Sexual transmission of hepatitis viruses

David W Smith

Division of Microbiology and Infectious Diseases
PathWest Laboratory Medicine WA
Hospital Avenue
Nedlands WA 6009
Tel: (08) 9346 3122
Fax: (08) 9346 3960
Email:
david.smith@health.wa.gov.au

Hepatitis viruses are often not perceived as sexually transmitted diseases, but sex is an extremely important mode of transmission worldwide for hepatitis B, and it plays a significant role for hepatitis C, hepatitis A and hepatitis D [1].

Sexual transmission of hepatitis B is well established. Chronic carriers of hepatitis B are the primary reservoir for hepatitis B within the community. Acutely infected individuals who recover have viremia only for a few weeks, while carriers can remain infectious for decades. Hepatitis B virus DNA levels in the blood of carriers may be over 10^9 copies per mL and have been found in semen at levels up to 10^6 copies per mL [2]. Therefore, it is not surprising that sexual contact has been shown to be an important source of hepatitis B among high risk groups in a number of countries including Japan, Thailand, the USA, Uruguay and Brazil [3]. In Russia, sexually active teenagers were three times more likely to be hepatitis B infected than were their sexually inactive peers. This illustrates the concerns about the potential role of sexual transmission in spreading infection among adolescents and young adults when they become sexually active. US data suggest that about half of acute hepatitis B in young adults is sexually acquired, while sexual transmission is an important factor in the maintenance of endemic infection in many parts of the world. Considerable efforts have been undertaken to control this problem. Safer sex practices, including use of condoms are important in prevention of all sexually transmitted infections including hepatitis B. A vaccine is also available, with a protective efficacy of better than 90% in immunocompetent adults, and is recommended for uninfected sexual contacts of people with acute or chronic hepatitis B. Several years ago, Australia embarked on a campaign to vaccinate adolescents against hepatitis B in order to avoid sexual acquisition. That was subsequently replaced with a universal childhood vaccination regimen [4].

Hepatitis C was identified in the late 1980s and it soon became clear that the vast majority of infections were acquired from contact with blood or blood products, particularly injecting drug use and, to a lesser extent, receiving blood or blood products. As contact with blood may occur during sexual contact, there is an obvious potential for transmission. However, in the absence of blood contact, there has been substantial controversy about the potential sexual transmission of hepatitis C. Data on the presence of hepatitis C in genital tract secretions have been variable, though recent studies have detected HCV RNA in the semen in about one third of infected men [2, 5]. Data such as this certainly indicate the possibility of genuine sexual transmission.

Epidemiological studies have implicated sexual contact as the most likely mode of transmission in 18% of cases in the US [6]. In high risk individuals, the probability of being hepatitis C positive is linked to the types of behaviour typically associated with sexually transmitted infections, ie number of sexual partners, failure to use barrier contraceptives, sexual activity involving trauma, receptive anal intercourse or HIV coinfection [7]. Also, studies of spouses of hepatitis C positive individuals in Europe and Taiwan found that the risk of hepatitis C increased the longer they were married. However, other studies have not shown any evidence of an increased risk for spouses compared with other relatives, while one Japanese study found that even when spouses were both infected with hepatitis C, the viruses of the partners were different in about half the couples [8]. This suggested that independent sources of infection contributed to coinfection of partners. For discordant monogamous couples, the incidence in the uninfected partner has been estimated at two transmissions per 1000 years of sexual contact [9]. Others have estimated heterosexual transmission rates of 0.5% – 2% per annum, with higher rates where the infected partner is also HIV positive [1].

Overall the data supports sexual transmission of hepatitis C, but it is uncommon. This can be further reduced by the use of barrier contraceptives. Therefore, the risk to any individual from sexual transmission of hepatitis C is extremely low, presuming couples avoid sexual activities that may involve contact with blood. Currently there is no standard recommendation for HCV infected individuals in long-term monogamous relationships to modify their sexual practices other than to avoid sex if they have genital ulceration, during menstruation and to avoid sex practises that produce trauma.

Hepatitis A is quite a different virus. Unlike hepatitis B and C, it is an enteric virus and transmission occurs almost entirely via faecal excretion and subsequent ingestion. This can occur either via close contact, such as occurs within families or between young children, or via contaminated food or water. Excretion of the virus begins about two weeks before the onset of hepatitis and jaundice, then drops off rapidly. Some individuals never develop clinical hepatitis, and their infectivity may go unrecognised. Transmission by intravenous drug use or blood transfusion can occur but is rare. Sexual or household contact was identified as the likely source of transmission in 13% of cases of hepatitis A in the US in 2002-2004 [10]. In the early 1990s a rapid increase in hepatitis A was noted among men who have sex with men (MSM) in the USA, Canada and Australia. While some studies linked this to specific sexual practices, particularly oral-anal contact, that has not been a consistent finding [10]. A highly effective inactivated vaccine is available for hepatitis A and is recommended for MSM [4].

Hepatitis D virus is blood borne and potentially may be transmitted sexually, though this appears to be rare with a greater risk among MSM [1]. However, it requires coinfection with hepatitis B, so that prevention of hepatitis B will also prevent hepatitis D. Hepatitis E is enterically transmitted and there is no evidence of sexual transmission. It is known that there are other 'hepatitis' viruses but they have a relatively minor role in hepatitis in the community, are as yet not clearly identified, and the significance of sexual transmission is unknown. Other viruses occasionally cause hepatitis as part of their clinical manifestations. *Epstein-Barr virus* and *Cytomegalovirus* are able to do this and may be sexually transmitted, but neither is a significant cause of sexually transmitted hepatitis in the community.

Sexual transmission of hepatitis B is a significant health issue internationally, while for hepatitis A, C and D the sexual transmission largely occurs within more restricted high risk groups. Education and adherence to safer sex practices and the use of vaccines for high risk individuals can significantly reduce this problem.

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MICRO-FACT

Efforts to reduce the longer-term consequences of virally transmitted STDs such as HPV and hepatitis B are significantly enhanced by availability of effective and safe vaccines.

	Importance of sexual transmission	Mode of transmission	Measures to prevent infection
Hepatitis A	Minor in general population. Significant in MSM.	Contact and ingestion of virus excreted from the gastrointestinal tract	Safer sex practices, vaccination of high risk groups
Hepatitis B	High	Within semen and genital tract secretions. Contact with blood through sexual activity.	Safer sex practices, vaccination of high risk groups.
Hepatitis C	Minor in stable monogamous relationships. Moderate in high hepatitis C prevalence groups not in stable relationships.	As for hepatitis B.	Safer sex practices.
Hepatitis D	Minor. Requires coinfection with hepatitis B	As for hepatitis B.	As for hepatitis B