

INTRAOPERATIVE MYOCARDIAL ISCHAEMIA IN SURGICAL PATIENTS WITH TREATED ISCHAEMIC HEART DISEASE

Pages with reference to book, From 80 To 82

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ABSTRACT

Twenty patients were divided into 2 groups. Group - A had 10 ASA Grade I while Group - B consisted of 10 asymptomatic patients with ECG evidence of ischaemia. One week of coronary dilator treatment was given to the patients in group-B before surgery. Intra operative cardioscopic monitoring was done in both the groups. In group-B, 5 patients showed ECG evidence of intraoperative myocardial ischaemia, and/or ventricular ectopics, which were in most cases attributable to anaesthetic/surgical stimuli but were not always associated with increased Rate pressure product. In group-A only one patient showed ECG evidence of ischaemia intraoperatively. It is therefore concluded that patients with optimal therapy for IHD continue to be at risk of intraoperative cardiovascular abnormalities (JPMA 41: 80, 1991).

INTRODUCTION

A pre-operative ECG indicating pre-existing ischaemic Heart Disease (IHD) in otherwise asymptomatic patients, has now been universally accepted to be linked with a high incidence of peri-operative cardiac complications¹⁻⁹. Adequate pre-operative treatment of the myocardial ischaemia has been suggested as a measure to decrease the incidence of these complications. In this controlled study we have concentrated on the intraoperative ECG changes occurring in patients with treated IHD undergoing major surgery under general anaesthesia.

PATIENTS AND METHODS

This study included 20 patients undergoing major surgery under general anaesthesia. They were divided into two groups of 10 patients each. The control group (Group-A) comprised of 10 ASA Grade I patients, and the study group (Group-B) consisted of 10 asymptomatic patients whose preoperative ECG showed evidence of IHD. Patients of both groups were comparable for age, sex and weight distribution (Group-A 48.9 ± 12.89 yrs; Male: Female: 3:7; $54.0 \text{ kg} \pm 6.77 \text{ kg}$ and Group-B 53.4 ± 13.2 yrs; Male: Female: 3:7; $52.6 \pm 6.65 \text{ kg}$). All these patients underwent lower abdominal or pelvic surgery. The nature of surgery was comparable in the two groups.

Pre-operative treatment of Ischaemia

The patients with pre-operative ischaemia i.e. Group-B were treated with Atenolol and/or Nifedipine for at least a week till the ECG returned to within normal limits.

Immediate pre-operative Coronary status

In the pre-operative period all the patients in group-A had normal ECG and all the patients in group-B had ECG which were within normal limits with treatment.

Anaesthetic technique

The anaesthetic management was similar in all the cases. Premedication consisted of Inj. promethazine 25 mg and Inj. buprenorphine 0.15mg IM, 45 mins before the induction of anaesthesia. Following a 3

min pre-oxygenation, anaesthesia was induced with a sleep dose of thiopentone sodium and relaxation achieved with succinylcholine (2mg/kg.) endotracheal intubation, using cuffed tube, was carried out. All the patients were maintained on nitrous oxide (6l/min) and oxygen (4l/min) with intermittent positive pressure ventilation using a Manley Blease Ventilator with a respiratory rate set at 12-14 breaths/min and peak airway pressure at 20-25 cm H₂O. Relaxation was maintained with d-tubocurarine and anaesthesia supplemented with intermittent small doses of pentazocine (10mg) or halothane 0.5-2%. During the intraoperative period attempt was made to keep the pulse and blood pressure to $\pm 20\%$ of the control value. Dose of the anaesthetic agent was tailored to meet individual patient requirement. At the conclusion of the surgery the effect of the muscle relaxant was reversed using neostigmine 2.5mg and glycopyrrolate 0.5mg intravenously.

Following adequate reversal, suction, oxygenation and extubation was performed.

Peri-operative monitoring

Strict monitoring of pulse and blood pressure (in some cases through an arterial line and in the remaining using a sphygmomanometer cuff) was done. Continuous cardioscopic monitoring of lead II and chest lead V5 was carried out and ECG strips were recorded as and when thought necessary.

RESULTS

In group A, intraoperative ECG changes suggestive of ischaemia were found in only 1 patient (10%) whereas 5 patients (50%) in group B showed ECG evidence of ischaemia and/or ventricular ectopic intraoperatively (Table I).

TABLE - I. Various intra-operative changes in ECG in the two groups.

Type Of ECG abnormality	Control Groups		Study Group	
	No. of Patients	%	No. of Patients	%
ST depression	1	10	2	20
V.E. c ST depression	-	-	1	10
V.E. c T wave inversion	-	-	1	10
Multifocal V.E.	-	-	1	10
Myocardial infarction	-	-	-	-
No ECG change	9	90	5	50

TABLE - II. Pulse, blood pressure and rate pressure product at the time of intraoperative ECG abnormalities in both the groups as compared to their basal pre-operative values.

