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
Pigles 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 ketamine (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.

Results
A total of 118 animals were anesthetized (49 X/Q, 33 X/Q/P, and 39 X/Q/T). There were no statistic difference between gender (p=0.411) and weight (p=0.068). The mean ONS size in both sides in each group was: 0.394 cm ± 0.048 (X/Q), 0.407 cm ± 0.029 (X/Q/P) and 0.378 cm ± 0.042 (X/Q/T) (median 0.400, 0.405 and 0.389 respectively). There was a statistical significance on the ONS size between the groups P and T (X/Q/P > X/Q/T, p=0.003). No statistic 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

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<td>X+Q = X+Q+P</td>
<td>0.661&lt;sup&gt;a&lt;/sup&gt;</td>
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<sup>a</sup> Dunnnett (d) method, <sup>b</sup> Tukey (e) method.

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