

CONCURRENT SESSION 5 – CHEMICAL AGENT DECONTAMINATION RESEARCH

In Vivo Efficacy of Rapid Skin Decontamination Protocols using the Reactive Skin Decontamination Lotion (RSDL) Kit Against VX

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The Reactive Skin Decontamination Lotion (RSDL) kit is a skin decontaminant product consisting of a viscous liquid that can chemically neutralize chemical warfare agents and a non-reactive sponge that aids in the physical removal of contamination. Package directions for using the RSDL kit recommend that the lotion be left on the skin for two minutes prior to removal with soap and water when conditions permit. Under austere conditions, it may not be feasible to achieve the recommended RSDL residence time and to remove the residue with soap and water. Decreasing the time required for decontamination with RSDL can also limit the risks of exposure such as hypothermia in casualty decontamination.

In this study, the RSDL kit was used to decontaminate anaesthetized swine following percutaneous application of the nerve agent VX (0.4 mg/kg, neat). Animals were decontaminated either 5 or 30 minutes after application of VX by scrubbing the site of contamination with a RSDL-saturated sponge for 10 seconds. The residual RSDL was immediately removed by wiping with either dry cotton gauze, or cotton gauze wetted with water. The rapid decontamination procedure was completed within 1 minute.

Animals that were not decontaminated showed >80% acetylcholinesterase (AChE) inhibition and required ventilation within 2 hours. Milligram-quantities of intact VX were recovered from the skin after 6 hours. When RSDL decontamination was initiated 5 minutes post-exposure, removal of residual RSDL using a dry wipe resulted in less AChE inhibition (mean = 22.4% at 6 hours) and lower concentrations of plasma VX compared to wet RSDL removal. This corresponded to fewer signs of nerve agent poisoning. The amount of intact VX recovered from the skin differed between the two RSDL removal conditions (mean = 72.5 µg, wet; 3.4 µg, dry). The mode of RSDL removal did not result in significantly different outcomes for animals decontaminated 30 minutes following VX exposure. After either wet or dry removal of RSDL, AChE inhibition was delayed and concentrations of VX in blood plasma were lower compared to control animals. The amount of VX remaining on skin was also similar using either dry or wet removal (mean = 16 µg, wet; 8.8 µg, dry).

The results demonstrate that rapid decontamination using the RSDL kit leads to improved outcomes when performed at either 5 or 30 minutes following dermal VX exposure. Differences between wet and dry protocols for RSDL removal suggest that “wash-in” effects may be significant and have implications for best practices for skin decontamination.
