PharmacologyOnLine April 30, 2015

Case Report • 2015 • vol.1 • 1-4

# HEPATITIS C DUE TO USE OF NON-STERILIZED INSTRUMENTS DURING SURGERY

Tariq, F.

Faculty of Pharmacy, University of Sargodha, Pakistan.

fatimatariqpunjabian@gmail.com

## Abstract

The case study has been designed to report hepatitis C in a patient. The patient belongs to Gujranwala model town. Patient was a regular blood donor. He got to know that he had hepatitis C when he went to donate blood in 2008. Then his physician suggested him some tests that are CBC and LFT. These tests confirmed that hepatitis C is active. Then evaluation tests were performed which was PCR (Qualitative and Quantitative). After that, physician started his treatment with pegylated interferon (injection) along with ribavirin (oral). This treatment prolonged to 12 months and replaced by sovaldi due to its large number of side effects.In 2007, he had foot surgery due to road accident. His physician has concluded that the patient attacked by hepatitis C virus due to the use of non-sterilized instruments during surgery.

Key words: HCV patient, HCV diagnosis, HCV evaluation tests, HCV treatment plan.

## Introduction

Hepatitis C virus (HCV) is one of the main causes of liver-related morbidity and mortality. The virus establishes a persistent infection in the liver, leading to the development of chronic hepatitis, liver cirrhosis and hepatocellular carcinomas [1]. A satisfactory treatment for HCV infection has yet to be developed because investigations of HCV have been hampered by the lack of a stable cell-culture system and of a small-animal model. An HCV replicon that has been reported recently is a selectable sub-genomic HCV RNA, which replicates efficiently and continuously in human hepatoma Huh7 cells [2]. The development of the replicon system has allowed various molecular studies of HCV replication, host–cell interactions and antiviral strategies.RNA interference (RNAi) is the process of sequence-specific, post-transcriptional gene silencing that is initiated by double-stranded RNA (dsRNA). RNAi is a multi-step process that involves the generation of small interfering RNA (siRNA), 21–23 nuclteotides long, that results in degradation of RNA that is complementary to the siRNA [3]. In mammalian cells, however, this provokes a strong cytotoxic response, leading to the non-specific degradation of RNA transcripts and a general shutdown of host-cell protein translation [4]. This problem has been overcome recently by using a synthetic siRNA that is long enough to mediate gene-specific suppression, but is short enough to evade the adverse effects of long dsRNAs [5]. RNAi has become a powerful tool for the analysis of gene function and has potential therapeutic applications. Recently, suppression of human immunodeficiency virus (HIV) and poliovirus replication by siRNA has been reported [6][7]. The successful use of siRNA in mammalian cells encouraged us to develop an siRNA expression vector [8] and to apply RNAi to the exploration of anti-HCV strategies using the HCV replicon system as the target.

The HCV genome is a positive-stranded RNA that contains a single, long open reading frame that encodes structural and non-structural proteins. Translation of the viral genome is mediated by an internal ribosomal entry site (IRES), which is located in the untranslated region at the 5′ terminus [9]. The HCV genome varies considerably between HCV strains. However, the 5′ UTR and the upstream portion of the core region are the most conserved parts of the genome, with a nucleotide identity of 99.6% [10]. Because sequence mismatches between the siRNA and the target affect the efficiency of RNAi, the 5′ UTR would seem to be an ideal target for siRNA.

Here, we engineered siRNAs and DNA-based siRNA-expressing vectors to target HCV RNA, and evaluated the effects on viral replication using an HCV replicon system. We report that viral replication was inhibited successfully both by vector-derived siRNA and by an extremely low concentration of a synthetic siRNA that targets the conserved 5′ UTR of the HCV genome.

Here are recommendations for HCV treatment for all genotypes from AASLD[13].

### *Case Study*

The patient is 45 years old business man.He lived in a village from his childhood. There, the environment was not antiseptic. Then he came to Model Town Gujranwala at the age of 25.He has his own business of steel. He is a regular blood donor. He started to donate blood at the age of 22. In 2007, he had a road accident in which his foot was injured severely. At that time, he had a foot surgery from civil hospital Gujranwala. He used some antibiotics for three to four weeks. After the rest of three to four weeks, he became good. In 2008, when he went to donate blood, his anti-HCV was positive. Then, he went to see his family physician for his checkup. Physician suggested him some evaluation tests for confirmation of HCV. CBC was done. CBC is actually complete blood count i.e the test especially for the detection platelets disturbance. CBC was done from ShaukatKhanum Memorial Cancer Hospital and Research Centre Lahore. CBC tests report (table 1). LFT was also done. Through LFT, it was reported that ALT and AST of the patient was so high and alkaline and bilirubin level was normal. LFT test report (table 2). PCR (polymerase chain reaction) qualitative and quantitative was performed. In PCR qualitative, it was reported that virus was getting spread strongly in the body.

