ISSN No. 2456-4400
Int J Med Lab Res 2018, 3(2): 46-51

IJMLR International Journal of Medical Laboratory Research

RESEARCH ARTICLE

CLINICOHEMATOLOGICAL PROFILES OF HEPATITIS C VIRUS (HCV): A RETROSPECTIVE HOSPITAL BASED STUDY

RP. Jakribettu[1], T. George[2], MP. Rai[2], S. Sajan[2], A. Challapalli [2], JM. Mathew[2], MS. Baliga[3]

[1]*Department of Microbiology, MES Medical College, Perinthalmanna, Kerala 679338.*
[2]*MBBS students, Father Muller Medical College, Mangalore 575002, Karnataka, India*
[3]*Father Muller Research Centre, Kankanady, Mangalore 575002, Karnataka, India*

Received: 9 July, 2018/ Revision: 14 July, 2018/ Accepted: 30 July, 2018

ABSTRACT: Aim: Acute viral hepatitis C (HAC) is an important organ specific virus affecting the liver. The pathological sequelae of the infection are well documented and a detailed literature study indicates that most studies have been on liver the primary organ affected by HCV. Studies and observations on the effect of HCV on the extrahepatic organs are lacking. The present study was carried out to ascertain clinical presentations and the alterations on the haematological and hepatic parameters. **Material and Methods**: This was a retrospective study and was conducted in a tertiary care hospital in India. Data was collected and analysed in people who were confirmed to be affected only by HCV by the standard diagnostic method using the Anti HCV Antibody for the period January 2014 to June 2016. A total of 48 people were included in the study and compared with healthy individuals who were tested negative for any infectious and chronic diseases (annual health check up individuals). **Results**: The results indicated that during the study period, 48 individuals were tested positive for HCV. Of these, 35 were symptomatic, while 13 were asymptomatic and were diagnosed incidentally during routine/mandatory investigation before surgery. In the 35 symptomatic patients jaundice (82.85%) and loss of appetite (57.14%) were the two predominant clinical symptoms. There was a significant difference in the various haematological, hepatic and electrolyte endpoints ($p < 0.05$ to 0.0001). **Conclusion**: The study indicates that acute infection with HCV causes changes in the alterations in haematological, hepatic and electrolytes in the serum.

KEY WORDS: Hepatitis C Virus (HCV); clinical, haematological, electrolytes.

INTRODUCTION:

Hepatitis C virus, a single stranded RNA virus member of flaviviridae family is packed into small (50nm) enveloped viral particle[1]. In 1975, a Lancet editorial suggested the term non-A, non-B hepatitis to describe the hepatitis as neither A and B hepatitis making certain the diagnosis was one of exclusion[2]. In 1989, almost after 15 years Choo and co workers successfully cloned a single cDNA clone from flavi-like virus by using molecular biological methods and human Hepatitis C was finally identified[3]. History of this virus has always been characterized with discoveries,

Corresponding Author:
Dr MS Baliga, Mangalore Institute of Oncology, Pumpwell, Mangalore, Karnataka, India 575002.003, India.

opportunities, challenges and difficulties[2]. Hepatitis C is processed by cellular and viral proteases into structural and non-structural polypeptides (P7, NS2, NS3, NS4A, NS4B, NS5a and NS5B) and they all have different role in the virus life cycle.E1 and E2 form a functional envelope and facilitates viral entry into host cells and induces neutralizing antibody proliferation. The replicase complex consists of NS proteins and release infectious particles and viral propagation. Hepatitis C reduce both intrinsic and adaptive immune response arm and hence by delaying they impair immune response and evade host immune system[1,4].

According to current global estimation 71 million people have chronic hepatitis C infection. Approximately 399000 people die each year from chronic hepatitis C. Hepatitis C is found almost worldwide, according to recent WHO statistics, the most affected regions are Eastern Mediterranean and European regions, with prevalence of 2.3% and 1.5% respectively[5]. HCV is a blood borne virus and mode of transmission is usually by exposure to infected blood, which happens due to IV drug use, unsafe injection practices, unsafe health care and transfusion of unscreened blood and blood products.Hepatitis C do not produce striking symptoms, Those who are acutely symptomatic may exhibit fever, fatigue, decreased appetite, nausea, vomiting, abdominal pain, dark urine, grey-coloured faeces, joint pain and jaundice (yellowing of skin and the whites of the eyes), until there are emergence of long term complications like cirrhosis, fibrosis, and hepatocellular carcinoma [5].

