POSTOPERATIVE MYOCARDIAL ISCHAEMIA IN PATIENTS WITH RECENT MYOCARDIAL INFARCTION

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SUMMARY
Fifteen patients (10 men and five women; mean age 67.3 yr) with a history of a recent (< 1 yr) myocardial infarction underwent ambulatory ECG monitoring for 5 days after non-cardiac surgery. The duration, number and severity of ischaemic episodes were maximal within the first 12 h after surgery and again on the 3rd day after operation. The difference in the duration of ischaemic episodes between the 2nd and 3rd days after operation was statistically significant (P < 0.05). There were no perioperative myocardial infarctions and all patients were discharged from hospital.

KEY WORDS

The prognosis of patients after myocardial infarction (MI) is related to evidence of active ischaemia, the extent of coronary artery disease and the residual left ventricular function [1]. Recent studies showed that objective myocardial ischaemia (silent or symptomatic) after MI increases the cardiac risk for anaesthesia [1]. In the perioperative period, myocardial ischaemia leading to infarction can occur throughout the perioperative period; the incidence peaks on the day of surgery and again on the 3rd day after operation [2, 3]. The ischaemic episodes may be silent in up to 61 % of patients [2, 3]. The aim of the current study was to investigate the degree of ischaemic changes in the ECG of patients with recent MI undergoing non-cardiac surgery.

METHODS AND RESULTS
Between September 1988 and September 1990, we studied all patients with a history of a recent myocardial infarction (< 1 yr) undergoing a non-cardiac surgical procedure. Approval by the Ethics Committee of the University and informed consent were obtained. A two-channel ambulatory ECG recorder (Tracker, Reynolds, Hertfort, England) was applied with the exploring leads in the CM6 and CC5 positions. Recording commenced immediately after surgery when the patient was transferred to the ICU and ended at the beginning of the 5th day after operation. The tapes were analysed at the end of the 5-day period by two independent cardiologists, who were not aware of the individual clinical course of the patient. A scanner unit was used for automatic and operator-controlled analysis.

The mean, maximal and minimal heart rate in each 24-h period and number, duration and severity of ST-segment changes in each 12-h period were recorded and evaluated. An ischaemic episode was defined as a transient ST-segment depression > 0.1 mV, 60 ms after the J-point and lasting for at least 1 min. ST-segment changes associated with bundle branch block, intraventricular conduction disturbances or pacemaker activity were excluded. T-wave abnormalities were not included in the analysis.

The Wilcoxon test for matched pairs (Bonferroni correction) was used to compare each pair of consecutive periods. P < 0.05 was considered statistically significant.

All patients received their usual medication, which was continued until the morning of surgery.
and recommenced as soon as possible after operation. Arterial pressure, a 12-lead resting ECG, cardiac enzyme and serum electrolyte analysis and chest x-ray were performed daily. Oxygen was given via a face mask continuously for the first 24 h and subsequently if indicated by blood-gas analysis.

We studied 15 patients (10 male), of mean age 67.3 yr. The mean interval between MI and surgery was 23.4 weeks. Eleven patients received a general anaesthetic and four a regional technique. No intraoperative or postoperative myocardial reinfarction was detected by the daily resting ECG recordings or cardiac enzyme concentrations. All patients were discharged from the hospital.

Ambulatory ECG data (fig. 1) show that the number, duration and severity of ischaemic episodes were greatest on the 1st and 3rd days after operation \( (P < 0.05 \) compared with day 2).
POSTOPERATIVE MYOCARDIAL ISCHAEMIA

the 7th and 8th measuring periods. This may suggest that the early ischaemic events are related to the operative procedure, whereas the second peak reflects non-specific phenomena, not related directly to intraoperative influences. London [3] observed that our knowledge of the many different factors involved in the pathogenesis of perioperative myocardial ischaemia and infarction remains incomplete and that the traditional simple concept of haemodynamic imbalance does not fit the complex pathophysiological derangements. Although haemodynamic, respiratory and coagulation changes occurred after operation in our small group of patients, they could not be correlated with the ischaemic events.

The results of this study confirm that symptomatic ischaemic events are rare, after both MI and surgery [1, 3, 4]. Only three of 65 ischaemic events in this study were symptomatic (4.6%). Asymptomatic ischaemia is not only a specific postoperative problem, it is also very common after MI. As many as 50% of the postinfarction patient population who have ST-segment changes on exercise testing are asymptomatic. However, the prognosis of patients after MI is worse if ST-segment changes can be detected by exercise testing or ambulatory ECG monitoring [1, 4].

Recent studies using modern Holter technology have documented ST-segment changes in the postoperative period of patients undergoing non-cardiac surgery, but only few studies extended over a longer postoperative period and none correlated ischaemic events between the postoperative days. Wong and colleagues [5] found ischaemic events throughout the first week, culminating on the 6th day after operation. Mangano and colleagues demonstrated that, in high risk patients undergoing non-cardiac surgery, postoperative myocardial ischaemia is an important correlate of adverse outcome [6]. The good outcome of our small group of patients despite severe ischaemia may have been influenced by the site and type of surgery and by left ventricular function. Only two patients had impaired left ventricular function with an ejection fraction of less than 40% and only three patients underwent upper abdominal or extended vascular surgery.

REFERENCES