

FREQUENCY OF ACUTE HEPATITIS C AFTER NEEDLE STICK INJURY AND ITS TREATMENT OUTCOME

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ABSTRACT

Objective: To determine the frequency of acute HCV infection after needle stick injury and its treatment outcome.

Methodology: Patients with HCV positive needle stick injury and reporting within 72 hours of incident were selected. Co-infections with HBV, HDV, HIV, hematological disorders and depression were excluded. Anti-HCV was done at presentation and those testing positive were excluded. HCV RNA was done after two weeks or anti-HCV after six weeks of incident. Those testing positive were kept under observation for 16 weeks for spontaneous resolution. After this period HCV RNA and Genotype were done and therapy with Peg-interferon was started. Rapid, early and sustained virological responses were checked.

Results: Two hundred eight patients with HCV positive needle stick injury were selected, 10 (4.8%) developed acute HCV infection out of them one (10%) had spontaneous recovery during the observation period of 16 weeks. seven (77.8%) achieved rapid virological response and eight (88.9%) achieved sustained virological response.

Conclusions: Acute HCV is an uncommon disease to diagnose; it has favorable response to therapy if initiated early after a strict surveillance of patients for 8-16 weeks.

KEY WORDS: Acute Hepatitis-C, Needle stick injury.

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INTRODUCTION

Health care workers (HCW) in department of internal medicine & pediatrics are at the highest risk of acquiring a blood born infection via a needle stick injury (NSI) as prevalence of blood-borne infections in admitted patients is reported about nine times higher for HBV and approximately 15 times higher for HCV as compared to general population.¹⁻² In different surveys 22-31 % of HCWs reported one or more than one NSI during the previous 12 months.²⁻³ Cases have also been reported by accidental NSI in community by needles and sharp objects of medical waste and needles thrown away by i.v. drugs users.⁴ Infection with HCV is usually subclinical and goes undetected for variable periods of time and is detected incidentally.

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Acute HCV is defined as a new occurrence of viremia with conversion from an HCV-RNA negative to an HCV-RNA positive status.⁵⁻⁶ Acute HCV is usually a silent infection and is difficult to pick up but in under the circumstances of NSI it is detected easily if properly followed.⁷ If left untreated up to 80% of these will develop chronic hepatitis.^{5,6,8} About 20% of chronic hepatitis C patient are expected to develop cirrhosis; among these 6% will progress to end stage liver disease and about 4% will develop hepato-cellular carcinoma.⁶ There are reports that treating acute HCV prevents progression to chronic hepatitis.⁹ Thus proper investigation and follow-up of cases with NSI is essential to prevent these complications.

As there are no reports of follow-up of patients from NSI from our area, this study is an interventional cohort of HCV infected NSI from our area. This is the first report of frequency of acute HCV after NSI and treatment outcome of these patients from Pakistan.

METHODOLOGY

The study was conducted at Dow University of Health Sciences, Karachi, Pakistan during the period July 2004 to June 2008. All subjects reporting with NSI from documented HCV positive patient within 72 hours of incident were initially selected for screening. Informed consent was taken from the subjects. Subjects with co-infection with other viruses like HBV, HDV or HIV were excluded. Subjects with severe depression, thrombocytopenia, leucopenia, decompensated renal and liver disease were also excluded. Anti-HCV and ALT were done immediately at presentation by EIA method to document the base line status. If negative, patients were advised anti-HCV after six weeks of incident. Patients who tested positive were selected for follow-up up to 16 weeks. During this period fortnightly ALT were done and HCV RNA qualitative PCR was repeated at the end of this period. The patients who tested positive were selected for therapy while those who tested negative were kept on observation for next 24 weeks and retested for HCV RNA quali-

tative PCR thereafter, and the one who tested positive were selected for therapy. All those selected for therapy underwent HCV genotyping and quantitative PCR.

