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(Accepted for publication May 15, 1998)

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(Accepted for publication May 15, 1998)

Is Lack of Statistical Power Always Evidence of Lack of Effect?

To the Editor—I read with interest the paper by Pittman et al. recently published in *Anesthesiology*. The study in the article shows that rats undergoing 75-min middle cerebral artery occlusion during pentobarbital or propofol anaesthesia, in doses sufficient to maintain electroencephalogram burst suppression, have similar neurologic and histologic outcomes. The study is well designed, and I think that this research is extremely important.

As stated in the article by the authors, the neurologic scores between the two groups were not significantly different. However, when neurologic scores are analyzed in detail (their fig. 2), animals treated with pentobarbital seem to have a better neurologic outcome. In fact, seven pentobarbital-treated animals had a neurologic score of 1 (as compared to one propofol-treated animal), and fewer pentobarbital-treated rats had a score of 2 (four versus seven) or a score of 3 (six versus nine). If we pool the results (0 to 1 versus 2 to 3 neurologic score), 10 animals treated with pentobarbital versus 5 animals treated with propofol had a "good" neurologic score (0 to 1, no deficit or left forelimb flexion only), and 10 versus 16 had a more severe hemiparesis (2 to 3 neurologic score).

The authors did not attempt to "force" the results in any direction. I also agree that histologic results (infarct areas) provide a better end point when considering the protective cerebral effects of any drug or treatment, or both. However, although the aforementioned differences are not statistically significant, they should be considered. The authors did not provide any correlation between histology (infarct area) and neurologic deficit. I would speculate that such scores are congruent, with smaller cerebral infarct size correlating with better neurologic outcome. However, if this is the case, I wonder which drug provides a better correlation.

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(Accepted for publication May 5, 1998)

In Reply.—Dr. Tommasino raises the issue whether a different statistical analysis might offer a different conclusion regarding the relative effects of propofol and pentobarbital on neurologic outcome from transient middle cerebral artery occlusion in the rat. We agree that visual inspection of figure 2 in Pittman et al. suggests this possibility. However, the statistical test (Mann-Whitney U test-Wilcoxon’s rank sum) used to compare neurologic scores between groups was chosen a priori. This decision was, in retrospect, quite reasonable. Our study was not designed to detect a difference between groups for the correlation between infarct volume and neurologic score. Therefore, we recommend that no conclusions be drawn from these values. Nevertheless, as requested, for propofol, Kendall’s \( r = 0.51 \) (95% confidence interval, 0.21 to 0.81) and, for pentobarbital, Kendall’s \( r = 0.31 \) (95% confidence interval 0.01 to 0.60). Perhaps the correlation is better for the propofol group. But, because our experiment was not designed to test differences in correlation between the two groups, we truly do not know. The data presented in figure 2 of Pittman et al. suggest, however, that a more comprehensive approach to the neurologic examination may be of value in defining potential differences among groups. This is being explored in our laboratory and by other groups.

Anesthesiology
1998; 89:799-800
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Lippincott Williams & Wilkins

A Method for Measuring Carbon Dioxide at the Tracheal Stoma

To the Editor.—End-tidal carbon dioxide monitoring is a standard used during general anesthesia and monitored anesthe- sia care. Nasal cannulas commonly are used to deliver supplemental oxygen and to sample carbon dioxide for the monitoring of respiratory rate and rhythm in patients undergoing sedation for surgical procedures. Monitoring end-tidal carbon dioxide in patients with tracheal stomas may be difficult when using standard tracheal collar oxygen supplementation because no adaptation for the carbon dioxide sample line is readily available. We present a device for the monitoring of carbon dioxide in patients with tracheal stomas who are undergoing operative procedures that necessitate intravenous sedation.

Taking a standard tracheal collar, a 6-inch piece of corrugated oxygen tubing, a BODAI suction safe swively endotracheal suction connector (Sontek Medical, Hingham, MA), and an 8-French pediatric suction catheter, we fabricated a simple device to monitor carbon dioxide at the tracheal stoma (fig. 1). The pediatric suction catheter is placed through the BODAI suction device and threaded into the corrugated tubing until it rests at the skin edge of the tracheal stoma. The end-tidal carbon dioxide sample line is attached to the BODAI suction device, which is then attached to the patient’s endotracheal tube. The end tidal CO2 sample line is then connected to the BODAI monitoring device. The BODAI suction device is then connected to the tracheal collar to deliver oxygen as usual (fig. 2). The end tidal CO2 is monitored through the BODAI suction device.

Fig. 1. Assembled airway equipment.

Anesthesiology, V 89, No 3, Sep 1998

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(Accepted for publication May 5, 1998)