



Optical nerve sheath diameter during anesthesia in experimental model without intracranial hypertension

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Introduction

The high intracranial pressure (ICP) may increase the patient mortality. Among the treatments to control ICP, thionembutal has demonstrated an efficient drug for ICP reduction.

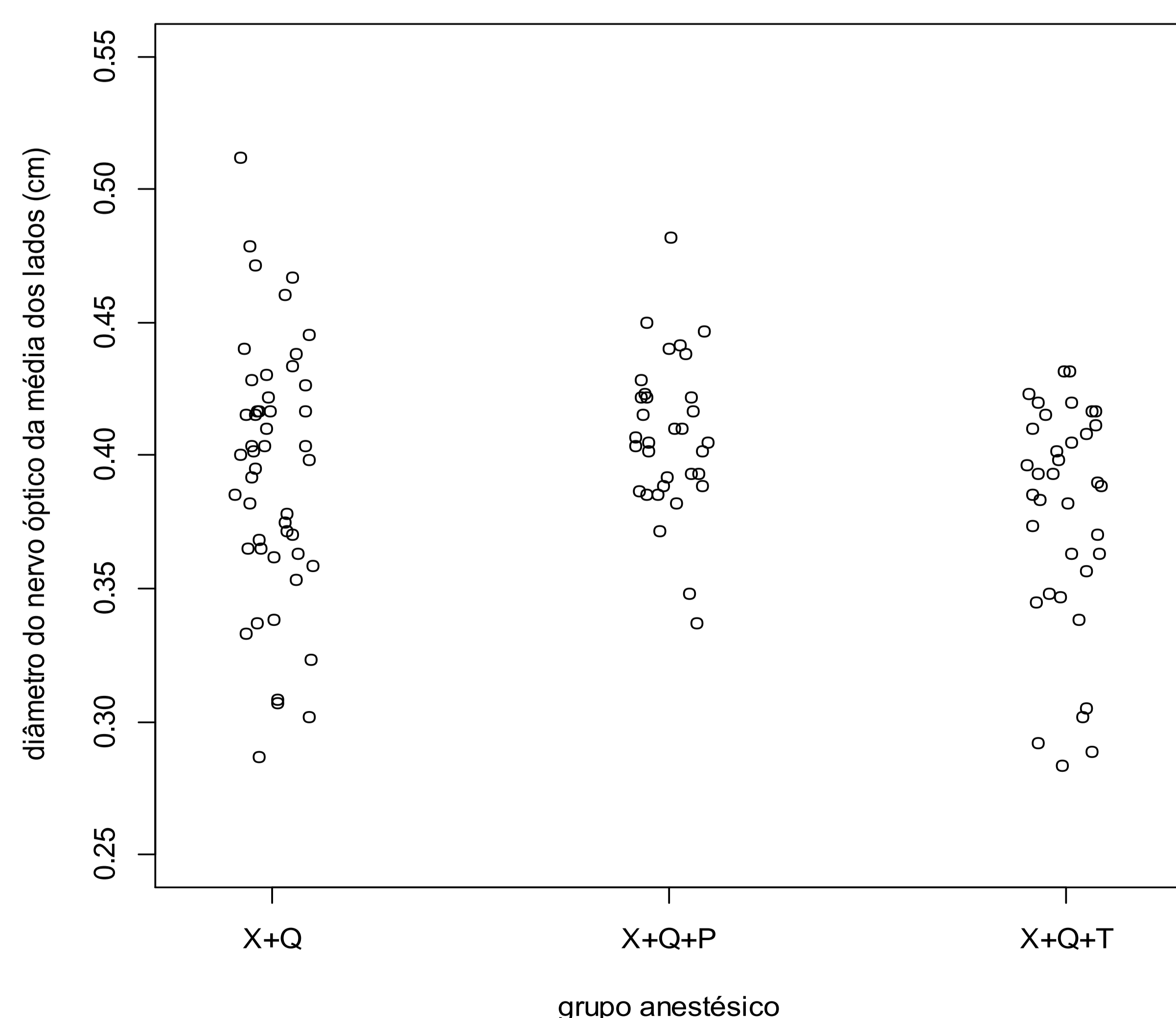
Objective

The Objective of this study is to demonstrate the effects of different anesthetics, including thionembutal, in the optical nerve sheath (ONS) in animals without intracranial hypertension.

Material and methods

Pigs in normal health conditions were anesthetized, from January 2013 to May 2015, with three different drug groups using usual doses for weight and age for these animals: 1) xilazine (X) and quetamine (Q) 2) X/Q and propofol (P) 3) X/Q and thionembutal (T). Three ONS measures were obtained by ultrasonography using 8-15 MHz transducer in each eye (right and left), after anesthesia induction.

Diagram dimensional dispersion of the optic nerve diameter (cm) in both eyes of the animals from anesthesia groups.



Results

A total of 118 animals were anesthetized (49 X/Q, 33 X/Q/P and 39 X/Q/T). There were no statistical difference between gender ($p=0.411$) and weight ($p=0.068$). The mean ONS size in both sides in each group was: $0,394 \text{ cm} \pm 0.048$ (X/Q), $0,407 \text{ cm} \pm 0.029$ (X/Q/P) and $0,378 \text{ cm} \pm 0.042$ (X/Q/T) (median 0.400, 0.405 and 0,389 respectively). There was statistical significance on the ONS size between the groups P and T ($X/Q/P > X/Q/T$, $p=0.003$). No statistical difference was detected in other group comparisons ($X/Q = X/Q/P$, $p=0.302$; $X/Q=X/Q/T$, $p=0.294$).

Conclusions

Thionembutal is a potent vasoconstrictor of cerebral microvasculature and can decrease ICP. It is possible linked with statistical differences between X/Q/T and X/Q/P groups. Although there is no statistical difference in ONS size between X/Q and X/Q/T groups, the ONS median size in the latter was lower. X/Q anesthesia had heterogeneous effect in ONS and statistical difference could not be found in the comparisons (figure 1).

It is important to emphasize that ONS measure by ultrasonography in our study was a sensitive method to detect alterations in the optical nerve diameter during sedation with different drugs, even in animals with normal ICP.

Results of multiple comparisons between groups anesthetics

Left side		Right side		Median side	
conclusion	p	conclusion	p	conclusion	p
X+Q = X+Q+P	0,661 ^d	X+Q = X+Q+P	0,138 ^e	X+Q = X+Q+P	0,302 ^d
X+Q = X+Q+T	0,343 ^d	X+Q = X+Q+T	0,212 ^e	X+Q = X+Q+T	0,294 ^d
X+Q+P > X+Q+T	0,028 ^d	X+Q+P > X+Q+T	0,003 ^e	X+Q+P > X+Q+T	0,003 ^d

Dunnnett (d) method, Tukey (e) method.