Therapy was started with pegylated interferon alpha 2a 180 µg/week with ribavirin 1000-1200 mg according to the weight. Test for Rapid Virological Response (RVR) by qualitative PCR at four weeks into therapy was done. Those achieving RVR were given 16 week therapy with tested for Sustained Virological Response (SVR) 24 weeks off therapy. Patients who did not achieve RVR were given 24 weeks of therapy and tested for Early Virological Response (EVR) by quantitative PCR at 12 weeks for two log reduction in their viral load. Those who failed to achieve EVR were informed about the low likelihood of achieving virological clearance but were continued with the therapy for total of 24 weeks in genotype three and 48 weeks for genotype one.

RESULTS

Two hundred fifteen subjects presented with NSI during the study period out of these five were anti-HCV positive and two were HBsAg positive at presentation and were excluded. The remaining 208 subjects were enrolled for follow-up and were having mean ALT of 18.3 ± 2.6 IU/l at that time. The incident occurred while recapping the syringe in 149 (71.6%), during intravenous cannulation in 51 (24.5%) and by accidental prick while disposing used syringes in eight (3.8%). Out of these 164 (78.8%) were females and 44 (21.1%) were males. The occupation breakup is given in Table-I.

Anti-HCV done six weeks after the incident showed seroconversion to positivity in 10 (4.8%)

Table-I: Frequency of NSI according to the job description

<i>Occupation</i>	<i>No.</i>	<i>%</i>
Consultant	6	02.9%
Trainee	51	24.5%
House Officer	93	44.7%
Nurse	34	16.3%
Lab Technician	23	11.1%

subjects who were selected for monitoring for next 16 weeks with weekly ALTs. At the end of this period one (10%) patient had spontaneous recovery while the rest nine (90%) had HCV RNA positive. The mean ALT done fortnightly during the previous 16 weeks is given in the line plot in Figure-1. All nine patients were of genotype three and had mean viral load of $2.9 \pm 1.2 \times 10^5$ IU/ml.

After four weeks of therapy seven (77.8%) patients achieved rapid virological response (RVR) and were given 16 weeks therapy. The two (22.2%) patients who did not achieve RVR were tested for early virological response at 12th week both showed > two log reduction in viral load and were continued for total 24 weeks therapy. Both tested negative for HCV RNA at the end of 24 weeks thus achieving the end treatment response (ETR). Testing for sustained virological response (SVR) 24 weeks off treatment in all the patients showed that only one patient developed relapse, this patient belonged to the group of patient who did not achieve RVR. The SVR rate in our series was eight (88.9%) in acute HCV after NSI.

DISCUSSION

NSI is a known preventable occupational hazard and it can potentially transmit many blood

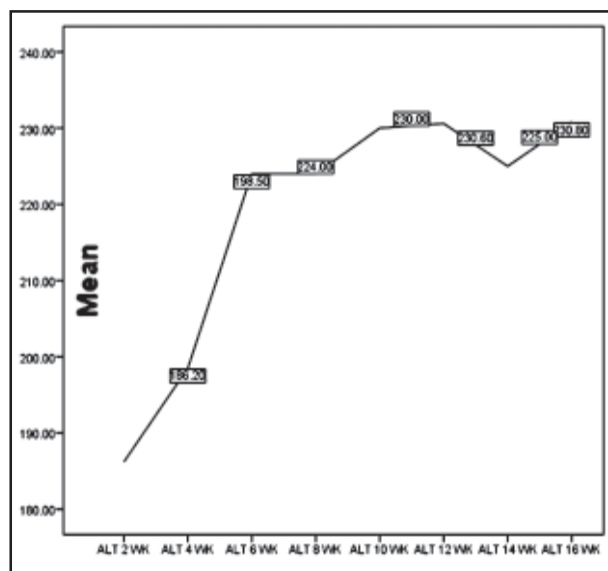


Fig-1: Mean of ALT done fortnightly during observation phase

borne diseases like HIV, hepatitis B, C & D.¹⁰ Despite its seriousness, the event is still neglected by medical community and many cases go unreported. In a recent survey, incidence of NSI in HCW has been reported at 31.4%.² The major risk identified for NSI are, staff shortage, high activity in the ward and inadequate supervision.¹¹ Care must be taken while rostering the staff and a combination of junior and senior staff should be available.

