] and Quetta 8.9% [7].

The HCV infection is endemic worldwide whereas Pakistan is also considered as the same for HCV. The HCV infection in Pakistan is due to unsafe routinely practices such as, reuse of contaminated razor blades at different barber shops and the usage of contaminated dental instruments. The contaminated syringes, unsafe blood transfusion and hemodialysis are also the main cause of HCV infection transmission into a healthy host. The utilization of surgical tools without absolute sterilization procedure is the possible source of HCV infection [8]. It is important to screen out HCV in preoperative patients to have entire control over the infection by the implementation of further preventive protocols against HCV infection. Therefore, investigations based on the epidemiology need to be done on a large scale to overcome hazardous conditions. Pakistan is the country where Immunochromatography technique (ICT) is widely performed but with low accuracy rate of HCV detection. Similarly, Enzyme linked immunosorbent assay (ELISA) and Polymerase Chain reaction (PCR) are employed for the detection of virus in clinical

specimens. The HCV have different genotypes with genotype 1a bit higher followed by genotype 2 in the world. However, the genotype 3 is in higher frequency (78.96%), in Pakistan with 3a and 3b. While other genotypes such as 4, 5, 6 are very rarely reported in Pakistan. Khyber Pakhtunkhwa and Punjab have the 3a genotype predominant while the Balochistan is with 3a and 1a genotype [9, 10].

Quetta is situated in Balochistan province having diverse population with colossal status of social interactions. The scattered population has less access to health care facilities. Viral hepatitis is on alarming stage in the province. Therefore this study was planned to detect the prevalence of HCV infection in general population before surgical operation and compare the detection rate of ICT and ELISA.

Materials and methods

Study area

This cross-sectional study was carried out in Quetta, Balochistan Pakistan. Balochistan is the largest province of Pakistan with scattered population and uneasy access to health care centers. Most of the patients visit Quetta for major surgery operations from all over the province. Blood serum samples from the patients visiting 2 major hospitals (Sundayman provincial Hospital and Bolan Medical Complex Hospital) were collected aseptically and were screened for HCV infection at Balochistan Lab brewery Road Quetta.

Study population

A total of 1000 (male = 627: female =373) patients were screened for HCV infection during March-Sept, 2016. All the patients were from different ethnical groups visiting Quetta viz, Pashtun, Baloch, Hazara, and Urdu speakers. The blood samples were taken and serum was separated by centrifugation for 5 minutes at 4000 rpm. The serum was tested for the presence of anti-HCV antibodies by using ICT and positive

samples were again reconfirmed using ELISA.

Tests procedure and principles

All the reagents were equilibrated at room temperature before the start of tests. The ICT assay is one-step procedure performed in vitro for the qualitative identification of anti-HCV antibodies in patient's serum. The ICT device is antigen coated membrane and serum chromatographically moves towards the lines denoted as T (test-region) and C (control-region) along with the membrane of ICT strip.

The test was performed in accordance with the protocol suggested by the manufacturer and performed and proposed by [8]. Similarly, the enzyme linked immunosorbent assay (ELISA) was used for the detection of anti-HCV antibodies in patient's serum. The Optical Density values were read with spectrophotometer @ 450 nm.

Results

Present study was carried out to evaluate anti HCV antibodies in general surgery patient in Quetta, Pakistan. Among all 1000 patients (male=627; female= 373) an overall seroprevalence of 5% 55/1000 (5%) was recorded (Table 1). Similarly, on gender basis in male 29/627 (4.6 %) and 26/373 (6.9 %) in female prevalence was detected. While, on age basis seroprevalence among the age group of 0-15 year 3/162 (1.85 %), 16-30 year 14/406 (3.44 %) and 16/223 (7.17 %) in 31-40 age group was recorded. Likewise, the age group of 41-50 years showed 17/188 (9.0 %) and 51-60 years group had 5/21 (23.8 %) anti HCV antibodies. While distribution of seroprevalence on ethnic group basis, Hazara population (12.0%) was highest followed by Pashtoon (6.2%), Punjabi (4.6 %) and Baloch (3.9 %).

Both the two immunological techniques (ICT and ELISA) used in this study, were also

compared. Out of 1000 total samples 48 and 55 samples were positive with ICT and ELISA, respectively. While, ELISA technique detected 7 samples positive that were undetected with ICT (Table 2).

