BRIEF REPORT

Assessment and Reporting of Perioperative Cardiac Risk by Canadian General Internists

Art or Science?

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OBJECTIVE: Physicians may use several validated risk indices to estimate perioperative cardiac risk, but there is little evidence for interventions to reduce this risk. We were interested in evaluating how general internists assess, define, communicate, and attempt to modify perioperative cardiac risk.

DESIGN: Cross-sectional survey of all 312 general internists in the Canadian Society of Internal Medicine with Canadian mailing addresses; 117 (38%) responded.

RESULTS: Respondents' mean age was 46 years, 79% were male, and on average they did 17 preoperative consults per month. Of the 104 respondents who routinely performed preoperative assessments, 96% (100/104) informed patients of their perioperative cardiac risk, but 77% did so only subjectively (i.e., stating risk as low, moderate, or high). Respondents provided 8, 27, and 12 different definitions for low, moderate, and high risk, respectively, with marked variability in the range of definitions they provided: from <1% to <20% for "low risk," from 1% to 2% to 20% to 50% for "moderate risk," and from >2% to >50% for "high risk." The 67% of respondents who reported using a perioperative cardiac risk index used a variety of indices and exhibited just as much variability in their risk estimates and definitions as those who didn't use risk indices. While virtually all advised perioperative β blockade in patients with known coronary artery disease, they varied substantially in the recommended agent or dose; further, these internists were evenly split on whether antiplatelet agents should be held or continued perioperatively.

CONCLUSIONS: These physicians differed widely in their assessment of perioperative cardiac risk and their definitions of low, moderate, or high risk. This raises concerns about whether patients (and surgeons) are provided with adequate

information to make fully informed decisions about the potential risks of elective surgical operations.

KEY WORDS: perioperative care; risk estimation.
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Patients require a clear communication of facts in order to weigh the potential risks and benefits of surgery. Cardiac events in patients undergoing nonvascular surgery result in significant morbidity and mortality¹; however, a substantial body of literature has established the accuracy of several perioperative cardiac risk indices.²⁻⁶ Given this evidence base, and the relative paucity of evidence for interventions to modify risk,⁷⁻⁹ we hypothesized that physicians who do preoperative consults would exhibit uniformity in their assessment and definition of perioperative cardiac risk, but substantial variability in their communication of these risks and their proposed management. To test these hypotheses, we undertook a survey of Canadian general internists.

METHODS

We sent a self-administered questionnaire by electronic mail (in October, 2000) to all 312 general internists in the Canadian Society of Internal Medicine with Canadian mailing addresses (faxes were sent to those without electronic mail). General internist status was determined by cross-referencing the databases of the Canadian Society of Internal Medicine and the Canadian Medical Directory. The Canadian Society of Internal Medicine, a voluntary organization, is the only national advocacy organization for general internists in Canada; approximately 20% of Canadian general internists are members (1995 Royal College of Physicians and Surgeons of Canada Work Force Study, unpublished data). Canadian Society of Internal Medicine members are more likely to have academic appointments (53% vs 39%; $P < .0001$) than nonmembers.¹⁰ Second and third mailings were carried out in November and December, 2000. General internists were chosen as the target population for this survey

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because chart audits confirmed that general internists perform the majority of preoperative cardiac risk assessments in Canadian hospitals.^{11,12}

We developed the questionnaire and pilot tested it with 5 general internists to ensure its acceptability, clarity, and face validity. We collected data on respondent demographics, and used open-ended questions to determine how they defined and communicated preoperative cardiac risk to patients and what perioperative interventions they recommended to reduce this risk, both routinely on the wards and for a hypothetical case (see Appendix A). We also asked whether they routinely used any preoperative cardiac risk indices when seeing consults and, if so, which (of the Revised Cardiac Risk Index,⁶ the original Goldman score,² the Detsky Modified Cardiac Risk Index,³ the Eagle,⁴ or the L'Italien⁵ scales; these are available electronically at <http://pbrain.hypermart.net/medrules.html>).

