Blood transmission through glove materials associated with simulated needlestick injury

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ABSTRACT

Background: Sharp needles and instruments are associated with a risk of percutaneous injury in healthcare settings. Barrier gloves are recommended as part of universal precautions to reduce the risk of bloodborne viruses (BBVs). Latex gloves are commonly used and ‘double gloving’ is believed to provide additional protection. Nitrile glove is widely available as a latex free alternative. The aim of this experimental study was to compare blood transmission through different glove materials associated with simulated needlestick injury.

Methods: Experiments with single and double layer latex and nitrile gloves were undertaken. A cutting suture needle was dipped into a specimen of anticoagulated horse blood. The needle was then jabbed through glove into a cell containing preservative solution. Glove material varied and other factors including angle, speed and depth of penetration were controlled so far as possible by the use of a testing machine. Following needle punctures, samples were taken from suspension contained in each cell and examined in a blinded manner. A standard method was undertaken using haemocytometer for red blood cells (RBC) counting which was used as a surrogate measure to compare volumes of blood transmitted through gloves.

Results: This experiment demonstrated marked difference between glove materials and controls. From findings of the study, double layer latex glove is expected to provide better protection than single layer latex or nitrile glove. Nitrile glove was associated with significantly lower RBC counts than single layer latex glove. The difference was small to medium.

Conclusion: This study provides further scientific evidence for selecting medical gloves. The findings support the practice of double gloving for high risk procedures.

The experiment also shows nitrile glove is a convincing alternative to latex glove, with promising protective quality in removal of blood from cutting suture needle in needlestick injury.