

The Perioperative Medicine Service: An Innovative Practice at Kaiser Bellflower Medical Center

By Marcus D Magallanes, MD

Abstract

Context: Perioperative medical care is widely recognized as an integral component of overall surgical case management. The perioperative medicine service at the Kaiser Permanente (KP) Medical Center in Bellflower, California (KPBF) was created to address major problems relating to medical preoperative evaluation and postoperative care, particularly for high-risk patients.

Objective: To illustrate successful, innovative practices implemented as functions of the newly formed perioperative medicine service at KPBF.

Design: Review of the genesis, structure, and beneficial outcomes of the perioperative medicine service.

Main Outcome Measures: Number of canceled surgical procedures and physician satisfaction.

Results: In 2000, the number of canceled surgical procedures was reduced by more than half compared with the number of cancellations during 1997. Surgeons, anesthesiologists, and primary care physicians expressed satisfaction with the new perioperative medicine service that led to this reduction.

Conclusion: The newly created perioperative medicine service at KPBF has been highly successful and may serve as a model of perioperative medical management for other KP facilities nationally.

Overview

Perioperative medicine addresses the medical care of the surgical patient and focuses on the patient's status before, during, and after the actual surgical procedure.¹ Perioperative medicine is not a subspecialty of medicine but rather a body of medical knowledge that enables physicians to manage medical illness during the perioperative period, assess operative risk, and respond to complications. The past two decades have seen burgeoning interest in perioperative medicine, an interest that has spawned medi-

cal research and an impressive collection of literature pertaining to this once-obscure topic, particularly with regard to surgery-related cardiopulmonary issues.²⁻⁶ Clearly, perioperative medical care is now well recognized as an integral component of overall case management for surgical patients. Furthermore, with regard to the patient's ultimate outcome, the importance of perioperative medical care is widely appreciated by surgeons, anesthesiologists, and internists alike. To put things into perspective, the clinical significance of perioperative medi-

cal care is demonstrated by one older study,⁷ which showed that approximately 80% of postoperative deaths on the surgical service were attributable to underlying medical conditions, whereas only 20% of the deaths were due to surgery or anesthesia.

Medical Center Background

The Kaiser Permanente Bellflower Medical Center (KPBF) is a Southern California KP facility serving approximately 290,000 Health Plan members, for whom 750 to 1000 outpatient surgical procedures are scheduled each month. These members are outpatients when the procedure is scheduled, but many require postoperative hospitalization, and a few require preoperative admission. (I note that outpatient surgery nowadays is no longer synonymous with elective surgery.) All major surgical disciplines except neurosurgery and cardiac surgery are represented at KPBF.

Past Problems Requiring Solution

The previous system of outpatient preoperative assessment and management at KPBF was essentially identical to that of most other facilities, both KP and non-KP: Patients scheduled for surgery were referred to their primary care physician (or to a subspecialty service) for pre-

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operative medical evaluation and “clearance” for surgery if the surgeon had specific concerns regarding underlying medical conditions. (The reality, of course, is that no one can clear a patient for surgery; instead, the duty is to evaluate the patient’s medical status, assess operative risk, and ensure medical optimization for surgery.) The previous system at KPBF manifested a number of problems, the most prominent of which was last-minute outpatient surgery cancellation. In 1997 alone, more than 800 scheduled surgical procedures were canceled on the day of surgery—equivalent to one month’s worth of surgical procedures. This circumstance resulted in completely lost time in the operating suite, a loss which had obvious financial impact as well as impact

on surgical access. A subsequent case-by-case review of these cancellations showed that about half were due to unforeseen causes and were not preventable (ie, patient failed to keep the appointment, patient be-

came ill with flu, or doctor became ill and thus had to postpone surgery); other cancellations were due to known patient conditions that were not addressed sufficiently before surgery (eg, congestive heart failure, chronic obstructive pulmonary disease, diabetes). This latter group of cancellations was felt to be preventable.

In addition, the previous system led to less objective problems: surgeons and anesthesiologists were dissatisfied with primary care practitioners’ preoperative assessment and preparation of patients with complex medical problems, and primary care physicians were frustrated by the difficulty of trying to

perform adequate preoperative evaluation in their clinics with little background or training in perioperative medicine. There also existed inconsistent postoperative medical care for patients who remained in-house after surgery, particularly in high-risk cases.

The Solution: A Perioperative Medicine Service

These problems prompted the medicine and surgery departments at KPBF to combine their efforts and resources in search of a solution. The outcome was a novel concept: a perioperative medicine service whose primary goals were to evaluate and optimize high-risk cases preoperatively (thus minimizing last-minute surgery cancellation and lessening the burden on the primary care physicians) and to provide consistent in-house medical care for these same patients postoperatively. To achieve this result, the planned service would consist of an outpatient preoperative medicine clinic as well as inpatient perioperative follow-up and consultation.

