INTRA VENOUS LIPID EMULSION FOR THE TREATMENT OF
PERMETHRIN TOXICOSIS IN CATS

by

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BVSc MVS

This thesis is presented for the degree of
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I declare that this thesis is my own account of my research and contains as its main content work which has not previously been submitted for a degree at any tertiary institution.

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Abstract

Over the last decade, a growing interest has emerged in the use of intravenous lipid emulsions in the treatment of lipophilic drug toxicoses. Initial interest in the therapy was prompted by its successful use in rats and dogs for reversing the life-threatening cardiovascular effects of local anaesthetic overdoses. A postulated mechanism of action of intravenous lipid emulsion in lipophilic drug toxicoses is lipid partitioning, which is creation of an intravascular lipid compartment into which lipophilic drugs may be bound and sequestered away from their sites of action. Permethrin is a highly lipophilic insecticide which can cause significant morbidity and mortality in cats through its neuroexcitatory effects. Permethrin is a common ingredient in flea treatments marketed for dogs and accidental administration to cats is common. The aims of this study were to (1) determine if a lipid emulsion added to permethrin-containing feline plasma in vitro would lead to a decrease in plasma permethrin concentration thus supporting a lipid sink effect, and (2) assess the clinical response to intravenous lipid emulsion administration in cats with permethrin toxicosis. In the in vitro study, addition of a lipid emulsion to permethrin-containing feline plasma led to a significant reduction in plasma permethrin concentration within 30 minutes. In the clinical trial, there was a significant difference in the distribution of clinical stages over time between treatment groups, with cats receiving 20% intravenous lipid emulsion having lower clinical stages earlier than cats receiving the saline control. The results of these studies support the use of intravenous lipid emulsion in the treatment of permethrin toxicosis in cats and the in vitro study supports intravascular lipid partitioning as a mechanism of action. Future research is needed to confirm lipid partitioning as a mechanism of action of intravenous lipid emulsion in vivo for lipophilic drug toxicoses, determine the metabolic fate of lipid sequestered drugs and
ascertain adverse effects of intravenous lipid emulsion at the doses recommended for drug toxicoses.
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