COMMUNITY ACQUIRED NEEDLESTICK INJURIES

Community acquired needlestick injuries (CANSIs) have not been well described, and the evidence base on which to recommend management strategies is poor.1 CANSIs cover a wide spectrum from criminal assault with blood filled syringes to children playing with discarded syringes in public parks.1

Although community needlestick injuries are a common source of anxiety for the public and for the health care providers who treat them, transmission of BBVs in a non-clinical setting is exceedingly rare.2 CANSI due to deliberate assault with a blood filled syringe represents a higher risk than average.1

In contrast to the situation with needlestick injuries in health care workers, the source of blood in discarded needles is usually unknown, injury does not occur immediately after needle use, the needle rarely contains fresh blood, any virus present has been exposed to drying and environmental temperatures, and injuries are usually superficial.3

The risk of BBV transmission through a needlestick injury from a discarded needle/syringe is likely to depend on several factors. These factors include the prevalence of BBVs among PWID in the particular setting, the type of injury sustained, the viability of the particular virus outside the body, how recently the needle/syringe has been used, the level of immunity (in the case of HBV) and the availability and use of PEP (in the case of HBV and HIV).4

Reported cases of BBV transmission following a CANSI

There are currently few reported incidents of BBV infections thought to be secondary to a CANSI. A case of presumed acute HBV infection was reported in a 4 year old boy in Spain who did not receive post-exposure HBV vaccine or HBIG.5 In 2011, a case of acute HBV infection occurring 2 months after a CANSI was reported from Australia. The patient had a history of incomplete vaccination and HBV vaccine booster was delayed. He did not receive HBIG.2 Three cases of HCV seroconversion in adults following needlestick injuries in the community have been reported.6, 7 No HIV infections have been reported after a CANSI.8

Case series

In a study in an emergency medicine department in Sydney, 124 cases of CANSI were identified over a 6 year period, of which 120 were described. The median age was 26 years. There was a marked male predominance. Injuries were work-related in 36% of cases, predominantly police officers and cleaners. 68% of cases were as a result of exposure to discarded syringes. The source of the blood in the syringe was identifiable in only 12% cases. 54% of patients received HBV PEP and 8% received HIV PEP. At 6 months post-injury there were no HBV, HCV or HIV seroconversions in the 10 patients for whom there was follow-up serology.1

A large study in Montreal of 274 paediatric patients presenting with CANSI between 1988 and 2006 found no seroconversions.8 Of patients who were not known to be immune to HBV, 82.2% received HBIG and 92.6% received HBV vaccine. HIV chemoprophylaxis was given to 39% of patients who presented after 1997. The most common site of injury was the hand. Most of the injuries were superficial and blood was rarely visible on the needle or syringe.8

Several other studies reported the outcome of CANSIs in children presenting to emergency departments in Edinburgh, Dublin, Melbourne and Birmingham. No cases of seroconversion for BBVs were detected. However, compliance with follow-up was generally poor.9, 10, 11, 12

A review of the literature up until September 2007 by the Canadian Paediatric Society yielded 12 case series from areas of high prevalence of bloodborne viruses. These involved a total of 483 children with follow-up for HIV, 452 for HBV and 265 for HCV. There were no infections. The majority of children received HBV prophylaxis, if it was indicated. 130 children received antiretroviral prophylaxis.9
Viability of BBVs in the environment
CANSIs are likely to carry a considerably smaller risk of BBV transmission than injuries in the occupational setting as needles found in the community have been exposed to environmental temperatures and drying for an indeterminate period of time.8

Environmental HBV transmission is well documented and relates to its high concentration in blood and its ability to maintain infectivity on environmental surfaces.4 HBV has been demonstrated to survive in dried blood at room temperature on environmental surfaces for at least 1 week.1 HBV has been detected in discarded needles.3