Genotyping of HCV was 2. Then his physician started his treatment with pegylated interferon in the form of injection along with Ribavirin which is administered orally. This treatment usually prolongs to 12-18 months. This treatment had large number of side effects. Two months later, patient faced severe side effects. After every injection, patient had anorexia, sleep disturbance, headache and gradual weight loss.

Then, the physician did monitoring. In CBC, platelet count was low. TLC, Hb and ALT levels was also low. Then, the treatment was restarted and after three months, PCR qualitative was done. In this, low viral attack was reported and the treatment continued for further three months. Whole of the treatment remained upto 12 months and viral spread reduced

day by day. But the side effects was not getting reduce. Later, the treatment was replaced by sovaldi + ribavirin. This is too expensive treatment of about three lac in Pakistan and eighty lac in America. By using this treatment patient became cure. Dose include 400mg tablet taken orally, once daily with food. By using this 12 weeks treatment, patient got cured and it was proved as a rational therapy.

## Discussion

This is a case study of hepatitis C patient using pegylated interferon. But due to the side effects of pegylated interferon patient was not getting cure completely. Side effects were very serious including anorexia, sleep disturbance, gradual weight loss and headache. Later, physician replaced it by sovaldi along with ribavirin. Patient got cure by its use.

Sovaldi (sofosbuvir) is a drug developed by Gilead Sciences used to treat hepatitis C infection. On December 6, 2013, sofosbuvir received approval from the U.S. FDA for treatment of individuals with chronic hepatitis C as a component of combination therapy [11]. In combination with other therapies it can effectively cure hepatitis C in 90% patients. Scientists have reported that sovaldi also have common side effects including fatigue, nausea, insomnia, headache, itching and diarrhea. But the above discussed patient did not have such side effects except sometimes headache after medication.

The recommended dose of sovaldi is one 400mg tablet, taken orally, once daily with or without food. Scientists have reported that the proportion of subjects who permanently discontinued treatment due to adverse events was 4% for subjects receiving placebo, 1% for subjects receiving SOVALDI + ribavirin for 12 weeks,<1%for subjects receiving SOVALDI + ribavirin for 24 weeks, 11% for subjects receiving peginterferonalfa + ribavirin for 24 weeks and 2% for subjects receiving SOVALDI + peginterferonalfa + ribavirin for 12 weeks.

## Conclusion

Effective care of hepatitis C requires comprehensive assessment, appropriate diagnosis using current criteria, development and implementation of a written plan of care, and evaluation of the patient's response to treatment. As hepatitis C increases in prevalence and there are multiple factors that contribute to symptom severity. These factors include unsafe blood transfusion, needle piercing especially during tattoos, use of non-sterilized dental and other instruments during surgery etc. Clinicians must maintain a high level of awareness in order to detect hepatitis C and initiate treatment early to preserve patient's overall quality of life while preventing morbidity and mortality.

### *Recommendations*

1. Physician must prescribe sovaldi(sofosbuvir) along with ribavirin to patient. This is new drug used in the treatment of hepatitis C and is very effective with low side effects. But this treatment is very expensive roundabout of three lac in Pakistan and of eighty lac in America.
2. Physician should monitor the viral load of patient by Qualitative PCR after every three months which is main goal of the treatment(i.e reduction of viral load on body)
3. Doctors should use sterilized dental and other instruments during dental and other kinds of surgery.
4. Health care professionals should continue to recommend the avoidance tattoos.
5. Health care department should organize such a blood test lab in which even a layman can have its routine checkup every six months.
6. Prevention and control of hepatitis C is based on effective diagnosis, treatment and counseling of infected person.
7. Pre-exposure vaccination of person is available and effective against the attack of hepatitis C virus to body.
8. There should be evaluation, treatment and counseling of sex partners of persons who are infected with hepatitis. This step also reduces the chances of hepatitis C in their partners.
9. Health care providers should provide the guidelines of hepatitis C to persons in low- and middle-countries.
10. Do not eat raw vegetables; steam them instead. These include carrots, potatoes, cauliflower or any "hard to chew" vegetables. Juicing is preferred. Avoid alcohol, hot sauces, spicy foods, fried foods, fatty foods and salty foods[12].

