Title : INTRAVENOUS NICARDIPINE FOR TREATMENT OF INTRAOPERATIVE HYPERTENSION.

Authors : C. Begon, MD, B. Dartayet, MD, A. Edouard, MD, D. David, MD, and K. Samii, MD

Affiliation : Département d'Anesthésiologie, Université de Paris-Sud,
Hôpital de Bicêtre, 94275 Le Kremlin-Bicêtre, FRANCE

INTRODUCTION. Nifedipine has been successfully proposed to treat intra- (1) and postoperative hypertension (2). Another dihydropyridine calcium blocker, nicardipine (N), is currently available in an iv form which is not deteriorated by light (Sandoz Lab.). The N-induced hypotension seems to be mainly related to a vasodilatation, even during deep inhalational anesthesia (3). The aim of the present randomized study was to evaluate the efficacy and safety of iv N vs. placebo to treat intraoperative hypertension.

METHODS. The study was performed in 20 patients undergoing abdominal surgery. Anesthesia was induced with thiopental (7 mg/kg) and pancuronium (0.1 mg/kg), and maintained with intermittent iv doses of fentanyl (2 μg/kg) and pancuronium (1 mg). patients were mechanically ventilated (O2/N2O:40%/60%) in order to have an ETCO2 around 30 mmHg. Arterial pressure (AP) was monitored either through an arterial line or by a Dinamap* while heart rate (HR) was obtained from ECG. Intraoperative hypertension was defined as mean AP (MAP) above 110 mmHg. Then, an iv bolus of fentanyl (4 μg/kg) was injected. If fentanyl did not induce at least a 10% decrease in MAP, patients received either N (5 mg in 5 ml) or placebo (P:5ml as N solvent) iv over a 5 min period in a random and double blind fashion. At the end of N or P infusion, a 10 min period of AP and HR recording was started, at the end of which 5 mg of N were infused in 5 min in the absence of at least 10% decrease in MAP, thus opening the trial. Means $\pm$ SD are reported. Statistical analysis was performed using non parametric tests : Mann-Whitney for intergroup comparison, and Wilcoxon for intragroup comparison. The study was approved by our Institutional Ethical Committee.

RESULTS. Twenty patients entered the study because fentanyl was unable to lower MAP below 110 mmHg. As shown in table 1, no difference was observed between patients in N and P groups during the preoperative period. There were no differences between N and P groups in post-fentanyl values of MAP (126 $\pm$ 13 mmHg vs. 125 $\pm$ 9 mmHg respectively) and HR (78 $\pm$ 22 bpm vs. 81 $\pm$ 22 bpm respectively). As demonstrated in the left part of figure 1, N induced a 34% decrease in MAP ($P < 0.001$) and increase in HR ($P < 0.01$) as compared with P (intergroup comparison). The lowest value of MAP was 82 $\pm$ 13 mmHg. Ten min after N or P infusion, no patient required additional N injection in N group, but 7 out of the 10 patients in P group required N injection. Figure 1 shows that N induced a stable decrease in MAP during 45 min either in N group or in the 7 patients of P group during open trial, without significant change in HR (intragroup comparison). Supraventricular premature complexes have been noted in one patient after P injection.

DISCUSSION. This study demonstrates that N can lower MAP during moderate intraoperative hypertension without obvious deleterious effects. Titration of N infusion to a specific AP seems possible and could provide a more precise AP control. The concomitant injection of fentanyl prevents an inadequate analgesia and may buffer the reflex tachycardia following N-induced hypotension through an increase in vagal tone. In conclusion, iv N is an easy, safe and effective method to treat intraoperative hypertension

	N group n = 10	P group n = 10
Sex ratio (M/F)	5/5	4/6
Age (yr)	54.6 $\pm$ 9.9	61.4 $\pm$ 8.5
Weight (kg)	66.7 $\pm$ 12.0	74.7 $\pm$ 9.8
Story of Hypertension	6	8
Preoperative MAP (mmHg)	103.9 $\pm$ 8.0	102.5 $\pm$ 10.4
Preoperative HR (b/min)	76.1 $\pm$ 17.6	72.6 $\pm$ 14.0
Cardiac Sinus Rhythm	10	10
Cardiothoracic Ratio	47.6 $\pm$ 7.8	51.3 $\pm$ 3.8

Table 1. Presentation of the 20 Patients

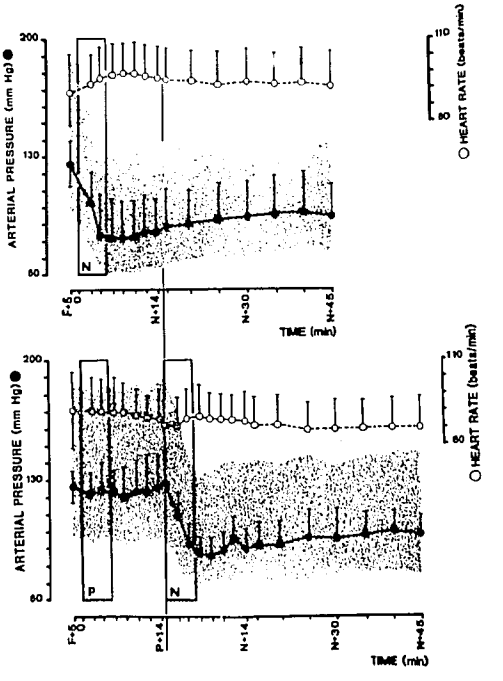

Figure 1. Evolution of MAP and HR in N (upper part) and in P (lower part) groups ▒ Pulse pressure

REFERENCES.

1. A Rogers, PE Curling, S Cooper et al : Intravenous nifedipine for treatment of intraoperative hypertension. ANESTHESIOLOGY 63 : A24, 1985.
2. G Godet, P Coriat, M Samama et al : Treatment of postcarotid endarteriectomy hypertension with nife dipine : Effects on hemodynamics and mixed venous oxygen saturation. ANESTHESIOLOGY 65 : A75, 1985.
3. RG Merin : Calcium channel blocking drugs and anesthetics : Is the drug interaction beneficial or detrimental ? ANESTHESIOLOGY 66 : 111-113, 1987