

# Transmission routes of hepatitis C virus infection

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The definitive identification of the hepatitis C genome in 1989 resulted in confirmation that this virus is a worldwide health problem.<sup>(1)</sup> The hepatitis C virus (HCV) is one of the most common causes of chronic liver disease and is one of the principal indications for liver transplantation. It is estimated that about four million Americans harbor hepatitis C antibodies. The virus is present in the blood of three million Americans and is most prevalent in people between 40 and 60 years of age.<sup>1,2</sup>

Hepatitis A, B, and C viruses are members of the *Flaviviridae*. The virus consists of a single RNA chain surrounded by an envelope of host membrane into which glycoproteins have been inserted. Six genotypes of HCV have been identified phylogenetically.<sup>3</sup>

## Risk factors

The HCV is transmitted by parenteral routes, of which blood transfusion and intravenous administration of drugs are the most frequent. Before 1992, when screening of blood donors for hepatitis was introduced, transfusions with blood or products derived from blood increased the risk of transmission of the HCV.<sup>4-6</sup> Other potential routes by which the HCV may be transmitted include tattooing, the use of intranasal cocaine, body piercing, and accidental injuries with infected needles. Tattoos require special attention because the risk of HCV infection seems to be dependent on the size, number, and site of the tattoos.<sup>7,8</sup>

Common risk factors for hepatitis C are:

- intravenous drug use,
- blood transfusions conducted before 1992,
- accidental puncture with infected needles,
- perinatal transmission,
- hemophilia,
- hemodialysis, and
- transplants conducted before 1992.

Uncommon risk factors for hepatitis C are:

- intranasal cocaine use,
- body piercing,
- tattoos,
- shared shaving equipment,
- sexual activity,
- erosion of boxers' knuckles, and
- transmission from health workers to patients.

Transmission of hepatitis C from health workers to patients in their care has been reported but is rare.<sup>9</sup> It is more likely that hepatitis will be transmitted from patients to health workers during invasive procedures such as colonoscopy or cardiothoracic surgery.<sup>10,14</sup> The virus may be transmitted to health workers by accidental puncture of the skin; the rate of transmission of hepatitis C by this route is lower than that of type B hepatitis but higher than that of HIV. Although immunity against the hepatitis B virus can be temporarily boosted by administration of gamma globulin, all that can be done when the potential exists for HCV transmission as a result of accidental puncture is to observe whether the disease develops. The viral load in the infected person is indicative of the risk of transmission to the uninfected person. Transmission is improbable if the source patient has no detectable hepatitis C RNA, but if the viral load of the source patient cannot be established or if the test is positive for HCV RNA, the person who incurred the injury should be examined for HCV and treated if positive.<sup>8</sup>

Sexual transmission of hepatitis C occurs in less than 5% of cases,<sup>1</sup> but the transmission rate is increased in instances of multiple sexual partners, sex with prostitutes, anal sex, traumatic sex, sex during menstruation, or sex without suitable vaginal lubrication. In married couples, the risk of transmission increases with time,<sup>10</sup> but the effect of common shaving blades has not been determined.<sup>11</sup>

As the HCV is rarely present in semen or vaginal fluid, the risk of sexual transmission of the HCV is very small. The risk of infection for a person who has a sexual relationship without protection for 20 years with person infected by the HCV is 2.5%. Therefore, as a rule, barrier methods are not recommended for monogamous couples. According to some studies, the risk of sexual transmis-

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sion is greater when it occurs from a man to a woman than when it occurs from a woman to a man. The transmission risk associated with anal sex is greater because it is more traumatic. The presence of genital ulcers may increase the risk of HCV transmission. Oral sex does not constitute a risk except when mouth ulcers or gingival bleeding is present.<sup>12, 13</sup>

Whether it is necessary for partners in a sexual relationship with hepatitis C patients to use prophylactics condoms is controversial. European authors consider condoms less important than American authors do. The latter support the use of condoms because of the risk of transmission of other sexually transmitted diseases when a person has multiple partners. However, the efficacy of latex condoms for preventing HCV infection is unknown.<sup>13</sup>

Perinatal transmission of hepatitis occurs in 3% to 5% of infants born to mothers infected with HCV. The risk of perinatal transmission is greater in mothers with high viral loads, anti-HCV IgM at the time of delivery, or HIV.<sup>14</sup> study found that the risk of perinatal transmission is less when delivery is via caesarian section than when delivery is via the vaginal channel. Infants born to mothers infected with the HCV may acquire anti-HCV antibodies through transplacental transfer. Such antibodies persist during the first year of life and then disappear. Therefore, detection of HCV RNA in the serum of newborns is necessary to make a positive diagnosis of HCV. As some studies have shown that infants who were breast fed by HCV-infected mothers did not become infected, nursing should not be prevented.<sup>15,16</sup>

### Consensus panel recommendations

What was the main route of transmission of prevailing cases of hepatitis C in Latin America?

Studies show that HCV transmission in prevailing cases in Latin America was mainly through transfusion of blood or products derived from blood. However, the frequency of infections acquired via this route should decrease as laws enforcing mandatory screening of blood bank samples for HCV are promulgated. Transmission via needles used for intravenous drug administration, currently considered the second most important transmission route, will become the main route of transmission of HCV in the future.

### The quality of evidence for this recommendation was given a rating of 2

Should we recommend screening tests be done for patients with a history of risk factors such as tattooing?

The panel recommends HCV screening tests for any individual with a history of tattoos, body piercing, or intravenous drug use. The quality of evidence for this recommendation was given a rating of 2.

Screening tests are not recommended for people with a history of odontological procedures, major surgery, or in-

trafamily cohabitation with patients that are anti-HCV positive. The quality of evidence for this recommendation was given a rating of 3.

Should we recommend the routine use of prophylactics for couples with long-term relationships?

The use of prophylactics is recommended, although the incidence of sexual transmission of HCV is low.

### The quality of evidence for this recommendation was given a rating of 2

Should we recommend that families of HCV-positive people implement universal preventive measures?

Full information must be provided to patients and their families about universal measures of prevention of HCV infection such as not sharing toothbrushes, nail clippers, scissors, shaving blades or other punching-cutting items and nail-care products.

### The quality of evidence for this recommendation was given a rating of 2

Should we carry out screening tests on newborns from mothers who are chronically infected by HCV?

It is recommended that qualitative measurement of HCV RNA be conducted at 12 months of age for infants born to mothers who are positive for anti-HCV antibodies.

### The quality of evidence for this recommendation was given a rating of 2

Should nursing be prevented in anti-HCV-positive mothers?

Nursing in anti-HCV-positive mothers should not be prevented, except in cases of diseases or factors that result in mammary tissue discontinuity.

### The quality of evidence for this recommendation was given a rating of 2

Should children of HCV-positive mothers be delivered by the vaginal route or by caesarian section?

The consensus panel made no recommendation on this issue. However, the delivery route may be irrelevant.

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