TITLE : FAILURE OF CLONIDINE TO IMPROVE PRE-BYPASS HEMODYNAMICS IN PATIENTS UNDERGOING CORONARY ARTERY SURGERY PERFORMED UNDER HIGH DOSE ALFENTANIL ANESTHESIA

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INTRODUCTION : Clonidine has been reported to improve the intra-operative course of coronary artery bypass graft (CABG) surgery performed under sufentanil-isoflurane anesthesia (1). The aim of this double blind study was to assess whether clonidine improves pre-bypass hemodynamics of CABG patients managed with high dose alfentanil-oxygen anesthesia.

MATERIAL AND METHODS : 24 adult patients, scheduled for CABG surgery, where included in the study after institutional approval and informed consent. All had a left ventricular ejection fraction above 0.5 and none was on chronic clonidine treatment. They where assigned at random to receive, as oral premedication, lorazepam 3.5-5 mg, their usual cardiac medications and either clonidine 5µg/kg (group C) or placebo (group P). Then all patients were managed identically.

The evening prior to surgery, a Swan-Ganz catheter was inserted via the right internal jugular vein and pre-operative hemodynamics recorded (Tn).

A radial artery catheter was inserted before induction and baseline hemodynamics (TO) recorded.

Induction relied on 10 mg of AF infused over 5 min; intubation was carried at this point; then AF was infused at a rate of 60 mg/hr for 60 min or until sternotomy, followed by 30 mg/hr up to the end of surgery. A bolus of 2.5 mg of AF was given whenever mean arterial pressure or heart rate increased by more than 20% of baseline, repeated once 2 min later if necessary, then isoflurane was started if AF failed to control the HR or BP.

Muscle relaxation relied on pancuronium, and ventilation, using 100% oxygen, was adjusted to maintain $PaCO_2$ at 35mmHg.

Heart rate (HR), mean arterial pressure(MAP), pulmonary capillary wedge pressure (PCWP), and cardiac output were measured at TO, before (T1) and after (T2) intubation, 15 min post-induction (T3), after incision (T4), sternotomy (T5) and maximal sternal retraction (T6). Cardiac index (CI) and systemic vascular resistance index (SVRI) were calculated.

Results are expressed as mean ± SD. Statistical analysis used an ANOVA followed by t-test.

RESULTS : Group C (n=11) and group P (n=13) did not differ with respect to age (59±7.5 vs 56±12 yrs), previous history of hypertension (1 vs 5), pre-operative cardiac treatment: beta blockers (n= 8 vs 9), calcium channel blockers (n= 8 vs 11), or nitrates (n= 11 vs 12), total dose of AF (140±22 vs 161±35 mg).

Hemodynamic parameters are shown in table(1).

Significant hemodynamic differences between the control and the clonidine group occured only before incision. Between Tn and TO, where clonidine administration occured, MAP became lower in group C.

After induction, a lower HR and CI could be demonstrated in group C, returning to similar values after intubation. Surprisingly, SVRI were lower in the control group at T1, T2 and T3.

Within groups, HR, PCWP and CI did not change significantly at any time.

Before incision, SVRI in group P, decreased at T2 and T3, inducing a lower MAP at T3.

After incision, both groups increased their SVRI, and consequently their MAP; those of the control group returning to baseline, while those of the clonidine group became significantly higher.

The number of patients requiring one or several boluses did not differ significantly between groups (P=6/13 vs C=4/11) Out of these, 1/4 in group C and 4/6 in group P had more than one bolus followed by isoflurane.

COMMENTS : Since control and clonidine groups were similar with respect to demographics and anesthetic management, we can safely assume that clonidine pretreatment, in patients undergoing CABG surgery under high dose AF anesthesia, failed to prevent the rise in SVRI and MAP induced by incision, sternotomy and sternal retraction.

TIME		HR (b/min)	MAP (mmHg)	PCWP (mmHg)	CI (l/min/m²)	SVRI (dyn.sec /cm⁵/m²)
Tn	P	67±9	91±10	9.1±3.0	2.7±0.4	2627±521
	C	*63±10*	*88±7*	*8.1±2.9*	*2.6±0.6*	*2737±752*
TO	P	66±12	93±12	9.4±3.0	2.5±0.5	2899±545
	C	*57±8*	*82±10#*	*7.8±2.1*	*2.1±0.4*	*2956±640*
T1	P	73±15	86±15	8.8±2.8	2.5±0.8	2636±480
	C	*60±7 #*	*80±12*	*8.2±2.5*	*1.9±0.2#*	*3036±400#*
T2	P	74±14	86±16	8.8±2.9	2.7±0.9	2463±501*
	C	*64±10*	*87±11*	*8.1±2.0*	*2.1±0.4*	*3196±640#*
T3	P	72±14	82±14*	8.2±2.5	2.5±0.6	2463±525*
	C	*63±10*	*83±10*	*7.7±1.9*	*2.1±0.4*	*3131±603#*
T4	P	66±11	89±15	9.6±2.4	2.1±0.3	2974±736
	C	*58±9*	*93±9 **	*7.9±1.9*	*2.0±0.3*	*3515±480**
T5	P	66±12	97±19	9.1±3.0	2.2±0.4	3355±800
	C	*60±11*	*96±13**	*7.8±3.3*	*1.9±0.4*	*3835±560**
T6	P	65±9	94±12	8.9±2.5	2.2±0.5	3355±960
	C	*66±12*	*93±9 **	*7.5±3.7*	*2.0±0.5*	*3675±640**

Table (1) : Pre-bypass hemodynamics in groups P and C ; Significant difference ($p<0.05$) from baseline (TO) value (*) ; Significant difference ($p<0.05$) between groups (#).

REFERENCE :

1) Flacke J. *et al.* : Reduced Narcotic Requirement by Clonidine with Improved Hemodynamic and Adrenergic Stability in Patients Undergoing Coronary Bypass surgery. Anesthesiology, 67 : 11-19, 1987