

Transmission of hepatitis C virus but not human immunodeficiency virus type 1 following sharing of cleaned injecting equipment

Neil J Bodsworth, Mark Robertson, John Kaldor

Sydney Sexual Health Centre, Sydney Hospital
N J Bodsworth

Taylor Square Private Clinic, Darlinghurst, NSW
M Robertson

National Centre in HIV Epidemiology and Clinical Research, University of New South Wales
J Kaldor

Address for correspondence: Dr N J Bodsworth, Sydney Sexual Health Centre, Sydney Hospital, GPO Box 1614, Sydney NSW 2001, Australia.

Accepted for publication 19 January 1994

In most industrialised countries sharing of drug injecting equipment is a major risk factor for both human immunodeficiency virus type 1 (HIV-1) and hepatitis C virus (HCV) infections. Public health authorities have consequently adopted various strategies including distribution of clean injecting equipment; programmes to minimise drug use; and dissemination of advice on disinfection procedures. We report here a case of HCV but not HIV-1 transmission following sharing of cleaned injecting equipment.

In March 1993, a 21 year old homosexual man presented with a three day illness comprising fever, headache, malaise and painful eyes. Examination was remarkable only for fever (38.8°C). Liver enzymes were elevated: ALT 316 U/l (normal range 2-37); AST 103 U/l (2-37); GGT 314 U/l (0-60); bilirubin 18 µmol/l (6-26). Anti-HCV was positive using second generation enzyme immunoassay (EIA; Abbott). Anti-HAV IgG and IgM (Abbott) were negative. Anti-HCV was negative in November 1992 and anti-HIV-1 antibodies were not detected in late October 1992 (fig).

He had had a regular sexual partner for the previous eight months with whom he practised deep kissing and mutual oral sex (fig). Insertive and receptive anal intercourse occurred about five times but always using

condoms. There were no other sexual contacts during this period. They had both injected morphine on about a daily basis for the previous seven months, and heroin or amphetamines every month or so. The index case had not injected drugs previously and shared injecting equipment only with his sexual partner. Each man generally used a new needle and syringe each time. Occasionally the same syringe barrel was shared following cleaning but new needles were always used. Barrel cleaning was with full strength household bleach (5.25% sodium hypochlorite) according to the recommended "2 plus 2 plus 2" schedule¹—two flushes with water followed by two flushes with bleach then two further flushes with water. On one occasion each, Pine O'Clean (a quaternary ammonium disinfectant, 1.5% w/w) and neat ethanol were used instead of bleach.

The partner first tested positive for anti-HIV-1 in May 1992, 13 weeks before sexual contact with the index patient and for anti-HCV in November 1992. He had never had a negative test for anti-HCV and had injected drugs for the previous three years.

The acute illness resolved within a week and serum transaminases were normal within five weeks. Eight months after the onset of the illness, EIA tests for HIV-antibodies and p24 antigen remained negative and there were no HIV-1 specific bands on Western Blot.

There appears little doubt that the index case acquired HCV infection from his partner. Sexual transmission is a possibility but generally this appears to be rare, and condoms were always used for anal intercourse. Far more likely is transmission through shared injecting equipment. That HIV was not also transmitted could be due to either a differential susceptibility of the two viruses to bleach disinfection or it may reflect a relatively greater efficiency of HCV transmission through shared injecting equipment.

Although bleach has previously been recommended for the disinfection of drug injecting paraphernalia by employing the so called "2 × 2 × 2" method,¹ this was based on studies which demonstrated that household bleach inactivates HIV *in vitro*.^{2,3} More recent work has shown bleach to be less effective against HIV in association with whole blood.⁴ These recommendations have also been questioned on the grounds that HIV might be exposed for insufficient time to be denatured.⁵ Although there are no published case reports of bleach disinfection failing to prevent HIV-1

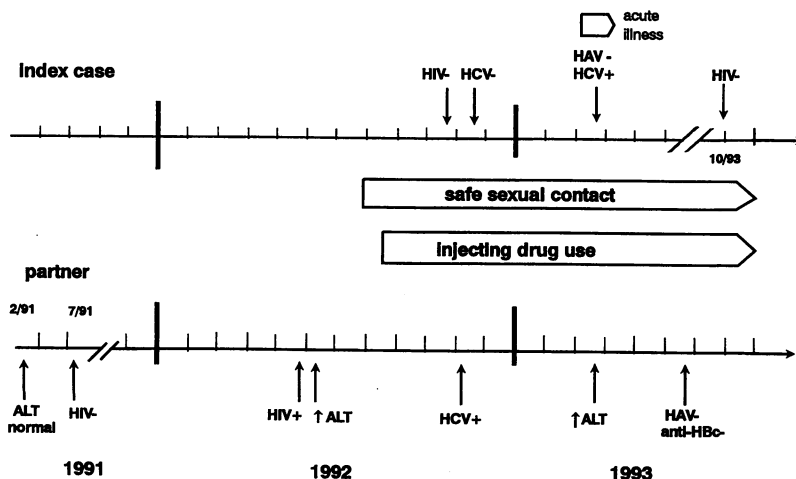


Figure HCV transmission: results of diagnostic tests, risk behaviours and symptoms of illness in index case and partner. ALT = alanine transaminase; HCV = antibody to hepatitis C virus (second generation enzyme immunoassay, Abbott); HIV = antibody to human immunodeficiency virus type 1; HAV = total antibody to hepatitis A virus; anti-HBc = antibody to hepatitis B core antigen. Fine vertical bars represent one month intervals.

transmission, one case control study found no differences in HIV seroconversion rates between injecting drug users who reported using bleach disinfection for none, some, or all of the time.⁶

This case provides further evidence that HCV is more readily transmitted by shared injecting equipment than is HIV and may also be more resistant to bleach disinfection. Currently recommended disinfection techniques for HIV can no longer be relied upon for the prevention of transmission of HCV. In vitro studies of HCV disinfection from contaminated injecting equipment are required.

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