Personnel for the service currently consists of one caseworker, one scheduler, and one physician (myself). The caseworker receives all requests from surgeons for medical preoperative evaluation and is in charge of arranging and following up any pending issues or studies before surgery. The scheduler makes appointments for the preoperative medicine clinic and conducts basic intake assessment of the patient by phone when assigning an appointment date. As the sole physician of the perioperative medicine service, I am staff for the preoperative clinic and provide inpatient follow-up and consultation. My background is in internal medicine with a one-year fellowship in general

medicine consultation, focusing primarily on preoperative assessment and perioperative management. I have no clinical duties apart from the perioperative medicine service.

Results of Implementing the New Service

The outpatient preoperative referral and evaluation process for KPBF patients is completely centralized. All referrals are channeled through the preoperative medicine clinic, which became operational in May 1999. The primary care department has since been relieved of performing preoperative evaluation, and, in general, the primary care physicians have been pleased by this development. Surgeons and anesthesiologists invariably are more satisfied with the current system of outpatient preoperative evaluation and by postoperative inpatient follow-up. The number of scheduled surgical procedures canceled on the day of surgery has diminished markedly. In the year 2000, only 344 (3%) of 11,426 surgical procedures were documented as canceled on the scheduled day of surgery; this figure represents a reduction of more than half compared with 1997, when about the same number of surgical procedures were scheduled but more than 800 were canceled. (Rate of same-day cancellations for 2001—3%—was identical to the rate for 2000.)

The Preoperative Medicine Clinic

In general, the surgeon is the one who refers patients for preoperative medical evaluation. (A few referrals to the preoperative clinic come from anesthesiologists, primary care physicians, and subspecialists.) The referral process is simple: The surgeon writes “medicine preop” on the sur-

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gery scheduling card, which the surgery scheduling office automatically faxes to us as a referral. The surgeon or other physician may also refer patients to the preoperative medicine clinic directly either by delivering a consult request, by sending an e-mail, or by phone. The orthopedics department has used the preoperative clinic most, followed by the general and vascular surgery departments; but all KPBF surgical services (with the exception of pediatric surgery) have sent and continue to send referrals to the clinic.

In the years 2000 and 2001, the preoperative clinic performed 1096 and 1067 evaluations respectively—figures which correspond to approximately 10% of surgical procedures scheduled during those years. The remaining 90% of scheduled surgical procedures were done on patients who did not require evaluation in the preoperative medicine clinic. For those patients, the required preoperative visit with the surgeon and the anesthesiologist was sufficient.

Inpatient Follow-up and Consultation

The inpatient service has been somewhat problematic, particularly given our high volume of surgical patients overall. Most of our hospitalized surgical patients have been admitted from the emergency department or urgently from various clinics; these patients are not the group who remain in the hospital postoperatively after having outpatient surgery performed. Because of inherent limitations to a one-physician service with major outpatient responsibilities, the role of the inpatient perioperative service has evolved mainly into follow-up care and medical management of patients who have been evaluated preoperatively by the preoperative clinic but

require postoperative hospitalization. Otherwise, surgical patients who have been admitted to the hospital from the emergency department or urgently from a clinic and who require inpatient medical care are automatically assigned a medicine team that provides care jointly with the surgeon.

(At KPBF, the medicine teams consist of hospitalists and rotating clinicians who see patients during hospital rounds.) Perioperative consultation can still be requested on any surgical inpatient and is used mainly to address particular perioperative problems or to assist with medically complex patients having major surgery.

Special Projects of the Perioperative Medicine Service

A major benefit of having a dedicated perioperative service is its focus on improving hospitalwide perioperative care. To that end, several projects are in progress or have been completed at our medical center. For more than a year now, the perioperative service has both emphasized and advertised implementation of prophylactic beta-blocker therapy for surgical patients with clinically diagnosed coronary artery disease or with major risk factors for coronary artery disease. Prophylactic beta-blocker therapy is progressively becoming the standard of care at our institution just as it is nationwide.⁸⁻¹⁰

Management of chronic anticoagulation for surgery has been standardized for our outpatients, and guide-

Practice Tips

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| Implement prophylactic beta-blocker therapy for surgical patients with clinically diagnosed coronary artery disease. |
| Standardize the management of chronic anticoagulation for surgery for our outpatients. |
| Institute a <i>Medical Release for Dental Procedure</i> form containing guidelines and recommendations. |
| Implement preoperative evaluation protocols for low-risk surgical procedures or for patients at low surgical risk. |

lines for inpatient management are currently being distributed.^{11,12} *The Bellflower Perioperative Pocket Manual*,¹³ a convenient inpatient guide to medical care of surgical patients, was locally produced in September 2000 and was widely disseminated to physicians at our medical center. This manual has proved to be a convenient, useful resource to surgeons, internists, and anesthesiologists. A second, updated edition is planned for 2002. A quick and easy *Medical Release for Dental Procedure*¹⁴ form has recently been made available to all our primary care clinics. The form contains guidelines and recommendations (ie,

for use of local anesthetic, antibiotic, and anticoagulant medication) that are easy to scan and apply according to the patients' diagnoses.