Due to the mild or asymptomatic behavior, acute HCV is rarely recognized outside the surveillance after exposure.^{5, 12} Number of patients diagnosed with acute HCV is very small thus large scale studies have not appeared and there is still no consensus regarding timing of therapy.^{13, 14} We found the frequency of acute HCV after NSI at 4.8%. The spontaneous resolution of acute HCV has been reported in 20-40% of cases in our series only one (10%) patient had spontaneous resolution during the 16 weeks of observation.⁵

The appropriate timing for interferon based therapy in acute HCV is debateable.¹⁵ This is because the studies with acute HCV are with very small numbers and it is difficult to ascertain the exact time of acquisition of infection. In most trials therapy was initiated after 1 -24 months of appearance of symptoms, first positive PCR or at seroconversion.¹⁵ Early start of therapy between 8-12 weeks of infection has been advocated in two randomized trials.^{9, 16} We initiated therapy after 16 weeks of observation in our series.

Duration of therapy is also not definite in acute HCV. We treated as per standard protocol of 16 weeks in RVR patients and 24 weeks in EVR patients. There are reports that 12 weeks of therapy would be sufficient in acute HCV with genotype non-1.¹⁶⁻²⁰ The SVR rates with 12 week therapy needs determination. Patients with genotype non-1, with low viral load and those achieving RVR are more like to have SVR.^{19, 21, 22} Co-infections with other viruses decrease the probability of achieving SVR.^{23, 24}

CONCLUSION

This study is limited by the small number of patients who developed acute HCV, but with the transmission rate of 4.8% it is a difficult task to get a large study and this has been a problem in doing research in this low prevalence disease. But this study does give important insights to the problem and will definitely act as a stimulant for research in this area. We conclude that acute HCV is an uncommon disease to diagnose; it has favorable response to therapy if initiated early after a strict surveillance of patients for 8-16 weeks.