RESULTS

Of the 312 questionnaires distributed, 117 (38%) responses were received. Thirteen respondents were excluded because they did not see preoperative consults, leaving a final sample size of 104 physicians. Respondent demographics were similar to those of the general membership of the Canadian Society of Internal Medicine: mean age 46 years, 79% male, mean of 16 years in practice, and 56% practice in large urban centers. However, respondents were more likely to have an academic position (69% vs 53%; $P < .001$) and to be in group practice (67% vs 41%; $P < .001$). All but 2 respondents had hospital admitting privileges (65% in a teaching hospital), and the mean time spent in direct patient care per week was 39 hours. Respondents saw a mean of 17 consults per month (SD 14.5), with a range from 2 to 80.

Evaluation and Reporting of Risk

The majority of respondents (67%) reported using published risk indices, with 37 routinely using more than 1 scale. The most commonly used indices were the Detsky Modified Cardiac Risk Index (66%) and the Revised Cardiac Risk Index (47%). Although internists with academic appointments were more likely to report using 1 of these risk indices (74% vs 53%; $P = .04$), the usage rates did not differ by experience (<16 years in practice vs ≥ 16 years) or volume (<10 vs ≥ 10 preoperative consults per month).

While 96% of respondents inform patients of their perioperative risk, most (77%) reported doing so only subjectively (i.e., informing patients that they are at low, moderate, or high risk, but without providing specific frequencies). When asked to provide their estimate of low, moderate, or high risk, these respondents provided 8, 27, and 12 different definitions respectively (Fig. 1). Even among those who reported using risk indices routinely, substantial variability still existed: 7, 20, and 9 different definitions were provided for low, moderate, and high risk, with modal responses and ranges identical to the entire cohort.

FIGURE 1A. Definitions of low risk.

FIGURE 1B. Definitions of moderate risk.

FIGURE 1C. Definitions of high risk.

Note: For all 3 figures, respondents were asked, in an open-ended fashion, their understanding of what constitutes low, moderate, and high risk for perioperative cardiac events in patients undergoing nonvascular surgery.

Although 69% estimated the perioperative cardiac risk for the hypothetical case as "low risk," their objective estimates ranged from <1% to <20% (modal response <5%); again, the results in those who reported routinely using published risk indices were identical to those who didn't use risk indices. Only 20% of respondents provided an estimate identical to that derived using the Revised Cardiac Risk Index ($\leq 1\%$).

Perioperative Recommendations

Respondents differed in their perioperative recommendations for patients with stable exertional angina (Canadian Cardiovascular Society class I) undergoing nonvascular surgery. Although no one recommended that patients already taking β -blockers, ACE-inhibitors, or nitrates stop them preoperatively, 51% routinely advised that antiplatelet agents be held. Although 67% recommended the initiation of β -blocker therapy routinely for patients with any degree of coronary artery disease, only 14% advised the initiation of nitrates and 19% the initiation of antiplatelet agents. For the hypothetical case, 94% advised the use of β -blocker therapy perioperatively, although the duration of therapy varied widely, from starting 14 days preoperatively to starting on the morning of surgery (the median and modal response) and from stopping immediately postoperatively (the median and modal response) to continuing indefinitely. There were no statistically significant differences between academic versus nonacademic physicians, or more-experienced versus less-experienced clinicians in their perioperative recommendations.

DISCUSSION

We found that 81% of respondents to our survey either do not inform patients of their cardiac risk preoperatively or do so only subjectively. The wide discrepancy between these physicians in their perception of what constitutes low, moderate, or high risk raises concerns about whether patients (and indeed the surgeons referring the patients) are being provided with accurate information in order to make informed decisions about the potential risks of elective surgical operations. Indeed, presenting patients with accurate risk estimates (for example, by means of patient decision aids) may well have a clinically meaningful impact on patient decision making about surgery.¹³

Of the various published cardiac risk indices, the respondents to our study reported using the Detsky Index or the Revised Cardiac Risk Index most commonly. Both of these scales are simple to apply, quantify risk explicitly for an individual patient, and have been validated in a prospective fashion. However, even those physicians who reported routinely using these indices demonstrated marked variability in their assessment of the perioperative cardiac risk for a hypothetical case.

