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Take Care: Guidelines for Patients with Chronic Hepatitis C

Kristina Hedin[1], MD, Ankica Babic,Ph.D.[2,3], Aril Frydén, MD, Ph.D.[1]
1 Department of Infectious Diseases, Faculty of Health Sciences, Linkoping University, Sweden
2 Medical Informatics, Department of Biomedical Engineering, Linkoping University, Sweden
3 Faculty of Electrical Engineering, University of Ljubljana, Slovenia

Abstract. Alcohol consumption has significant impact on the condition of the liver, by itself, and even more in conjunction with other liver diseases such as chronic hepatitis C. Drinking habits might be delicate issues to address and could harm otherwise satisfying communication. Therefore, we intended to outline guidelines for advising hepatitis C patients concerning alcohol consumption.
Analysis of a relatively limited knowledge base revealed the complexity of the disease rather than statistically significant findings regarding consumption. Thus, we instead chose to suggest a set of patient educational guidelines, which could be implemented on the Internet, hypothesizing that a better informed patient will be more able to comply with restrictions concerning alcohol consumption. A brief ad hoc evaluation pointed out Internet as a favourable media to present the information. We also suggest a tentative algorithm for further development of clinical decision support systems addressing monitoring of chronic hepatitis C patients.

1. Introduction

Understanding of Hepatitis C, outlining its treatment regimes and predicting immediate, as well as long term patient outcomes has been a distinguished subject of clinical studies over the last decade. In 1989, the genome of the hepatitis C virus (HCV) was completely outlined by molecular biology techniques. This virus was shown to be responsible for approximately 90 % of cases previously diagnosed as "non-A non-B hepatitis". The virus is mainly spread by the parenteral route, i.e. blood to blood contact, with blood transfusion and intravenous drug use (IVDU) as the main routes of transmission. The infection is most often asymptomatic for many years, but can still lead to significant damage of the liver and a considerable risk of liver cirrhosis and primary liver cancer [1]. HCV infection is now one of the leading causes of liver transplantation in the western world [2]. The virus has several subtypes with differing prognoses and different geographical distribution [3,4]. Given the slow and insidious nature of the disease, scientific publications, among other things, discuss ways of identifying and relating important findings, in order to disclose if the virus is likely to lead to a more or less severe liver inflammation in the individual patient. At present, antiviral treatment with alpha-interferon alone or in combination with ribavirine can lead to resolution of the disease in 10-70 % of treated patients, depending e.g. on virus subtype and viral load [5,6]. Treatment can be demanding, with side effects as fatigue and depression, and is also rather costly. It is thus important to consider the advantages and disadvantages of treatment in relation to stage and grade of the liver disease, and in relation to the patients somatic and psychological status which might influence compliance. The treatment should be evaluated with respect to established diagnosis, expected outcome and the patient's ability of self-care and maintaining a healthy life style. Negative consequences of the latter,

such as excessive use of alcohol might hamper the patients' recovery [7,8]. It is, therefore, important to make patients aware of risk they might be taking.

The main goal was to get insights into patterns of laboratory and histological findings and, within them, check if alcohol was significantly connected to the disease-related changes. The next step was to outline a graphical presentation of algorithms based on the results of knowledge discovery. Their purpose is to explain the complexity of the liver disease with respect to causes, clinical development, and factors that influence outcome of HCV infection. Such presentation of disease scenarios is not by itself normative, but it does reflect the patient material and gives a patient points of identification. Having an established diagnosis, and being aware of their own alcohol intake, patients would be able to estimate a predisposition for an eventual long-term outcome. Paradigm "Take Care" suggests physicians' recommendations and gives an impulse to patients to take control over their situation.

Several sites dealing with viral hepatitis already exist on the Internet, such as "Hepnet" and the American Liver Foundation Homepage [9,10]. These are very large information systems, addressing both physicians and patients, and they are most often supported by large institutions such as universities or pharmaceutical companies. To our knowledge, no such site exists in Swedish. Since approximately 40.000 Swedes could be affected by HCV, one could assume a need for a local Internet based information system for those who are not fluent in English. "Take Care" would be an attempt to develop this kind of site in a more local setting. A strong interactive component in a software application aims at developing a more active understanding of the patient's position both with respect to the disease and its treatments. During a visit to an outpatient clinic, the patient might not be able to ask all questions, or digest all the information the physician provides. Time constraints and demands for an efficient cost-benefit patient management might force a patient to be more responsible for his or her own health giving them an active role in getting informed.

