Are Ambulatory Surgical Patients as Healthy as We Think? Using a Self-Reported Health Status Questionnaire to Identify Unsuspected Medical Comorbidities

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Introduction

Over the last 30 years, there has been a strong trend toward the performance of surgery in the ambulatory, outpatient setting. In 1982, of all operations performed in the United States, 20% were performed as outpatient procedures; by 1995, this figure had increased to 60% [1]. This trend has been particularly evident in the field of orthopedic surgery. For example, at Hospital for Special Surgery, which focuses exclusively on musculoskeletal disease, there were over 7,000 ambulatory surgeries (AMS) performed in 2004. This is in contrast to ~4,700 outpatient procedures performed in 1996.

Although economically advantageous, AMS challenges the system of care in a variety of ways, perhaps most significantly in the arena of preoperative medical evaluation. Medical consultations on these patients are usually ordered at the discretion of the attending surgeon. In general, patients undergoing AMS are younger and healthier than those being admitted for inpatient procedures. However, given that an increasing proportion of surgery is being performed on an AMS basis, it is likely that older and potentially less healthy patients are being offered this

option. Therefore, this study was undertaken to determine if a simple self-reported health status questionnaire could be an effective tool to capture medical comorbidities that might impact perioperative care.

Methods

A medical screening questionnaire was designed to identify preexisting medical conditions among orthopedic surgery candidates scheduled to undergo AMS surgery. The questionnaire was developed by internists experienced in caring for perioperative orthopedic surgery patients. Its content included the following types of questions and asked the patient to:

- rank his or her health as excellent, good, fair, or poor
- list all medications taken
- note any problem with prior surgery
- complete a brief review of systems, including cardiac, respiratory, gastrointestinal, neurological, endocrine, etc.
- note any symptoms of sleep apnea
- note use of alcohol or “recreational” drugs

The questionnaire was given to patients in five high-volume surgeon’s offices representing different orthopedic subspecialties, including the Hand, Foot, and Sports Services. Office staff members were trained in administering the questionnaire to AMS patients on whom the surgeon had *not* ordered a preoperative medical consultation. The completed questionnaire was faxed to a central location and reviewed by an internist who determined if further information, specific testing, or a formal medical evaluation was necessary and approved (or did not approve) sur-

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- **Stage I** Approved for surgery on basis of the questionnaire alone.
- **Stage II** Approved for surgery after telephone contact by the internist.
- **Stage III** Approved for surgery only after a specific intervention was ordered. These included ordering a test, speaking with the patient's internist, reviewing a cardiogram, etc.
- **Stage IV** Approved for surgery only after medical consultation was performed (stage 4)

Fig. 1. Study overview

gery based on this assessment. Patients were subsequently contacted directly by the internist as necessary and patients were approved for surgery based on the opinion of the internist. The algorithm followed by the internist is shown in Figure 1.

Results

Seventy-seven questionnaires were reviewed by the study internists. The mean age of the patients was 41 years, with a range from 14 to 80 years, and 51% were female. Of the 77 patients whose questionnaires were reviewed, 40 were approved for surgery on the basis of the questionnaire alone. Although all patients had been booked for surgery by their surgeon without requesting an internal medicine consultation, it was not clear that the remaining 48% (37/77) of patients could be considered suitable surgical candidates (without further evaluation) based on the patient's answers to the questionnaire. Seven patients, in fact, were referred for immediate medical consultation. The remaining 30 patients were contacted by telephone to determine whether further medical work-up was indicated. Of the 30 patients called, 20 were approved for surgery after the telephone conversation, 1 required immediate medical consultation, 8 needed further interventions, whereas 1 patient was lost to follow-up. Interventions included stopping anticoagulants, stopping nutraceuticals or supplements, changing diabetic medication dose, ordering an electrocardiogram (EKG), ordering antibiotics, or reviewing patient medical records.

Many comorbid diseases were associated with non-approval of surgery (Fig. 2). These include cardiac arrhythmia, diabetes mellitus, coronary artery disease, hyperlipidemia, myocardial infarction, morbid obesity, chest pain, cancer, hypertension, rheumatoid arthritis, asthma, celiac disease, snoring (sleep apnea), and sarcoidosis. Although the sample size was too small to make any statistical association with specific diseases, these observations underscore that even the AMS population suffers from a substantial burden of chronic disease. Nonetheless, after appropriate evaluation, eight patients were felt to require a formal preoperative consultation, and three of these patients were ultimately approved for surgery on the basis of the consultation. Four patients did not present for their consultation and one patient was lost to follow-up.

