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Letter to the Editor

Sodium hypochlorite as a disinfectant for injection materials in third world rural dispensaries

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Dear Sir,

Intramuscular injections improperly performed by health care workers in black Africa are often responsible for the transmission of hepatitis B virus (HBV) and probably HIV (Vachon, 1987), of tetanus, sciatic paralysis and buttock abscesses. But the availability of injection material is often low in the dispensaries because of the poor health budget in these countries and thus syringes and needles are used many times, even if these materials are intended to be disposable.

The methods of disinfection or sterilization used are not always effective, because sometimes the equipment and the staff training are both inadequate.

Using a solution of sodium hypochlorite (NaOCl) containing 0.5% of available chlorine (0.5% Cl) is a good and cheap solution for disinfecting injection material; it is effective against bacteria, fungi and viruses.

That is the reason why we have evaluated:

- The durability of this solution of NaOCl when exposed to three disadvantageous factors (daylight, air and heat) for 5 weeks.
- Its antibacterial effectiveness by contamination of a polyethylene syringe (generally used in the dispensaries) with a concentration of 10^5 *Staphy-*

lococcus aureus per ml and then determining residual bacteria in rinsing out water after 20 min contact with the solution of NaOCl.

- The traces of residual NaOCl after a 20 min contact, into 3 successive rinsing out waters.

The results were:

- After exposure to daylight and air during 5 weeks, the final concentration of NaOCl was about 2300 ppm of available chlorine whereas the starting concentration was 4300 ppm. The daylight exposure had most influence (4200 ppm remaining in the NaOCl solution kept in darkness).
- Heat (37°C) in the dark did not have a great influence on the stability of the 0.5% NaOCl solution (loss of about 5% of available chlorine between D0 and D36).
- The solution containing 2300 ppm was found to be effective for decontamination of the polyethylene syringes; no bacteria were found under these experimental conditions.
- Traces of NaOCl were only recovered in the 2 first rinsing out waters (respectively 30 ppm and 10 ppm).

According to the literature, most of the bacteria and viruses are quickly killed by 1 ppm of available chlorine (Cremieux et al., 1982). After an exposure to a concentration of NaOCl containing 2000 ppm of available chlorine, less than 1% of HIV reverse transcriptase activity remains (Spire et al., 1984). Viral infectivity is undetectable within 1 min with 0.5% sodium hypochlorite (Resnick et al., 1986). Moreover, it has been proved that the

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accidental injection of small quantities of NaOCl remaining in the syringe or needle after disinfection can be slightly toxic (Froner et al., 1987).

These data and our results have induced us to suggest, for the dispensaries of developing countries, a protocol for decontamination of injection material using a NaOCl solution (0.5% Cl) kept in closed bottles in darkness during a period of no longer than 1 month. Previous cleaning is necessary before the decontamination with this NaOCl solution during 20 min, followed by 3 washings and a drying. The material so treated is kept in a clean box hermetically closed. Such a decontamination of syringes and needles should reduce the risk of transmission of HBV, HIV and bacteria by injections.

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