Global data suggest that almost 75-80% develop chronic hepatitis C, 60-70% develop cirrhosis and 5-20% develop cirrhosis and 1-5% develop into life threatening complications and hepatocellular carcinoma[6,7]. Since the discovery of hepatitis C there has been several diagnostic tests that have been developed over time, starting from the first-generation enzyme-linked immunosorbent assay (EIA-1) for the detection of antibodies to HCV, with low rates of sensitivity and specificity, molecular methods for the detection of acute infection, HCV RNA and genotyping analysis.After a person has been diagnosed with chronic hepatitis C infection, they should have an assessment of the degree of liver damage (fibrosis and cirrhosis). This can be done by liver biopsy or through a variety of non-invasive tests. People should have a laboratory test to identify the genotype of the hepatitis C strain. There are 6 genotypes of the HCV and they respond differently to treatment. Furthermore, it is possible more than 1 genotype can affect the person. Treatment decisions and management of the diseaseis based on the degree of liver damage and virus genotype that are used[8-15].

The detection of anti HCV helps in the diagnosis of Hep C infection. The anti-HCV reactivity by screening assays can indicate a past, acute or chronic hepatitis. European Association for the Study of the Liver (EASL) and Centre for Disease Control and Prevention (CDC) are 2 major guidelines which currently recommend the detection of anti-HCV antibodies together with molecular determination of HCV-RNA for the diagnosis of HCV infection[16-17]. The stage of fibrosis could be predicted by simple non-invasive lab method and the liver biopsies could be reduced.A number of studies attempted to predict severe liver fibrosis/cirrhosis using ratio of aminotransferase, sometimes in combination with other laboratory parameters[18-23]. In the present study we have attempted to understand the clinical, haematological and liver parameters in patients diagnosed with HCV at a tertiary care centre in coastal Karnataka, India.

MATERIALS AND METHODS:

This was a retrospective study and was conducted by the Departments of Microbiology and General Medicine at Father Muller Medical College Hospital, Mangalore during August 2016 to December 2016. The study was undertaken after

obtaining the approval (Ref No FMIEC/CCM /395/2016) from the Institutional Ethics Committee. The investigators searched through the microbiology reports that confirmed the presence of HCV from the year January 2014 to June 2016. The criteria considered while collected the data were that patients had to be tested positive for only HCV by chemiluminescent immunoassay vitro ECI anti-HCV assay using the ortho clinical diagnostics in the microbiology laboratory. Patients who were also affected by HIV, HBV, HAV, malaria, dengue, leptospirosis, filaria, tuberculosis, or any other infections, or were undergoing cancer-chemotherapy, systemic corticosteroid therapy, suffered from chronic liver or kidney or lung or complications of diabetes were excluded from the study. The patient's medical records were retrieved from medical record department and the clinical and laboratory parameters were collected. For controls, the investigators considered the age matched laboratory details of healthy individuals (devoid of any acute or chronic illness) who have had come to the hospital for a regular health check-up. The data from individual patients were noted and entered in to the Microsoft excel. All the data was recorded as mean ± standard deviation (SD) and are represented in each of the tables. The demographic and treatment details were categorised in to frequency. To assess the HCV-induced changes the data was accordingly segregated and compared with HCV negative subjects using the students "t" test. A p value of 0.05 was considered significant.

RESULTS:

During the study period of January 2014 to June 2016, a total of 48 patients were diagnosed with HCV infection in accordance to the inclusion criteria as specified above. Among them, 28 (58.33%) were males and 20 (41.66%) were females. The majority of the cases belonged to the age group of 18 to 72 years. Among these 48 patients, 35 patients were symptomatic. Other 13 patients were asymptomatic and were incidentally diagnosed when they were routinely investigated for Anti HCV Antibody before surgery. Among these patients, majority of the symptoms of jaundice (82.8%), loss of appetite (57%), nausea and vomiting, and fever in 45% (Table 1).

