Propofol post-mortem redistribution in a rabbit model

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ABSTRACT
Propofol is a rapid-acting intravenous hypnotic agent, commonly used as an anaesthetic drug for inducing and maintaining general anaesthesia. Since 1992, abuse of propofol for recreational purposes led to an increase in the number of propofol-related deaths. Here we report knowledge about the post-mortem redistribution (PMR) of propofol in rabbits. PMR refers to any movement of drug from one organ to another after death. In this study, we examined propofol post-mortem redistribution using 20 rabbits. The rabbits were anaesthetised and given 5mg/kg of propofol by the left auricular vein. One hour after administration, post-mortem blood samples were taken via the right auricular vein and the rabbit was euthanized using potassium chloride. The autopsy was performed after the rabbits were dead. The lungs, heart, liver, and skeletal muscles were taken for analysis by a validated GC/MS method. Propofol was not detected in tissues, but it was detected in ante-mortem blood, cardiac blood, and femoral blood samples. Post-mortem levels were similar in all organs. Propofol cardiac blood to femoral blood ratios at intervals of 0, 1, 2, 3, and 24 hours post-mortem were 1.0, 0.7, 0.7, and 0.7, respectively. The average ratio of propofol concentration in our study results was close to 1.0, giving an indicator that propofol may lack the potential to exhibit post-mortem redistribution.

INTRODUCTION
Propofol is a rapid-acting intravenous hypnotic agent, commonly used as an anaesthetic drug for inducing and maintaining general anaesthesia [1]. Since 1992, abuse of propofol for recreational purposes led to an increase in the number of propofol-related deaths [2]. Post-mortem redistribution refers to any movement of drug after death which commonly given as cardiac: femoral ratio [3]. Diffusion of drugs and other chemical poisons can be between organs, or from tissues and organ into surrounding blood and vice versa [3]. The aim of this study was to investigate post-mortem redistribution of propofol in rabbits at 0, 1, 2, 3, and 24 hours post-mortem and compare the results with human data.

METHOD
Specimens
Twenty male white rabbits from New Zealand were anaesthetised using 3-5% isoflurane with inducing and maintaining general anaesthesia [1]. Since 1992, abuse of propofol for recreational purposes lead to an increase in the number of propofol-related deaths [2]. Post-mortem redistribution refers to any movement of drug after death which commonly given as cardiac: femoral ratio, diffusion of drugs and other chemical poisons can be between organs, or from tissues and organ into surrounding blood and vice versa [3]. The aim of this study was to investigate post-mortem redistribution of propofol in rabbits at 0, 1, 2, 3, and 24 hours post-mortem and compare the results with human data.

Extraction & GC-MS Analysis
The rabbits were then placed in the supine position at room temperature and divided to five groups, one hour after administration ante-mortem blood samples were taken via the right auricular vein and the rabbit was euthanized using potassium chloride. The lungs, heart, liver, and skeletal muscles were taken for analysis by a validated GC/MS method. Propofol was not detected in tissues, but it was detected in ante-mortem blood, cardiac blood, and femoral blood samples. Post-mortem levels were similar in all organs. Propofol cardiac blood to femoral blood ratios at intervals of 0, 1, 2, 3, and 24 hours post-mortem were 1.0, 0.7, 0.7, and 0.7, respectively. The average ratio of propofol concentration in our study results was close to 1.0, giving an indicator that propofol may lack the potential to exhibit post-mortem redistribution.

RESULTS
Post-mortem samples from femoral blood, cardiac blood, vitreous, right kidney, heart, liver, skeletal muscle, and lung in all five post-mortem intervals. In the rabbits that were autopsied after death the average of post-mortem concentration was similar to the cardiac and femoral concentration. The average femoral concentration in rabbits autopsied after 24 hours was 0.11mg/L, higher than femoral concentrations of 0.07mg/L, 0.03mg/L, 0.10mg/L, and 0.05mg/L at 0, 1, 2, 3, and 6 hours post-mortem, respectively. The average ratio of cardiac to femoral blood concentrations in our study results was close to 1 (0.8).

CONCLUSION
Variances in propofol concentrations were relatively small between 0 and 3 hours post-mortem when compare samples taken at ante-mortem with cardiac and femoral samples taken post-mortem. We significantly changed concentration differences between post-mortem and ante-mortem samples were seen. The average ratio of post-mortem concentration was close to 1, giving an indicator that propofol may lack the potential to exhibit post-mortem redistribution.

REFERENCES