2. Material and methods

58 patients with chronic hepatitis C, who between 1989 and 1993 underwent liver biopsy at the Linkoping University hospital and Oskarshamn hospital, Sweden, were included in the study. The patients could be divided into several groups according to HCV subtypes: 1a (n=21), 1b (n=5), 2b (n=9) and 3a (n=23). This distribution of subtypes is similar to that in other Scandinavian materials [11]. The liver biopsies were evaluated according to the Knodell score, a score which grades different types of inflammation in the liver, and also stages the extent of liver fibrosis [12]. In addition, the amount of steatosis (fatty change) was evaluated, since this is a prominent feature of hepatitis C [12]. A large number of blood laboratory tests were performed on the day of biopsy. The results of the tests were analyzed in the search of relations between easily obtainable blood tests and findings in the liver biopsy. Furthermore, the patients were interviewed concerning alcohol consumption. They were divided into three groups; group 1: no or minimal consumption (n= 35), group 2: moderate (70-420 g of absolute alcohol/month, n=17), and group 3: higher consumption (> 420 g/month, n=6). The mean age of the population was 42 years, range 18-75. There were 39 men and 19 women in the study.

3. Results and discussion

In this preliminary study, we analyzed only a few findings associated with alcohol consumption and / or hepatitis C, i.e. presence of steatosis and periportal inflammation of the liver, liver enzymes in blood (AST and ALT) and HCV subtype.

Discriminant analysis according to virus subtype showed that the only significantly different factor was amount of periportal inflammation in the liver. Patient classification according to self-reported alcohol consumption was done using the above mentioned variables. The only significant finding was steatosis of the liver, which was more pronounced in alcohol consumption group 3. A potential problem with that finding was that a confounding factor might be the HCV which itself can induce liver steatosis [13]. HCV subtype 3a is associated with IVDU [11], but further testing in the patient group which reported highest alcohol consumption, showed no statistically valid connection between subtype of virus and heavy drinking. A confounding factor in this case could, however, be age, which was lower in the 3 a subgroup.

We thus conclude that the patient material and the amount of variables examined were not sufficient for constructing valid guidelines for professional monitoring of chronic hepatitis C patients. However, our findings elucidated the complexity of this disease in respect to interaction between e.g. viral factors, host factors and environmental factors (alcohol). It is possible that studies of a larger patient material and / or more groups of data could lead to the development of more statistically valid decision support systems, as we have shown in previous articles [14,15].

"Take care" is intended to address three different aspects of the information background. First, as illustrated in Figure 1, is a schematic representation of the natural course of the disease. It shows in sequential steps how the disease can be acquired, and what the possible outcomes are. It introduces a notion of potentially severe disease. By clicking on the circles one could get detailed explanations and updated statistical findings concerning e.g. which path of disease development is most likely in the general population. The end of the algorithm corresponds to the end stage of the disease, and could provide further information of risk factors for this development. It should be noted that only a small proportion of patients are at risk of finally reaching this stage.

