

Title: THE USEFULNESS OF THE GOLDMAN CARDIAC RISK INDEX

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INTRODUCTION

The prediction of cardiovascular risk from surgery and anesthesia is important in allocating medical resources and evaluating the risk-benefit ratio for operations. Goldman *et al.*¹ followed a large group of patients who underwent a variety of anesthetic and surgical procedures and determined their cardiac risk index (CRI) by comparing the patient's preoperative state with the incidence of life-threatening or fatal postoperative cardiovascular complications. We tested this CRI on a population of patients all subjected to the same type of operation, elective abdominal aortic surgery, which is thought to be associated with a higher cardiac risk.²

METHODS

Ninety-nine consecutive patients over the age of 40 undergoing their first elective abdominal aortic procedure were studied. Each patient's preoperative data were collected by interview, physical examination, and laboratory testing. A CRI was assigned following the scheme of Goldman *et al.*¹ Intraoperative anesthetic and surgical course was evaluated using the hospital record and interviewing the anesthesiologists. Each postoperative day the patient was seen by a member of the study group who reviewed their chart and/or interviewed their physician. Life-threatening cardiac complications were defined as documented myocardial infarction (MI), ventricular tachycardia, or pulmonary edema. Cardiac death was defined as death arising from an arrhythmia or low output refractory to therapy which was not part of an inexorable downhill course caused by a non-cardiac condition, e.g., septic shock.¹

RESULTS

Seventy-eight males and 21 females with an average age of 65 were studied. Ninety-seven patients had a smoking history and 51 smoked currently. Fifty-five had a history of hypertension, 44 had a history of coronary artery disease by history or EKG, 27 had a history of angina, 32 had a MI by history or EKG, and 10 had a history of congestive heart failure. Forty-six patients had respiratory disease either by history or chest x-ray. Three patients suffered minor renal impairment.

The CRI was 5 points or less in 56 patients (Class 1), between 6 and 12 points in 35 patients (Class 2), and between 13 and 25 points in 8 patients (Class 3). No patient had more than 25 points.

Eleven patients had either life-threatening or lethal cardiac complications postoperatively, 7 of which occurred within the first two postoperative days. Five of these 11 patients developed a new myocardial infarction, one of which resulted in death on the eleventh postoperative day; 5 patients developed pulmonary edema and one patient had one episode of ventricular tachycardia. There were two additional deaths, one secondary to a probable pulmonary embolism on the third postoperative day, and the other secondary to intraoperative renal failure, resulting in deaths on the third and forty-ninth postoperative days, respectively. The risk of serious cardiovascular complications in our study was significantly underestimated in Class 1 using Goldman's CRI ($P < 0.01$ Pearson's and likelihood ratio Chi-square). Classes 2 and 3 showed no statistically significant difference.

DISCUSSION

Those patients prospectively identified as being at high cardiac risk did in fact suffer a high incidence of serious cardiovascular events. In this sense the CRI criteria were useful, and Goldman's recommendation that a preoperative medical evaluation be obtained persists unchallenged.

However, there was also a significant incidence of serious cardiovascular events in patients who, by CRI criteria, were not in a high cardiac risk group. There was no obvious difference in patient care between our group and that of Goldman. The incidence of MI, cardiac death, and overall mortality in this study is similar to recently published series.^{2,3} Elective abdominal aortic surgery probably imposes a higher cardiac risk to the patient than predicted by criteria developed from a broad base of surgical patients.

REFERENCES

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