Needlestick injury in clothing industry workers and the risks of blood-borne infection

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This paper identifies the hazard of a hollow needle device used extensively in the clothing industry and assesses the risk of transmission for HIV, Hepatitis B and Hepatitis C. A substantial risk of transmission is suggested and measures have been advised for its control. Occupational Health Physicians are advised to be aware of hollow needles in other industrial processes and where risks of cross-infection exist, the same safety considerations should be applied as in clinical medicine and veterinary work to avoid needlestick injuries. Needle sharing must be avoided.

Key words: Hepatitis B; HIV; Needlestick.

INTRODUCTION

Needlestick injury in the medical, dental, nursing and veterinary professions is a well-recognized hazard with known risks for blood-borne viral and bacterial infections. However, hollow needles are also used in industrial applications and when these needles are shared between workers, the risk of accidental transmission of blood-borne diseases needs to be recognized, assessed and controlled.

This paper focuses on a hollow needle device, as illustrated in Figure 1, used in the clothing industry for attaching price tags to garments by nylon monofilament ties.

A number of instruments are available for attaching nylon tags to woven fabric and are used principally in the retail clothing trade. The distribution of such tagging procedures is world-wide and there are millions of such tags in use. The devices for inserting the nylon tags have a number of features in common.

1. The instrument has a sharp, wide bore, hollow needle which is detachable from a handheld device with a trigger.
2. The needle has a slot cut along its length.
3. Squeezing the trigger propels a barbed nylon thread down the hollow needle.

In use, the hollow needle is inserted, simultaneously, through a garment and a price ticket. The trigger is squeezed. The nylon tag, shaped much like an arrow, is forced along the grooved needle until its barbed end projects on the opposite side of the material.

The needle is then withdrawn, leaving the tag and price ticket attached. The 'gun' is automatically primed for the next attachment.

The perception of hazard is that an individual, whose blood is infective, might pierce the hand or other part of the body and that infected blood could be retained in the...
hollow needle. There is then an opportunity for a second person, using the same instrument, to accidentally pierce the skin and become infected.

RISK ASSESSMENT

In one year there had been only nine recorded accidents involving tagging guns at distribution centres which employed 317 (mainly part time) staff. However, it was recognized that considerable under-reporting existed, as many workers do not consider that minor skin punctures are worthy of an entry in the accident book. Anecdotal reports suggested that prick rates of three per 4-hour shift were not unusual when tagging was in progress.

Specialist advice was sought from a teaching hospital virology department and three elements of risk were assessed separately: (1) a staff member could be a carrier of hepatitis B, hepatitis C or of HIV; (2) the likely transmission rate if blood from a positive individual entered the tissues of another and (3) other factors including the nature and severity of injury, the amount of blood transferred, the health of the source individual, and the time elapsed between contamination of the needle and inoculation to another staff member.

For HIV carrier state, a rate as high as 1 in 200, for London antenatal patients has been recorded. Bearing in mind the geographic spread of the sites and the ethnic make-up of the workforce it seemed reasonable to suspect a rate of 1 in 500, which approximates to the HIV prevalence in antenatal clinic attendees at most centres in London. The rate is likely to be lower in other parts of the UK.

The transmission of HIV by a single percutaneous transmission from a known HIV positive source is, overall, 1 in 300, and the risk is increased considerably if the injury is deep or blood is visible on the device. It was assumed that if the source individual had an AIDS-related disease he/she would not be engaged in this kind of physical work but the overall risk of transmission was assessed at not less than 1 in 300. Thus the overall risk of transmission of HIV from a piercing wound using this tagging device would be around 1 in 150,000. This calculation does not allow for decay of the virus infectivity in the needles, due to time elapsed between inoculation injuries, and this may further reduce the risks of transmission.

For hepatitis B, the risk from a carrier is likely to be higher than for HIV, and the virus, which is known to be more stable, may persist on the needle in an infectious state for longer. The carrier rate in some parts of the Far East and central Africa can be as high as 1 in 5, and transmission rates (from HBeAg positive carriers) can be as high as 1 in 3. If one assumes a prevalence in the workforce of 1% and that 5% of these are ‘high infectivity’ (HBeAg positive) carriers, the risk of transmission may be as high as 1 in 6,000. The prevalence of hepatitis C in blood donors in the western world ranges from 0.3 to 1.5%, although higher rates (1.3–1.5%) occur in the Middle East.

Studies of transmission rates in health care workers have produced variable results, ranging from 0 to 3%. If a carrier rate of 1% and a transmission rate of 1% are assumed, the risk could be as high as 1 in 10,000. However, as with HIV, delays between inoculation injuries may lead to decay in the virus and subsequent loss of infectivity may reduce the risks considerably.

Control

The risk of hepatitis B infection was sufficiently high for action to be taken, and following the usual hierarchy for control of health hazards the way forward was to find an alternative, safe method of tagging garments. Every effort was therefore made to render the needle gun devices redundant, mainly by introducing labels and price tags at the manufacturing stage or through the use of adhesive labels. In the meantime, however, their use had to be controlled.

It was therefore decided to alter the protocol for the use of the device and a detailed instruction sheet was prepared with a training programme for a limited number of individuals who were to retain their own needles. Each trained operator was allocated a locked storage cupboard and a ‘sharps bin’ was provided for needle disposal.

We believe that this policy controls the risk, but we hope that eventually a safer alternative or different methods of tagging can replace the device. If manufacturers sewed a loosely woven label to all garments in a standardized position, it would probably be possible to use the same tagging gun with a blunt, hazard-free needle.

REFERENCES