Table 1. Symptoms in the HCV infected patients.

Symptoms	Frequency (N=35)	Percentage
Jaundice	29	82.85
Loss of appetite	20	57.14
Nausea and vomiting	16	45.71
Fever	16	45.71
Fatigue	13	37.14
Asymptomatic	13	27.08
Abdominal pain	8	22.85
Swelling in your legs	6	17.14
Joint pain	5	14.28
Ascites	4	11.43
Dark urine	2	5.71

The mean haematological parameters in the HCVpatients were deranged with respect to haemoglobin, lymphocyte count, monocyte count, erythrocyte sedimentation rate (ESR) and packed cell volume (PCV). The statistical analysis showed significant difference among these parameters when comparedto healthy individuals (Table 2). The mean serum total bilirubin level is elevated and Serum Albumin is reduced. The liver enzymes, alanine amino-transferase (ALT),

aspartate amino-transferase (AST) and alkaline phosphatase (ALP) were elevated (Table 2).The serum of sodium and chloride were reduced, and serum potassium level increased were significantly compared to healthy individuals (Table 2)

Table 2: Comparison of haematological and biochemical parameters in HCV infected and healthy individuals.

Parameters		Healthy Individuals	Hepatitis C infected patients	p Value
Hematological parameters	Hb	12.49±1.05 (9-15.4; N =128)	11.08±3.29 (5.4-17.4; N =48)	0.002
	TC	8201.61±1729.13 (5100-13600; N =128)	8593.38±4286.38 (3100-24300; N =48)	0.67
	N	58.31±8.29 (36-82; N =128)	63.21±14.50 (38-94; N =48)	0.13
	L	35.89±9.15 (14-54; N =128)	22.86±11.49 (3-45; N =48)	<0.0001
	E	3.66±2.14 (1-9; N =128)	5.43±5.86 (1-24; N =48)	0.08
	M	2.53±1.73 (1-14; N =128)	8.15±3.40 (1-16; N =48)	<0.0001
	ESR	5.38±1.88 (2-9; N =128)	37.52±23.94 (2-93; N =30)	<0.0001
	PCV	39.63±4.09 (33.9-47.8; N =128)	32.35±9.97 (16.6-52.5; N =38)	<0.0001
Hepatic parameters	AST	23.18±8.48 (10-60; N =128)	99.11±111.65 (21-466; N =36)	0.001
	ALT	21.58±12.39 (10-83; N =128)	54.31±43.75 (17-172; N =40)	<0.0001
	ALP	73.09±19.02 (38-108; N =125)	158.83±117.11 (39-442; N =42)	<0.0001
	T. Bil	0.63±0.407 (0.2-2.1; N =128)	1.35±1.41 (0.31-5.47; N =34)	0.02
	T. Protein	7.30±0.41 (6.4-8.2; N =125)	6.92±0.71 (5.52-8.34; N =41)	0.0004
	Albumin	4.29±0.42 (3.12-5.07; N =125)	3.38±0.88 (1.76-4.69; N =41)	<0.0001
	Globulin	2.98±0.33 (2.4-3.5; N =125)	3.519±0.81 (2.03-4.7; N =42)	0.001
	A/G Ratio	1.46±0.25 (0.9-1.9; N =125)	1.04 ±0.47 (0.38-2.09; N =41)	<0.0001
	Na	136.81±17.51 (1.37-143.8; N =128)	135.96±4.31 (128-144; N =44)	0.0002
	K	4.28±0.38 (3.6-5.07; N =128)	4.42±0.95 (3.18-6.8; N =44)	0.54
	Cl	99.93±12.74 (102.3-106; N =128)	97.05±5.99 (81.6-107.3; N =43)	0.0001

DISCUSSION:

In our study population which included 48 HCV infected people, we found that the males were more than females and was comparable to that of other studies[24, 25]. The majority of the cases belonged to the age group of 20–45 years. In Northern Indian population, around 42% (34/80) of the HCV patients were asymptomatic, eventhough they had significant histological changes in the liver and were incidentally diagnosed with HCV infection[24]. Similarly, we had 13/48 patients who were asymptomatic at the time of diagnosis. Most the HCV infected patients can have sub-clinical infection; symptoms in these can also vary widely. In our patients, Jaundice was the common symptoms (29/35) followed by fatigue (13/35), abdominal discomfort (8/35) which was in contrary to the Northern Indian population, where fatigue and abdominal discomfort was more common than jaundice [24].