S.No.	ECG Changes	Basal Pre-operative value			Time of Occurance of ECG Abnormality	Value at the time of ECG change		
		Pulse rate	BP	RPP		Pulse rate	BP	RPP
1.	CONTROL GROUP							
1.	ST depression	90	120/80	10,800	1 hr. after intubation during surgery	116	90/70	10,444
1.	STYDY GROUP							
1.	ST depression	88	140/90	12,320	Peri intubation period	100	150/96	15,000
2.	ST depression	78	130/80	10,140	Enucleation of prostate	136	120/76	16,320
3.	ST depression with ventricular ectopics	86	116/74	9,976	Peri intubation period	88	120/76	10,560
4.	T wave inversion with ventricular ectopics	106	160/90	16,960	Peri intubation period	86	180/106	15,480
5.	Multifocal ventricular ectopics	90	130/90	11,700	1 hr. after intubation during surgery	124	120/70	14,680

Table II shows that rate pressure product was not always altered significantly during the time of abnormal EGG. Three Out of 5 cases (60%) showed abnormalities during the peri-intubation period.

Treatment of intraoperative ECG changes

Any patient developing ECG evidence of ischaemia (ST segment depression > 1 mm or fresh T wave inversion) was treated with 2% nitroglycerine ointment (3-4.5 cm applied to forehead) and increased oxygenation^{10,11} Increasing concentrations of halothane were used to increase depth of anaesthesia and improve myocardial perfusion. Arrhythmias (ventricular ectopics) were treated with increasing oxygen concentration in anaesthetic gases and cessation of surgical stimuli till the disappearance of ectopics. Only one case required a bolus dose of 2% xylocard 1 mg/kg i.v. for the treatment of persistant ventricular ectopics.

DISCUSSION

In this study the patients belonging to the study group had no single or multiple pre-operative patient characteristic which could predispose them to increased intraoperative myocardial ischaemia except for findings suggestive of IHD in the ECG. Metzler et al¹² recorded 80% of ST segment events in patients with established coronary artery disease without pain, as did in all the patients of our study group preoperatively. The ECG changes had disappeared after treatment with coronary dilator therapy and in the immediate pre-operative period both the groups could have been considered as equally at risk to the hazards of anaesthesia and surgery. This was not so, as was clearly shown by the behaviour of the 2 groups intraoperatively. The incidence of intraoperative ischaemia was significantly higher in the study group of this series (50% as compared to 10% in the control group). Wilton et al¹³ state that silent myocardial ischaemia may occur frequently in patients with IHD on maximal medical therapy without clinical signs and symptoms. None of the patients in this study suffered from myocardial infarction though evidence of myocardial ischaemia persisted in one patient into the postoperative period despite adequate treatment Forty percent of the cases showing ECG abnormalities in the intraoperative period (2 out of 5 cases) were accompanied by significant tachycardia (> 120% of basal values). According to one study, 23% of ischaemic episodes during life in patients with stable angina were preceded by heart rate increase of more than 10 beats/min¹⁴. Sixty percent of the cases (3 out of 5) showed rate pressure product > 120% of the basal value and in 40% of the cases no significant changes in pulse, blood pressure and rate pressure product were noticed. Knight et al¹⁵ have shown that majority of ECG episodes occurred without major haemodynamic change and Wilton et al¹³ have theorised that since

most ischaemic periods are accompanied by minimal changes in heart rate, these episodes are related to problems with myocardial oxygen supply rather than any increased oxygen demand. Sixty percent of the ECG changes occurred in the peri-intubation period and in 20% of the cases there was strong surgical stimulation at the time of ischaemia. Only 20% showed ECG changes which could not be attributed to any anaesthetic or surgical cause. These findings are in accordance with those of Slog off and Keats¹⁶ who showed that ischaemic episodes were correlated with tachycardia but not with intraoperative hyper or hypotensive episodes with a strong temporal relationship to anaesthetic or surgical events known to produce intense sympathetic stimulation such as intubation and surgical stimuli. The lone patient in group-A showing intraoperative evidence of ischaemia had significant tachycardia and hypotension one hour after induction, though the rate pressure product remained constant. Nine patients in Group-A and 5 patients in Group-B facing similar surgical and anaesthetic stress did not show any evidence of ischaemia. It is therefore strongly recommended that all patients with documented IHD with, or without treatment, need intensive peri-operative monitoring to detect any further myocardial ischaemic episodes in this period.

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