HCV is thought to be a fragile virus which would be unlikely to survive in the environment, but there are little data at this time.3 Support for the potential for environmental HCV transmission comes from studies that demonstrate high levels of HCV transmission in healthcare settings – particularly renal dialysis units and wards with immunocompromised patients.4

HIV is a relatively fragile virus and is susceptible to drying. However, survival of HIV for up to 42 days in syringes inoculated with the virus has been demonstrated, with duration of survival dependent on ambient temperature. One study found no traces of HIV proviral DNA in syringes discarded by intravenous drug users, while another study found HIV DNA in visibly contaminated needles and syringes from shooting galleries.3 However, the presence of viral DNA is not a direct demonstration of viable virus.

Risk of BBV transmission
The risk of transmission of BBVs following CANSIs is difficult to estimate. HBV represents the highest risk. The likelihood of transmission of HCV or HIV is very remote.

The risk of BBV transmission following needlestick injuries in the occupational setting has been estimated and may be of value in estimating the risk in CANSIs:

The risk of acquiring HBV from an occupational needlestick injury when the source is hepatitis B surface antigen (HBsAg) positive ranges from 2% to 40%, depending on the source’s level of viremia.3

The average incidence of anti-HCV seroconversion after accidental percutaneous exposure from a HCV positive source is 1.8%.1

The risk of acquisition of HIV from a hollow-bore needle with blood from a known HIV seropositive source is between 0.2% and 0.5%, based on prospective studies of occupational needlestick injuries. The risk is increased with higher viral inoculum, which is related to the amount of blood introduced and the concentration of virus in that blood. The size of the needle, the depth of penetration and whether blood was injected are also important considerations. In most reported instances involving transmission of HIV, the needlestick injury occurred within seconds or minutes after the needle was withdrawn from the source patient.3

Management of CANSI (see appendix 3, algorithm for needlestick exposure)
Risk assessment
Although the actual risk of infection from such an injury is very low, the perception of risk by patients results in much anxiety. Evaluation and counselling are needed.

Individualised risk assessment is essential for every case of CANSI as the source is rarely identified. However, if the source can be identified, then all attempts should be made to assess their risk factors and to test them for BBVs (see section 3.3 Investigation of source).

Post-exposure prophylaxis
HBV: HBV vaccine with an accelerated schedule should be offered to non- and partially-immune recipients. HBIG may occasionally be indicated (see HBV PEP appendix 8).

HCV: There is no effective post-exposure prophylaxis for HCV. However, treatment of early infection has been shown to be effective. Baseline and follow-up testing at 6 weeks and 3 months for HCV
would therefore enable early therapeutic intervention following HCV transmission4 (see appendix 14 Treatment of acute hepatitis C).

**HIV:** HIV PEP remains an unresolved issue. No studies have directly measured the effectiveness of PEP in decreasing the risk of HIV transmission in non-occupational settings.12 The risk of HIV transmission, and risks and benefits of antiretroviral prophylaxis should be assessed on a case-by-case basis, and guided by expert opinion.1 Antiretroviral prophylaxis should be recommended only in cases of high-risk.3, 6, 12 (See appendix 7, HIV PEP)

The factors associated with increased risk are:
- the source is considered likely to have HIV
- the injury was deep, penetrating
- the needle was large-bore, hollow lumen
- the incident involved a needle with visible blood (particularly fresh blood)
- blood may have been injected.

**BBV testing and follow-up**
Follow-up after any significant needlestick injury is essential. The clinician dealing with the initial incident should ensure that the patient understands the importance of follow-up, and that appropriate arrangements are made. Patients sometimes assume that if blood tests that are performed at the time of injury are negative, then there is no possibility of infection and no need for further testing.3 If a significant exposure has occurred, testing the recipient for BBVs should be carried out at baseline, 6 weeks and 3 months (see appendix 9 Testing of recipient).

**Testing of needles and syringes**
Testing needles and syringes for viruses is not indicated. Results are likely to be negative, but a negative result does not rule out the possibility of infection.3

**References**