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Use of the Glucomander for Glycemic Control in Cardiac Surgery Patients**** Julie L. Huffmyer, M.D., Edward C. Nemergut, M.D.**

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INTRODUCTION

Over the past several years, multiple studies have illustrated the importance of glycemic control in the cardiac surgical patient. Perioperative hyperglycemia has been associated with an increased incidence of infection as well as increased perioperative mortality. Additionally, hypoglycemia has also been associated with increased risk of stroke and death.

The Glucomander (Glytec Systems, Greenville, SC) is a computer-based algorithm designed to direct the administration of intravenous insulin infusion. Calculation of the insulin dose requires a target glucose range, the present glucose value, and a multiplier that takes into account a patient's insulin sensitivity. The Glucomander has been used successfully to control glucose in hospitalized patients and has a low comparative incidence of hypoglycemia. The pilot study was designed to test the efficacy of the Glucomander in the cardiac surgical setting.

METHODS

After approval from the Institutional Review Board at the University of Virginia, we applied the Glucomander to 17 patients undergoing a variety of cardiac surgical procedures, including isolated coronary artery bypass graft (CABG) surgery as well as valvular surgery. Both diabetic and nondiabetic patients were included. The Glucomander was activated intraoperatively once the blood glucose level reached 120 mg/dl with a set target range of 120-150 mg/dl. The Glucomander was continued into the postoperative period in the intensive care unit for 24 hours. The efficacy of the Glucomander was assessed by comparing the glucose control in the study group to the glucose control in a group of 17 control patients who had cardiac surgery on the same day, treated with our standard glucose algorithm (target 120-150 mg/dl).

RESULTS

Patients treated with the Glucomander had better glycemic control than those treated with our standard glucose algorithm. In the Glucomander group, 73.8% of all glucose measurements were below 150 mg/dl compared with only 48% of controls ($p < 0.001$). There were two episodes of moderate hypoglycemia ($[start_en]003C;60$ mg/dl) in the Glucomander group. There were no episodes of severe hypoglycemia. Over the entire study period, patients in the Glucomander group had a statistically lower average mean glucose as compared to the standard group (138.5 mg/dl \pm 15.1 vs. 154.8 mg/dl \pm 17.1, $p = 0.006$). In the ICU, patients treated with the Glucomander had significantly improved glucose control, as evidenced by a lower average mean blood glucose values of 127.0 mg/dl \pm 10.4 vs. 152.5 mg/dl \pm 16.8 ($p < 0.001$). Intraoperatively, there was no significant difference noted in blood glucose control between the groups. There were two episodes of moderate hypoglycemia ($[start_en]2264;60$ mg/dl) in the Glucomander group. There were no episodes of severe hypoglycemia.

CONCLUSIONS

The Glucomander represents a helpful tool in achieving glycemic control in cardiac surgical patients. In this first small study, a statistically significant improvement in blood glucose was noted with the use of the Glucomander during the study period as compared to standard treatment. Further studies will help elucidate how this specialized tool may be utilized to improve glycemic control and variability in cardiac surgical patients and whether or not this results in improved outcome.

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