Outpatient preoperative evaluation done by the use of protocol (ie, not requiring an actual clinic visit) has now been implemented successfully for two years. The protocols are designed specifi-

cally for low-risk surgical procedures (eg, cataract surgery, procedures for foot or ankle) or for patients at low surgical risk (for example, those with hypertension, obesity, or hypothyroidism but no

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other major surgical risk factors). I initially screen all referrals to the preoperative clinic by reviewing computer-listed diagnoses and medical transcriptions; cases categorized as low-risk on the basis of patient characteristics and type of surgery are referred to the caseworker, who in turn interviews the patient by phone. I do the final chart review and assessment and make recommendations; these activities complete the protocol-based process. Retrospective review of more than 200 protocol-based cases, done from November 1999 to November 2000, found the process safe and reliable with no documented problems related to the protocol process itself. Nearly 20% of all preoperative evaluations done by the preoperative clinic are protocol-based, and this process has both saved time and improved clinic access without compromising patient care.

Conclusion

The perioperative medicine service at KPBF has been a successful, innovative practice. This article elucidates the genesis, structure, and benefits of this novel service, particularly for other KP medical centers which may have the same problems as encountered at KPBF before inception of the service. In my opinion, the system within which we, as Kaiser Permanente physicians, work is ideal for such a service, particularly given three factors: our available informational infrastructure; our familiarity and working relationships with surgeons and anesthesiologists within the same medical center; and our essentially enclosed patient referral base. To create such a service is certainly not an easy task; it requires

collaboration between both the medicine and surgery departments as well as ultimate buy-in from anesthesiology. However, the beneficial outcome of creating a perioperative medicine service will more than likely be worth the effort. ❖

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References

1. Goldmann DR. What is perioperative medicine? In: Goldmann DR, Brown FH, Guarnieri DM, editors. Perioperative medicine: the medical care of the surgical patient. 2nd ed. New York: McGraw-Hill, Health Professions Division; 1994. p 3-7.
2. Goldman L, Caldera DL, Nussbaum SR, et al. Multifactorial index of cardiac risk in noncardiac surgical procedures. *N Engl J Med* 1977 Oct 20;297(16):845-50.
3. Jackson CV. Preoperative pulmonary evaluation. *Arch Intern Med* 1988 Oct;148(10):2120-7.
4. Wong T, Detsky AS. Preoperative cardiac risk assessment for patients having peripheral vascular surgery. *Ann Intern Med* 1992 May 1;116(9):743-53.
5. Eagle KA, Brundage BH, Chaitman BR, et al. Guidelines for perioperative cardiovascular evaluation for noncardiac surgery. Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee on Perioperative Cardiovascular Evaluation for Noncardiac Surgery). *J Am Coll Cardiol* 1996 Mar 15;27(4):910-48.
6. Arozullah AM, Khuri SF, Henderson WG, Daley J. Participants in the National Veterans Affairs Surgical Quality Improvement Program. Development and validation of a multifactorial risk index for predicting postoperative pneumonia after major noncardiac surgery. *Ann Intern Med* 2001 Nov 20;135(10):847-57.
7. Beecher HK, Todd DP. A study of the deaths associated with anesthesia and surgery: based on a study of 599,548 anesthetics in ten institutions 1948-1952, inclusive. *Ann Surg* 1954 Jul;140(1):2-34.
8. Mangano DT, Layug EL, Wallace A, Tateo I. Effect of atenolol on mortality and cardiovascular morbidity after noncardiac surgery. Multicenter Study of Perioperative Ischemia Research Group [published erratum appears in *N Engl J Med* 1997 Apr 3;336(14):1039]. *N Engl J Med* 1996 Dec 5;335(23):1713-20.
9. Poldermans D, Boersma E, Bax JJ, et al. The effect of bisoprolol on perioperative mortality and myocardial infarction in high-risk patients undergoing vascular surgery. Dutch Echocardiographic Cardiac Risk Evaluation Applying Stress Echocardiography Study Group. *N Engl J Med* 1999 Dec 9;341(24):1789-94.
10. Schmidt M, Lindenauer PK, Fitzgerald JL, Benjamin EM. Forecasting the impact of a clinical practice guideline for perioperative beta-blockers to reduce cardiovascular morbidity and mortality. *Arch Intern Med* 2002 Jan 14;162(1):63-9.
11. Kearon C, Hirsh J. Management of anticoagulation before and after elective surgery. *N Engl J Med* 1997 May 22;336(21):1506-11.
12. Ansell J, Hirsh J, Dalen J, et al. Managing oral anticoagulant therapy. *Chest* 2001 Jan;119(1 Suppl):22S-38S.
13. Magallanes M. The Bellflower perioperative pocket manual. [Bellflower (CA): Kaiser Permanente Bellflower Medical Center; 2000].
14. Kaiser Permanente Bellflower Medical Center. Perioperative Medicine. Medical release for dental procedure [form]. [Bellflower (CA): Kaiser Permanente Bellflower Medical Center; 2001].

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