REFERENCES

1. Wicker S, Cinatl J, Berger A, Doerr HW, Gottschalk R, Rabenau HF. Determination of Risk of Infection with Blood-borne Pathogens Following a Needlestick Injury in Hospital Workers. *Ann Occup Hyg* 2008;52:615-622.
2. Wicker S, Jung J, Allwinn R, Gottschalk R, Rabenau HF. Prevalence and prevention of needlestick injuries among health care workers in a German university hospital. *Int Arch Occup Environ Health* 2008;81:347-54.
3. Moro PL, Moore A, Balcacer P, Montero A, Diaz D, Gomez V, et al. Epidemiology of needlesticks and other sharps injuries and injection safety practices in the Dominican Republic. *Am J Infect Control* 2007;35:552-9.
4. Haber PS, Young MM, Dorrington L, Jones A, Kaldor J, De Kanzow S, et al. Transmission of hepatitis C virus by needle-stick injury in community settings. *J Gastroenterol Hepatol* 2007;22:1882-5.
5. Chung RT. Acute hepatitis C virus infection. *Clin Infect Dis* 2005;41 Suppl 1:S14-7.
6. Thomas DL, Seeff LB. Natural history of hepatitis C. *Clin Liver Dis* 2005;9:383-98, vi.
7. Fabris P, Fleming VM, Giordani MT, Barnes E. Acute hepatitis C: clinical aspects, diagnosis, & outcome of acute HCV infection. *Curr Pharm Des* 2008;14:1661-5.
8. Guobuzaitė A, Chokshi S, Balciuniene L, Voinic A, Stikleryte A, Zagminas K, et al. Viral clearance or persistence after acute hepatitis C infection: interim results from a prospective study. *Medicina (Kaunas)* 2008;44:510-20.
9. Jaeckel E, Cornberg M, Wedemeyer H, Santantonio T, Mayer J, Zankel M, et al. Treatment of acute hepatitis C with interferon alfa-2b. *N Engl J Med* 2001;345:1452-7.
10. Pruss-Ustun A, Rapiti E, Hutin Y. Estimation of the global burden of disease attributable to contaminated sharps injuries among health-care workers. *Am J Ind Med* 2005;48:482-90.
11. Morrison AL, Beckmann U, Durie M, Carless R, Gillies DM. The effects of nursing staff inexperience (NSI) on the occurrence of adverse patient experiences in ICUs. *Aust Crit Care* 2001;14:116-21.
12. Orland JR, Wright TL, Cooper S. Acute hepatitis C. *Hepatology* 2001;33:321-7.
13. Ogata K, Ide T, Kumashiro R, Kumada H, Yotsuyanagi H, Okita K, et al. Timing of interferon therapy and sources of infection in patients with acute hepatitis C. *Hepatol Res* 2006;34:35-40.
14. Caruntu FA, Benea L. Acute hepatitis C virus infection: Diagnosis, pathogenesis, treatment. *J Gastrointest Liver Dis* 2006;15:249-56.
15. Kamal SM. Acute hepatitis C: a systematic review. *Am J Gastroenterol* 2008;103:1283-97; quiz 98.
16. Wiegand J, Buggisch P, Boecher W, Zeuzem S, Gelbmann CM, Berg T, et al. Early monotherapy with pegylated interferon alpha-2b for acute hepatitis C infection: the HEP-NET acute-HCV-II study. *Hepatology* 2006;43:250-6.
17. Kamal SM, Ismail A, Graham CS, He Q, Rasenack JW, Peters T, et al. Pegylated interferon alpha therapy in acute hepatitis C: relation to hepatitis C virus-specific T cell response kinetics. *Hepatology* 2004;39:1721-31.
18. Kamal SM, Moustafa KN, Chen J, Fehr J, Abdel Moneim A, Khalifa KE, et al. Duration of peginterferon therapy in acute hepatitis C: a randomized trial. *Hepatology* 2006;43:923-31.
19. Kamal SM, Fouly AE, Kamel RR, Hockenjos B, Al Tawil A, Khalifa KE, et al. Peginterferon alfa-2b therapy in acute hepatitis C: impact of onset of therapy on sustained virologic response. *Gastroenterology* 2006;130:632-8.
20. De Rosa FG, Bargiacchi O, Audagnotto S, Garazzino S, Cariti G, Raiteri R, et al. Dose-dependent and genotype-independent sustained virological response of a 12 week pegylated interferon alpha-2b treatment for acute hepatitis C. *J Antimicrob Chemother* 2006;57:360-3.
21. Calleri G, Cariti G, Gaiottino F, De Rosa FG, Bargiacchi O, Audagnotto S, et al. A short course of pegylated interferon-alpha in acute HCV hepatitis. *J Viral Hepat* 2007;14:116-21.
22. Zuberi BF, Zuberi FF, Memon SA, Qureshi MH, Ali SZ, Afsar S. Sustained virological response based on rapid virological response in genotype-3 chronic hepatitis C treated with standard interferon in the Pakistani population. *World J Gastroenterol* 2008;14:2218-21.
23. Zuberi BF, Afsar S, Quraishy MS. Triple hepatitis: Frequency and treatment outcome of co/super-infection of hepatitis C and D among patients of hepatitis B. *J Coll Physicians Surg Pak* 2008;18:404-7.
24. Dominguez S, Ghosn J, Valantin MA, Schruniger A, Simon A, Bonnard P, et al. Efficacy of early treatment of acute hepatitis C infection with pegylated interferon and ribavirin in HIV-infected patients. *AIDS* 2006;20:1157-61.