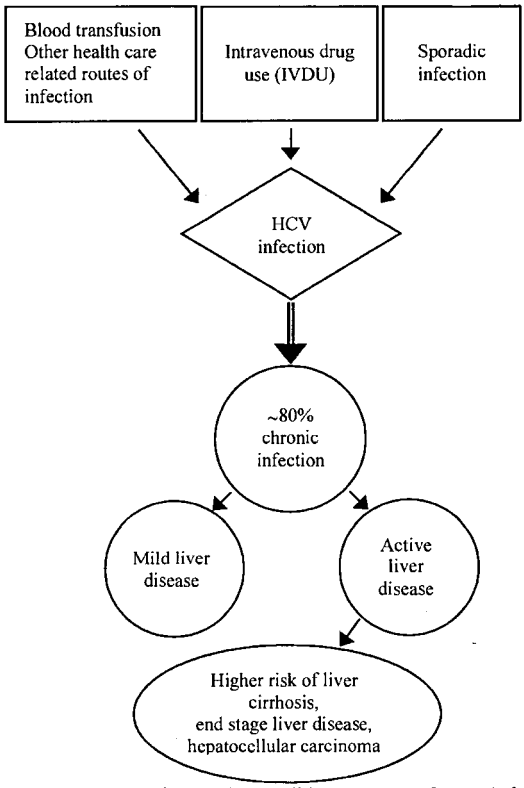

Figure 1 Schematic graph over the possible outcomes of HCV infection.

Secondly, we wanted to present factors that can influence the course of the disease both positively and negatively (Figure 2). The purpose of this is both to inform and inspire the patient to make possible changes in lifestyle, which with our present knowledge mainly concerns abstinence from alcohol and other liver toxic drugs. Furthermore we introduce the possibilities of treatment, which could be further explored by clicking on the circle. We also wanted to illustrate the complex nature of the disease, with multiple interacting factors that could modulate the disease process.

The ambition is to create several specialized algorithmic graphs of this basic one. In that way we would capture a complex interaction between all the factors, available treatments relating it to the outcome.

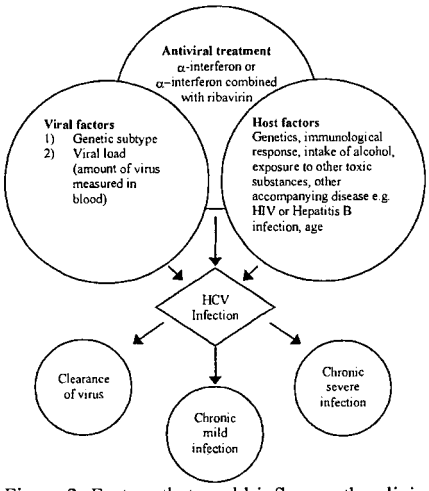

Figure 2. Factors that could influence the clinical course of the disease

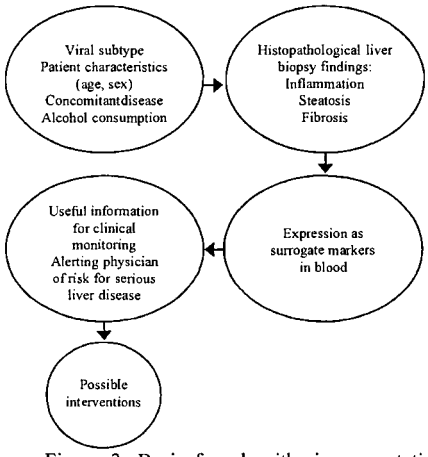

Figure 3. Basis for algorithmic presentation for development of professional guidelines.

At last, we also present an algorithm (Figure 3) which could illustrate how the physician can obtain and process data in order to make treatment and other management decisions.

This algorithm could in the future be further developed into a more comprehensive clinical decision support system. Clinical data could be a valuable source of precise knowledge needed to differentiate patients with respect to the disease severity, interventions and outcomes.

4. Conclusions

"Take Care" offers a fairly specialized knowledge, which is reflective of the clinical competence lying behind this work. However, we believe easily accessible instruments for patient information concerning chronic hepatitis C, could be a valuable complement to straightforward advice concerning e.g. alcohol abstinence. A better compliance to advice would be expected if the patient has a larger understanding of the nature of the disease.

In comparison with other systems on the Internet, our system is smaller and directed to a selected population. We followed the philosophy of Scott et al [16] to redirect information from general to more individually oriented patient viewpoints. Maintenance of the prototype system is not going to be normative, nor with a large knowledge base in the background. Instead, physicians who work with patients would be able to contribute their own empirical knowledge as well as updated information on ongoing research. Software routines for updating the systems are prioritized as well as personal responsibilities for keeping the system up to date. Knowledge based decision support with a basis in the presented algorithms is feasible, but is likely to demand significant efforts.

The concern of the future is evaluation, where the main question to the users (patients) would be whether this system makes it easier to deal with the task of living with a chronic disease, and to "take care" of themselves.

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