Epidemiology of viral hepatitis type C and prevention strategies

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Key words

HCV • Epidemiology • Prevention

Summary

Hepatitis type C is a major worldwide health problem. In Italy injecting drug use, surgery/hospitalisation, dental treatments are the most common risk factors among patients with hepatitis C. HCV is efficiently transmitted parenterally but the risk of HCV transmission by sexual or by vertical/perinatal route is low. As a consequence of the implementation of anti-HCV screening and the introduction of increasing restrictions on donor eligibility, the frequency of transfusion-associated hepatitis C has significantly declined during the past recent years. A candidate vaccine to protect against HCV is under development.

Hepatitis type C is a major worldwide public health problem.

Hepatitis C virus (HCV) infection can cause both acute and chronic liver diseases and is also associated with several extrahepatic manifestations, including cryoglobulinemia, vasculitis, glomerulonephritis and peripheral neurophaty. A strong association has also been found between chronic hepatitis C or HCV-related cirrhosis and the development of primary hepatocellular carcinoma.

The global prevalence of chronic hepatitis C is estimated to average 3% (ranging from 0.1 to 5% in different countries). Thus there are at least 150 million chronic HCV carriers throughout the world, of whom an estimated 4 million are in the USA and 5 million in Western Europe. The prevalence seems to be higher in Eastern Europe than in Western Europe. According to the data reported at the EASL (European Association for the Study of the Liver) International Consensus Conference on Hepatitis C, in industrialised countries HCV accounts for 20% of cases of acute hepatitis, 70% of cases of chronic hepatitis, 40% of cases of end-stage cirrhosis, 60% of cases of hepatocellular carcinoma and 30% of liver transplants [1].

The incidence of acute hepatitis C is currently estimated to be 1-3 cases/100,000 persons annually. However, since HCV infection goes often asymptomatic, the number of infected individuals per year is estimated to be at least 10 fold higher than reported. Although the burden of hepatitis C is still high, the incidence rate has drammatically declined in recent years. The incidence is mainly declined for two reasons: 1) transmission by blood and blood products has been reduced to near zero as a consequence of the introduction of selective donor criteria and testing for anti-HCV; 2) universal precautions have markedly reduced viral transmission in medical settings. Intravenous drug use remains the main mode of transmission; but, even here, the rate of transmission is diminishing due to a heightened awareness of the risk of needle sharing and the availability, in some countries, of needle-exchange program [1 2].

In the last two decades the incidence of acute hepatitis has declined progressively in Italy in response to improvements in the general standards of hygiene and sanitation, and to the introduction of several measures as the screening for safe blood and blood products, use of disposable medical equipment and of appropriate disinfection and sterilisation systems in medical setting. The actual incidence rate of acute nonA-nonB hepatitis (majority hepatitis type C) in our country is 1 case per 100,000 residents [3]. The acute disease is more frequent among young persons (age 15-24 years), in those living in southern Italy or in the islands, and in male subjects than in females.

Modes of transmission

Hepatitis C virus is efficiently transmitted parenterally, as is shown by the high rates of anti-HCV positivity among blood and blood product recipients, intravenous drug users, hemodialysis patients and health care workers with occupational exposure to blood. However, in a significant portion (around 30-40%) of patients with acute and chronic hepatitis C the source of infection remains unidentified [4 5].

Several studies have been carried out in order to evaluate the potential risk of HCV transmission by the vertical/perinatal route, or the horizontal route (i.e. person to person contact, either through sexual transmission or daily household contact). Published data on these issues are widely divergent, providing evidence both for and against such modes of viral transmission [4-7].

As concern the sexual transmission, several studies have shown that the prevalence of anti-HCV antibodies is significantly higher in homosexuals and heterosexuals with multiple partners, among prostitutes and their clients, and among patients with sexually transmitted diseases (STD) than in controls.

However, in interpreting these data possible bias cannot be excluded since most published studies have included intravenous drug users in their study population, and

have used blood donors as controls (a highly selected population not representative of the general population). Other studies carried out on sexual partners of HCV infected haemophiliacs and transfusion recipients have shown little or no transmission of HCV. There is nevertheless general agreement that the risk of acquiring HCV infection through sexual contact becomes much higher when the carrier partner is co-infected with HIV. In this setting it is likely that the immunodepression secondary to HIV infection favours HCV transmission to the partner by increasing the viral load in the index case.
HCV vertical transmission is uncommon: the prevalence of transmission from mother to child is less than 6% [7]. The risk of transmission appears to be greater in women with high levels of HCV viremia or HIV co-infection. The mode of delivery (caesarean section/vaginal) does not appear to influence the rate of HCV transmission from mother to child. There is no association between breast-feeding and transmission of HCV infection from mother to child.
Nosocomial transmission of HCV, like that of other blood-borne pathogens, is well documented. In developed countries this is not a major source of HCV infection, except among hematologic patients under immunosoppressive therapy and patients on chronic hemodialysis where 30-70% are infected [2]. However, nosocomial transmission of HCV appears to be a major source of infection in many developing countries due to possible transfusions of blood from unselected donors and the use of contaminated or unproprerly sterilised surgical and medical equipments and the re-use of syringes and needles.

Prevention measures

In recent decades the frequency of transfusion-associated hepatitis C has progressively dropped as a consequence of the introduction of increasing restrictions on donor eligibility and of specific (anti-HCV) assays to detect HCV carriers. Donors screening and the virucidal treatment of blood products such as the factor VIII and IX used to treat haemophiliacs, have proved effective measures to minimise the residual risk of infection through the transfusion of blood or its derivates.
In the health care settings, the safety procedures adopted to avoid infection with blood-borne viruses like HIV and HBV, are also effective in preventing HCV transmission [8].
Since parenteral drug injection is one of the major risk factors in acquiring HCV infection, extensive education campaigns aimed at persuading young persons to avoid drugs or at least to avoid syringes and needles sharing are needed.
The use of condoms in stable monogamous relationships is not strictly recommended but is strongly encouraged in patients with multiple partners [1].
A study carried out in Italy, showed the efficacy of prophylaxis with intramuscolar immune serum globulin in preventing sexual transmission of HCV [9].
The high degree of genetic heterogeneity of the envelope proteins of HCV represents a serious hurdle in the development of an effective vaccine. However, a candidate vaccine which employs the full-length gpE1/gpE2 has already been produced and injected in chimpanzees, with promising results in terms of safety and efficacy [10].

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