

LOW DOSE CLONIDINE ACCENTUATES THE HYPERGLYCEMIC RESPONSE TO SURGERY

Ralph Lattermann MD¹, Markus Schreiber MD²
Michael Georgieff MD, PhD², Thomas Schrickler MD, PhD¹

¹ Department of Anesthesia, McGill University, Montreal General Hospital,
1650 Cedar Avenue, Montreal, Quebec, Canada H3G 1A4

² Clinic of Anesthesiology, Ulm University, Steinhövelstr. 9, 89075 Ulm, Germany

INTRODUCTION

The influence of the α_2 agonist clonidine on the metabolic response to surgery has been shown to be variable depending on the dose administered and the type of surgery studied. Premedication with clonidine $4 \mu\text{g kg}^{-1}$ attenuated the hyperglycemic response to neurosurgical procedures and minor, non-abdominal interventions.^{1, 2} In contrast, clonidine administered at a lower dose caused a more pronounced increase in glucose plasma concentration during pelvic surgery.³ The purpose of this study was to examine the effects of low dose i.v. clonidine premedication ($1 \mu\text{g kg}^{-1}$) on perioperative glucose homeostasis.

METHODS

After approval by the local Ethics Committee, sixteen patients undergoing abdominal hysterectomy were randomly assigned to receive either i.v. clonidine ($1 \mu\text{g kg}^{-1}$) 30 minutes before induction of general anesthesia (clonidine, $n = 8$) or saline (control, $n = 8$). Plasma concentrations of glucose, insulin, cortisol, epinephrine and norepinephrine were measured before, during and two hours after surgery. Heart rate and mean arterial pressure were monitored.

RESULTS

In both groups, glucose concentrations significantly increased during and after surgery. 60 min after peritoneal incision glucose plasma concentration in the clonidine group was higher than in the control group (clonidine: $6.8 \pm 0.6 \text{ mmol/l}$ vs. control: $5.7 \pm 0.8 \text{ mmol/l}$, $p < 0.05$). This was accompanied by a lower insulin plasma concentration (clonidine: $3.9 \pm 1.9 \mu\text{U/ml}$ vs. control: $6.5 \pm 2.8 \mu\text{U/ml}$, $p < 0.05$). Hemodynamic parameters remained unchanged throughout the study without any differences between the groups. Clonidine did not affect the intraoperative increase in epinephrine and norepinephrine plasma concentrations, but significantly attenuated the intra- and postoperative cortisol response.

DISCUSSION

Premedication with clonidine administered at a dose insufficient to inhibit the surgery induced stimulation of sympathoadrenergic pathways, accentuates the hyperglycemic response to surgery most likely mediated through its inhibitory effect on insulin secretion⁴. We further propose that the hyperglycemic action of low dose clonidine is overlaid by the suppression of the sympathoadrenergic response to surgery if larger doses are administered.

REFERENCES

- 1 Can J Anesth 1991; 38: 837-43
- 2 Anesthesiology 1998; 88: 922-7
- 3 Br J Anaesth 1997; 78: 134-7
- 4 Diabetes 1978; 27: 554-62