The effect of oxygen concentration on arterial blood partial pressure of oxygen in dogs under general anesthesia

P. Chongphaibulpatana\textsuperscript{1,2}, D. Fukui\textsuperscript{3}, M. Katayama\textsuperscript{2}, Y. Uzuka\textsuperscript{2}

\textsuperscript{1} The United Graduat School of Veterinary Science, Gifu University, Yanagido 1-1, Gifu, Gifu, 501-1193, Japan
\textsuperscript{2} Laboratory of Veterinary Diagnostic Radiology, The Cooperative Department of Veterinary Medicine, Faculty of Agriculture, Iwate University, Ueda-cho, Morioka, Iwate, 020-8550, Japan
\textsuperscript{3} Laboratory of Small Animal Surgery, The Cooperative Department of Veterinary Medicine, Faculty of Agriculture, Iwate University, Ueda-cho, Morioka, Iwate, 020-8550, Japan

Abstract

Oxygen is used for medical treatment and general anesthesia. However, high concentrations of oxygen can have toxic effects on cells. In veterinary medicine, 100\% oxygen is usually used during general anesthesia and it can be toxic to animals. However, there is little concern about its harmful effects in humans. The objective of this study was to demonstrate that using a high concentration of oxygen increases the partial pressure of oxygen in arterial blood (PaO\textsubscript{2}) more so than a lower concentration, by comparing PaO\textsubscript{2} at three different oxygen concentrations (100\%, 60\%, and 40\%) in six dogs under general anesthesia for 3 hours. The mean PaO\textsubscript{2} and standard error values at the 100\%, 60\%, and 40\% oxygen concentrations were 535.8 ± 24.01, 374 ± 17.19, and 239 ± 8.78 mmHg, respectively (p<0.05). These results show that 100\% and 60\% oxygen concentrations could increase oxidative stress. Further studies are needed to examine the oxygen concentration that causes toxicity.

Key words: arterial blood gas, dog, general anesthesia, oxidative stress, oxygen concentration, partial pressure of oxygen in arterial blood