The haematological parameters in HCV infected patients are usually deranged like any other viral infection. The haemoglobin and PCV is usually raised in HCV infected patients on haemodialysis, when compared to patients with HCV patients not on haemodialysis who have only PCV raised [26,27]. The ESR was significantly high in the patients compared to healthy individuals as seen in population from our neighboring country[27]. Since, HCV infect the liver mainly, and the

production of the proteins by the hepatocytes is hampered, this can explain anaemia in them.

The total bilirubin, liver enzymes are elevated, the Serum albumin in reduced and A/G ratio is deranged significantly in HCV infected patients, indicating the damage to the liver cells by theHCV[26-28]. Even though, the dyselectrolytemia has been documented in HCV patients; it varies in patients from different geographical location[26,28]. We have noticed significant hyponatremia and marginal hyperkalemia in HCV infected patients compared to healthy individuals.

CONCLUSION:

The patients with HCV infections can be asymptomatic, only laboratory diagnosis can help in early and accurate diagnosis of the infected individuals. In our study patients were anaemic and had raised ESR and reduced PCV. Liver enzymes especially ALT and ALP were increased significantly and Albumin reduced. This indicates the importance of haematological and biochemical profile in HCV infected patients.

REFERENCES:

1. Khaliq S, Jahan S, Hassan S. Hepatitis C virus p7: molecular function and importance in hepatitis C virus life cycle and potential antiviral target. Liver Int. 2011; 31(5):606-17.
2. Anoynomous. Editorial: Non-A, non-B. Lancet 1975; 2: 64-65.
3. Choo QL, Kuo G, Weiner AJ, Overby LR, Bradley DW, Houghton M. Isolation of a cDNA clone derived from a blood-borne non-A, non-B viral hepatitis genome. Science 1989; 244: 359-362.
4. Vieyres G, Thomas X, Descamps V, Duverlie G, Patel AH, Dubuisson J. Characterization of the envelope glycoproteins associated with infectious hepatitis C virus. J Virol. 2010; 84:10159-68.
5. World Health Organization Hepatitis C Fact Sheet 2017.
6. World Health Organization Hepatitis C Fact Sheet 2012.
7. Wise M, Bialek S, Finelli L, Bell BP, Sorvillo F. Changing trends in hepatitis C-related mortality in the United States, 1995-2004. Hepatology 2008; 47: 1128-1135.
8. Alter MJ, Margolis HS, Krawczynski K, Judson FN, Mares A, Alexander WJ, Hu PY, Miller JK, Gerber MA, Sampliner RE. The natural history of community-acquired hepatitis C in the United States. The Sentinel Counties Chronic non-A, non-B Hepatitis Study Team. N Engl J Med 1992; 327: 1899-1905.
9. Van der Poel CL, Reesink HW, Lelie PN, Leentvaar-Kuypers A, Choo QL, Kuo G, Houghton M. Anti-hepatitis C antibodies and non-A, non-B post-transfusion hepatitis in The Netherlands. Lancet. 1989; 2(8658):297–298.
10. Bukh J, Purcell RH, Miller RH. Importance of primer selection for the detection of hepatitis C virus RNA with the polymerase chain reaction assay. ProcNatlAcadSci USA 1992; 89: 187-191.
11. Cha TA, Kolberg J, Irvine B, Stempien M, Beall E, Yano M, Choo QL, Houghton M, Kuo G, Han JH, et al. Use of a signature nucleotide sequence of hepatitis C virus for detection of viral RNA in human serum and plasma. J Clin Microbiol. 1991; 29:2528–53.
12. Chevaliez S, Rodriguez C, Pawlotsky JM. New virologic tools for management of chronic hepatitis B and C. Gastroenterology 2012; 142:1303-1313.
13. Park Y, Lee JH, Kim BS, Kim do Y, Han KH, Kim HS. New automated hepatitis C virus (HCV) core antigen assay as an alternative to real-time PCR for HCV RNA quantification. J ClinMicrobiol 2010; 48: 2253-225.
14. Hosseini-Moghaddam SM, Iran-Pour E, Rotstein C, Husain S, Lilly L, Renner E, Mazzulli T. Hepatitis C core Ag and its clinical applicability: potential advantages and disadvantages for diagnosis and follow-up? Rev Med Virol 2012; 22: 156-165.
15. Descamps V, Op de Beeck A, Plassart C, Brochot E, François C, Helle F, Adler M, Bourgeois N, Degré D, Duverlie G, Castelain S. Strong correlation between liver and serum levels of hepatitis C virus core antigen and RNA in chronically infected patients. J ClinMicrobiol 2012; 50: 465-68.
16. European Association for the Study of the Liver. EASL Clinical Practice Guidelines:

