

# Abdominal Complications Following Cardiac Surgery

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Between 1978 and 1991, 116 of 19,246 patients (0.6%) undergoing cardiac surgery developed abdominal complications (renal/hepatic failure excluded) within 30 days of their cardiac operation. Comparison with a randomly selected control group of 217 patients operated upon over the same period of time was also undertaken. Compared to the control group, the study patients were older (mean age,  $63.3 \pm 12.5$  years vs  $57.5 \pm 21.5$  years;  $P = 0.03$ ), more likely to have a history of alcohol abuse (10% vs 4%;  $P = 0.03$ ), and more likely to have a previous history of gastrointestinal problems (43% vs 17%;  $P = 0.0001$ ). There was also a trend towards a greater number of patients having valvular surgery, particularly reoperative surgery, in the study group. Postoperatively, patients with marked low cardiac output, requiring the intra-aortic balloon pump, were more likely to develop abdominal complications. These complications included complicated peptic ulcer disease in 54 (47%), intestinal obstruction and/or perforation in 19 (16%), biliary tract disease in 13 (11%), mesenteric ischemia in 13 (11%), acute pancreatitis in 3 (3%), and miscellaneous complications in the remaining 14 (12%). Forty-three patients were treated medically and 73 patients required operative intervention. The surgical procedures performed were truncal vagotomy and drainage (12), oversewing of a perforation or a bleeding vessel (6), gastrectomy (2), intestinal resection (14), laparotomy only (14), cholecystectomy (14), and other (11). Mortality was 26% (30/116) with the mortality for medical and surgical treatment being 16% vs 32%, respectively ( $P = 0.112$ ). Intestinal ischemia had the highest mortality, with a rate of 85% (11/13).

Despite intensive monitoring and care of cardiac surgical patients, abdominal complications do occur, although rarely. Risk factors include older age, a positive history of gastrointestinal disease, reoperative valve surgery, and severe postoperative low cardiac output.

Since the early days of cardiac surgery, abdominal complications have been well recognized entities that carry a significant mortality and morbidity.<sup>1-11</sup> Despite improvements in preoperative, operative, and postoperative care, it has been our impression that abdominal catastrophes following cardiac surgery remain a significant problem. We have retrospectively evaluated our own experience with such complications for the period between 1978 and 1991. In order to evaluate possible risk factors for these complications, a control group of patients was also studied.

## METHODS

The Mayo cardiac surgical database was reviewed for all patients who developed an abdominal complication within 30 days of cardiac surgery involving cardiopulmonary bypass. Patients with either renal or hepatic failure alone were excluded. Between 1978 and 1991, 116 such patients were identified. As a control group, 217 patients operated upon over the same time period and on the same days as the study patients, but who did not develop abdominal complications, were also reviewed. Data collected included sex, age, date of surgery, cardiac procedure, presence of diabetes, cerebrovascular disease, peripheral vascular disease, alcohol abuse, use of anticoagulants and/or aspirin in the postoperative period, cardiac-related abdominal complications, and subsequent treatment and outcome. All variables are expressed as the mean  $\pm$  the standard deviation except as otherwise noted. Differences in clinical, operative, and postoperative values between the study and control groups were tested for statistical significance by the chi-square test.

## RESULTS

### Clinical Features

Between 1978 and 1991, 19,246 patients underwent cardiac surgery requiring cardiopulmonary bypass. Of these, 116 (0.6%) developed an abdominal complication. The incidence of such complications between 1978 and 1984 was 0.57% and from 1985 to 1991 was 0.61%. Seventy-four percent of the patients were male with a mean age of  $63.3 \pm 25.5$  years (range: 3 months to 86 years) (Table I). In comparison, the control group of patients were younger, mean age  $57.5 \pm 21.5$  years ( $P = 0.03$ ), had a lower incidence of known peptic ulceration ( $P = 0.0001$ ) and biliary tract disease ( $P = 0.03$ ), and were less likely to have a history of alcohol abuse ( $P = 0.03$ ). Study patients had a greater incidence of diabetes mellitus, although this was not statistically significant ( $P = 0.06$ ). The use of steroids preoperatively and subsequent administration of aspirin and anticoagulants in the postoperative period did not differ significantly between the two groups.

### Cardiac Procedures

A large number of patients in the study (46%) and control (47%) groups underwent coronary artery bypass graft-

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Presented at the Society for Surgery of the Alimentary Tract, Boston May 17-19, 1993.

Manuscript submitted June 4, 1993, and accepted in revised form October 4, 1993.