Discussion

The global HCV prevalence is approximately 3 % with 150 to 200 million infected peoples [11]. Annually 3-4 million peoples are newly infected with HCV whereas mortality rate is 3.5 million yearly throughout the globe. Different prevalence rate of HCV has been reported in various regions of the world such as America 1.7%, Europe 1.03 %, Western Pacific 3.9%, South Asia 2.15 % and 5.3 % Africa [12]. The Highest prevalence rate of 10-20 % is observed in Egypt [13]. The HCV infection is well known for serious morbidity and mortality in especially in low income countries like, Pakistan etc.

Overall, 5.5 % prevalence of HCV infection has been reported in this study from general population in preoperative patients from Quetta, Pakistan (Table 1). Our study corroborates with [7] who detected 8.9 % HCV infection rate in Quetta region. Similarly, [7] also reported 9% infection in young male blood donors in Quetta, Pakistan. This high rate of infection may be attributed to the lower literacy rate and low socio economic status of the general population in Quetta, Pakistan.

On age basis, more aged people were more prone to infection as explored in this study. While least 3/162 (1.85%) infection was found in younger age (0-15 Years) population. This could be attributed to more chances of exposure to infection in their life like, visits to barbers' shop and unsafe blood transfusion etc. Similarly, higher prevalence was seen in older ages. This might be due to fading immune system.

Table 1. Prevalence of Anti-HCV on the bases of Age, ethnicity and gender

Factors	Total patients (%)	Positive Patients (%)
Age group (Years)		
0-15	162 (16.2)	3 (1.85)
16-30	406 (40.6)	14 (3.44)
31-40	223 (22.3)	16 (7.17)
41-50	188 (18.8)	17 (9.0)
51-60	21 (2.1)	5 (23.8)
Ethnicity		
Pashtoon	559 (55.9)	35 (6.2)
Baloch	330 (33.0)	13 (3.9)
Punjabi	86 (8.6)	4 (4.6)
Hazara	25 (2.5)	3 (12.0)
Gender		
Male	627 (62.7)	29 (4.6)
Female	373 (37.3)	26 (6.9)
Total	1000	55 (5.5)

Table 2. Comparative analysis of ICT and ELISA for diagnosis of HCV

Test	Total Subjects	Positive	Negative	False Negative
Anti HCV on ICT	1000	48	952	7
Anti HCV on ELISA	1000	55	945	0

On ethnic basis higher seropositivity 3/25 (12.0%) have been reported in Hazara ethnic group followed by Pashtoon community 35/559 (6.2 %), Punjabi 4/86 (4.6 %) and the Baloch tribes with lowest 13/330 (3.9%) (Table 1). High rates of anti HCV in these tribes are ascribed to unscreened blood transfusion, reuse of contaminated syringes, and unawareness of Hepatitis C infection. As the population is scattered in patches living in remote areas and most of the population is illiterate with low socio-economic status. Moreover, the huge number of afghan refugees residing throughout the province especially, in Pashtoon area may also be one of the factors for higher prevalence in these communities.

On gender bases, it was observed that anti HCV antibodies were more in female 26 /373 (6.9 %) than male 29/627 (4.6 %) patients. This higher ratio in female might be ascribed to more frequent visits to hospitals and the

unsafe and unscreened blood transfusion during scissarian sections and pregnancies.

In this study, seven samples were found false negative with ICT but, were positive by ELISA rendering it more sensitive and specific than ICT. Our findings corroborate with previous study from Lahore, Pakistan, who also reported ELISA as more sensitive and specific test for the confirmation of HCV antibodies (Table 2) [14].

Conclusions

Illiteracy, poverty and unawareness were the striking causes of hepatitis C infection in the Patient of this area. As the disease is endemic, therefore mass scale screening program must be carried out with the help of ELISA, ICT and other molecular technique. Similarly, screening and monitoring of the concerned health staff should also be monitored regularly. For control of this disease public health interventions like destruction and disposal of disposable needle and screening of blood and blood product must be maintained.

With the help of modern electronic and print media public awareness program, eradication practices and proper control should have to be launched to minimize the infection in the society.

Authors' contributions

Conceived and designed the experiments: A Rauf & Z Ahmad, Performed the experiments: M Umar & M Ashraf, Analyzed the data: MA Mengal, Critical review of the paper. Amanullah, Wrote the paper: M Shafee & N Khan.

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