management of hepatitis C virus infection. J Hepatol 2011; 55: 245-264.
17. Centers for Disease Control and Prevention (CDC). Testing for HCV infection: an update of guidance for clinicians and laboratorians. MMWR Morb Mortal Wkly Rep 2013; 62: 362-365.
18. Haber MM, West AB, Haber AD, et al. Relationship of aminotransferases to liver histological status in chronic hepatitis C. Am J Gastroenterol 1995;90:1250–7.
19. Bonacini M, Hadi G, Govindarajan S, et al. Utility of a discriminant score for diagnosing advanced fibrosis or cirrhosis in patients with chronic hepatitis C virus infection. Am J Gastroenterol 1997; 92:1302–4.
20. Giannini E, Botta F, Fasoli A, et al. Progressive liver functional impairment is associated with an increase in AST/ALT ratio. Dig Dis Sci 1999; 44:1249–53.
21. Sheth SG, Flamm SL, Gordon FD, Chopra S. AST/ALT ratio predicts cirrhosis in patients with chronic hepatitis C virus infection. Am J Gastroenterol. 1998; 93(1):44-8.
22. Reedy DW, Loo AT, Levine RA. AST/ALT ratio 1 is not diagnostic of cirrhosis in patients with chronic hepatitis C. Dig Dis Sci 1998; 43:2156–9.
23. Williams AL, Hoofnagle JH. Ratio of serum aspartate to alanine aminotransferase in chronic hepatitis. Relationship to cirrhosis. Gastroenterology 1988; 95:734–9.
24. Sood A, Midha V, Sood N, Kaur H, Malhotra V, Awasthi G. Chronic Hepatitis C in Northern India – ThePathological and Clinical Spectrum. JAPI .2004, 52; 5:380-84.
25. Fasola F A, Otegbayo J A, Abjah U M A and Ola S O. Haematological parameters in Nigerians with acute viral hepatitis. Nigerian Journal of Gastroenterology and Hepatology 2009; 1:27-31
26. Alsaran K A, Sabry A A,Alghareeb A H and Al Sadoon G Effect of Hepatitis C Virus on Hemoglobin and Hematocrit Levels in Saudi Hemodialysis Patients, Renal Failure. 2009; 31: 349-354,
27. Asghar S, Zia M A, Jafri S A, Ahmed I and Amjad M.A Correlative Study Between Biochemical and Hematological Parameters and Hepatitis C Prevalence in the Premises of Faisalabad.Middle-East Journal of Scientific Research 2011; 7: 538-42.
28. Alsaran KA, Sabry AA, Alghareeb AH, Al Sadoon G. Effect of hepatitis C virus on hemoglobin and hematocrit levels in Saudi hemodialysis patients. Ren Fail. 2009; 31: 349-54.

CONFLICT OF INTEREST: Authors declared no conflict of interest

SOURCE OF FINANCIAL SUPPORT: Nil

Cite of article: Jakribettu RP, George T, Rai MP, Sajan S, Challapalli A, Mathew JM, Baliga MS; Clinicohematological profiles of hepatitis c virus (HCV): a retrospective hospital based study. .Int. J. Med. Lab. Res. 2018, 3(2): 46-51