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In Response to Leppikangas H, et al, *Levosimendan as a Rescue Drug in Experimental Propranolol-Induced Myocardial Depression: A Randomized Study*

To the Editor:

We read with interest the recent paper examining the role of levosimendan in a porcine model of β-blocker poisoning.[1] While we agree with the premise of the study and the need to evaluate novel therapeutics such as levosimendan, we have several reservations regarding the interpretation of the results.

Though randomization occurred, critical differences in hemoglobin and pulse rate were noted at baseline between the placebo and study groups. The placebo group had a lower hemoglobin (58 g/L) compared to the dobutamine active control group (74 g/L) and no information was provided regarding the baseline hemoglobin value of the levosimendan group. In addition, the placebo group had a significantly faster pulse rate (135 beats/min) compared to the dobutamine (97 beats/min) and levosimendan group (94 beats/min). The anemia and tachycardia in the placebo group, which may be due to greater blood loss during the extensive instrumentation, suggests that they were at a hemodynamic disadvantage. The decreased baseline hemoglobin content and subsequent decrease in the oxygen-carrying capacity of the blood could account for the statistically significant decreased mixed venous oxygen saturation and elevated lactate in the placebo group when compared to levosimendan. It is imperative to begin such a controlled trial ensuring that there are no significant differences at baseline. Of note, the placebo group is also the only group that appeared to have achieved clinical beta blockade based on a reduction in both heart rate and blood pressure.

In addition, the use of dobutamine as a positive control was an unusual choice as most emergency physicians and medical toxicologists would consider other therapies, such as glucagon and hyperinsulinemia-euglycemia therapy, clearly superior choices. The authors admit that dobutamine may not have been the primary choice for physicians treating β-blocker toxicity and do not offer support for their decision.

We commend the authors for an impressive study protocol that involved the measurement of several hemodynamic parameters and serum markers of cardiovascular shock. There may be room for expansion in this line of investigation, but in this study the suboptimal choice of dobutamine as a positive control combined with the unbalanced control group make the extrapolation of the results very difficult.

Daniel M. Lugassy, MD
New York City Poison Control Center
New York University Medical Center
New York, NY

Alexandra Stefan, MD
University of Toronto
Toronto, Ontario, Canada

Daniel Dexeus, DO
Long Island Jewish Medical Center
New Hyde Park, NY

Robert S. Hoffman, MD
Lewis S. Nelson, MD
New York City Poison Control Center
New York University Medical Center
New York, NY

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1. Leppikangas H, Ruokonen E, Rutanen J, et al. Levosimendan as a rescue drug in experimental propranolol-induced myocardial depression: a randomized study. *Ann Emerg Med*. 2009;54:811-817.

In reply:

We thank Dr. Lugassy et al for their interest in our study on the role of levosimendan in a porcine model of β-blocker