Although a study conducted in 1996 suggested that Canadian internists infrequently initiated β -blockers perioperatively,¹¹ our survey reveals an apparently dramatic shift in opinion. Although the majority of respondents reported using β -blockers perioperatively in patients with established coronary artery disease, they varied in the duration of β -blocker administration. Indeed, only a minority of physicians followed the protocols employed in either of the trials suggesting benefits with this intervention (in 1 trial, atenolol was started 30 minutes before surgery and continued until discharge or 7 days, whichever came

first; in the other trial, bisoprolol was started at least 7 days before surgery and continued until postoperative day 30).^{14,15} Further, these internists varied substantially in their reported use of antiplatelet agents in patients with coronary artery disease, with over half recommending stopping these agents preoperatively. There are no currently accepted national guidelines on the use of antiplatelet agents perioperatively, but at least 1 study found no apparent impact on cardiovascular events (other than pulmonary emboli or deep venous thromboemboli) in 17,444 patients undergoing hip or knee surgery and randomized to 160 mg aspirin daily versus placebo, with a slight excess (0.6%) in transfused bleeding episodes.¹⁶ However, it should be recognized that this trial was designed to evaluate the impact of aspirin on venous thromboembolic events, there were few cardiovascular events, and patients felt to need aspirin for myocardial protection were excluded. Until well-powered clinical trials are undertaken, physicians will remain uncertain as to which perioperative interventions decrease cardiac risk and variations in practice patterns are likely to persist.

This study has a number of limitations. First, the response rate was only 38%, raising concerns about the generalizability of the findings. However, the key finding of this study is the marked interphysician variability in risk assessment and communication to patients. Although our results may not capture the actual practice of Canadian general internists, it seems unlikely that nonrespondents would be more uniform in their risk assessment and communication than respondents. Indeed, it would be reasonable to theorize that physicians more favorably disposed to the use of objective scales would be more likely to answer the survey. Second, there is always a possibility of social-response bias in any survey. However, the confidential nature of this self-administered survey should minimize any such bias. Third, this is a survey of physician attitudes, not an audit of actual practice, and actual use of risk indices and β -blockers may not be as common as physicians report. Fourth, this survey was developed de novo for this project and we do not have any information on the test-retest reliability of the questionnaire. Fifth, as we chose to present only 1 hypothetical case, we are unable to explore whether reported practices change with the specifics of each case. Sixth, we have no information on whether respondents looked at or merely relied on their memory of the risk indices while filling out the survey.

In summary, despite a substantial evidence base establishing the accuracy of several perioperative cardiac risk indices, we unexpectedly found marked interphysician variability in the assessment, definition, and communication of these risks to preoperative patients. This raises concerns about whether patients (and indeed the surgeons referring the patients) are being provided with accurate information about the potential risks of elective surgical operations. Our data suggest a potential role for patient support technologies, such as decision aids, in the assessment and communication of perioperative risks, and the

need for easier access to risk indices for clinicians (perhaps through the use of hand-held electronic devices loaded with the relevant indices). Further research is needed to test these strategies.

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APPENDIX A

Hypothetical Case

A 70-year-old male with a history of an anterior myocardial infarction 5 years previously and stable exertional angina since. He had a negative stress test (modified Bruce protocol) 6 weeks post-MI and currently only gets angina on extreme exertion (CCS class I). He takes enteric-coated aspirin, 325 mg per day, but no other medications. He is scheduled for elective left hip replacement for osteoarthritis. He is hemodynamically stable, and the only abnormal finding on examination is an apical S4. His electrocardiogram shows normal sinus rhythm with a rate of 75 and old anterior MI, nil else of note.