## Acknowledgement

I passionately and warmly thanks to Dr. TahaNazir (B.Pharm, M.Phil and PhD Course Director: Microbiology & immunology. Faculty of Pharmacy, University of Sargodha, Sargodha) who wished me to design such a case report. Through his guidance, monitoring and constant encouragement, I made this case report.

## References

1. Alter, M.J., Epidemiology of hepatitis C. Hepatology

1997;26:628-658.
2. Lohmann, V., Koerner, F., Koch, J.O.O., Herian, U., Theilmann, L., Bartenschlager, R., Replication of subgenomic hepatitis C virus RNAs in a hepatoma cell line. Science 1999;285:110-113.
3. Sharp,P.A., RNA Interference. Genes Dev 2001;15:485-490.
4. Banglioni, C., Nilsen, T.W., Mechanisms of antiviral action of interferon. Inteferon 1983;5:23-42.
5. Elbashir, S.M., Harborth, J., Lendeckel, W., Yalcin, A., Webel, K., Tuschl, T., Duplexes of 21-nucleotide RNAs mediate RNA interference in cultured mammalian cells. Nature 2001;411(a):494-498.
6. Gitlin, L., Karelsky, S. Andino, R., Short interfering RNA confers intracellular antiviral immunity in human cells. Nature 2002;418:430-434.
7. Jacque, J.M., Triques, K., Stevenson, M., Modulation by RNA interference. Nature 2002;418:435-438.
8. Miyagishi, M., Taira, K., U6 promotor-driven siRNA with four uridine 3 overhangs efficiently suppress targeted gene expression in mammalian cells. Nature Biotechnol 2002;19:497-500.
9. Tsukiyana-Kohara, K., Lizoka, N., Kohara, M., Nomoto, A., Internal ribosome entry site with hepatitis C virus RNA. J Virol 1992;66:1476-1483.
10. Choo, Q.L., et al., Genetic organization and diversity of the hepatitis C virus. Proc Natl Acad Sci 1991;88:2451-2455.
11. *www.hepatitisc.uw.edu/page/treatment/drugs/sofosbuvir-drug*
12. Jones, R.L., C.N. http://C.natures-response.com/
13. American Association for the Study of Liver Diseases

**Table 1.** AASLD HCV treatment recommendations for treatment naïve patients who are eligible to receive interferon

| | RECOMMENDED | ALTERNATIVE |
|---|---|---|
| Genotype 1 | Sovaldi + Ribavirin + Pegylated interferon for 12 weeks | Sovaldi for 12 weeks + Ribavirin + Pegylated interferon for 24 weeks |
| Genotype 2 | Sovaldi + Ribavirin for 12 weeks | None |
| Genotype 3 | Sovaldi + ribavirin for 24 weeks | Sovaldi + Ribavirin + Pegylated interferon for 12 weeks |
| Genotype 4 | Sovaldi + Ribavirin + Pegylated interferon for 12 weeks | Olysio for 12 weeks + Ribavirin + Pegylated interferon for 24 to 28 weeks |
| Genotype 5 or 6 | Sovaldi + Ribavirin + Pegylated interferon for 12 weeks | Ribavirin + Pegylated interferon for 48 weeks |

**Table 2.** CBC

| Test | Normal range | Unit | 15-10-08 |
|---|---|---|---|
| WBC | 4-6 | *10.e 3/ul | 9.28 |
| RBC | 4-11 | *10.e 6/ul | 4.26 |
| HGB | 11.5-17.5 | g/dl | 10.2 |
| HCT | 36-54 | % | 33.5 |
| MCV | 76-96 | Fl | 78.6 |
| MCH | 27-33 | Pg | 23.9 |
| PLT | 150-400 | *10.e 3/ul | 300 |

**Table 3.** Liver function tests

| Test | Normal value | Unit | Result |
|---|---|---|---|
| Bilirubin total | 0.2-1.2 | Mg/dl | 0.3 |
| S.G.P.T(ALT) | 5-55 | U/L | 19 |
| S.G.O.T(AST) | 5-40 | U/L | 23 |
| Alkaline phosphate | 40-150 | U/L | 133 |
| Total protein | 6-8.5 | g/dl | 7.5 |
| Albumin | 3.5-5 | g/dl | 4.1 |
| Globulin | 1.8-3.4 | g/dl | 3.4 |