Interestingly, despite the significant amount of medical comorbidity uncovered in this study, all responding patients rated their health as "good" or "excellent" (Fig. 3).

Discussion

Improved surgical techniques, anesthesia and pain management, have resulted in the ability to perform a much broader range of surgical procedures on an ambulatory basis. This results in tremendous cost savings, and is often much more convenient for the patient. Currently, most plastic and cosmetic surgery is performed on an outpatient basis, as is

transurethral resection of the bladder and lithotripsy in urology, hernia repair in general surgery, sinus procedures in otolaryngology, and laparoscopy in general and gynecological surgery [1]. As a general practice, AMS has also been successfully adopted by the field of orthopedic surgery, especially procedures that are performed arthroscopically. At our institution, the proportion of surgical cases performed in the ambulatory setting has increased by 25% between the years 1997 and 2004.

Initially, patients whose surgery was performed in the outpatient setting tended to be younger and healthier, and they were often undergoing minor procedures. As might be expected, these patients generally had low complication rates. However, as the indications for AMS have expanded, older and more medically complicated patients are being offered this option. At HSS, the average age of AMS patients has been gradually increasing—from 44 years in 1999 to 46 years in 2004, with a range of 18–92 years. In 2004, 15% of AMS patients were over 65-year old, whereas 4% were over 75-year old. It should, therefore, no longer be assumed that, by definition, AMS patients can be considered a "low-risk" population: a "healthy" 65-year old is simply not the same as a "healthy" 45-year old. Compounding this potential problem is the patients' own belief that their health is "good or excellent," despite self-reporting serious medical comorbidities, a self-perception that may contribute to the minimization (by the patient and surgeon) of perioperative risk. As such, there will be an increasing need to improve our methods for preoperative assessment to ensure patient safety and optimize postoperative outcomes. Apropos of these considerations, this article describes our early experience with a screening methodology that demonstrates promise in the identification of patients who may be a higher risk for surgery in the outpatient setting.

Our data suggest that routine preoperative assessment of AMS patients as currently practiced may result in an underestimation of potentially important medical comorbidities. Serious medical conditions were identified by the questionnaire, which had not been previously noted, and which an experienced internist determined required further assessment before surgery. Adding our questionnaire to the preoperative screening process made a substantial impact: 20% of patients required additional consultation and/or medical intervention before an internist was willing to approve them for surgery.

The utility of the preoperative examination before admission for elective surgery has been demonstrated, at least for inpatient surgery. In a study of 21,553 patients booked for elective inpatient procedures, introducing routine pre-surgical assessment as an outpatient led to significant decreases in cases canceled for medical reasons, decreases in the length of hospital stay, and a significant increase in the rate of same-day admissions [2]. In addition, the number of preoperative EKGs, chest radiographs, and preoperative laboratory tests also decreased significantly. The number of patients on whom no laboratory tests were performed increased from 17% to 37%. There was no change in postoperative ICU admissions despite the decrease in preoperative testing [2]. Other investigators in different

STAGE I**Reasons Not Approved from Questionnaire**

Medical Problem	55.7 %
Insufficient Info On Questionnaire	5.7 %
Multiple Meds or Significant Meds	27.1 %
Multiple Prior Surgeries	1.4 %
Reason Not Indicated by MD	4.3 %
Diagnostic Tests Done, Results not	
Available/Known to MD	5.7 %

Spectrum of Disease Preventing Approval from Questionnaire

Arrhythmia	Diabetes
Coronary artery disease, MI, CABG	Celica disease
Hypertension	Morbid obesity
Asthma	Sarcoid
Snoring (sleep apnea)	Rheumatoid Arthritis
Chest Pain	Cancer

STAGE II**Reasons Not Approved from Primary Phone Call**

Medical Problem(s)/Multiple Medications	33.3 %
Significant Medication	16.7%
Diagnostic Test Required	8.3 %
Need to Review Local MD's Data	33.3 %
Patient Unreachable	8.3 %

Spectrum of Disease Preventing Approval from Primary Phone Call

Hypertension	25 %
Asthma	25 %

Fig. 2. Results

centers have shown similar results [3–6]. Thus, in the in-patient arena of surgical practice, preoperative medical assessment appears to reduce costs and potentially result in improved patient outcomes.

Although much less robust, there are some data that support the observation that the preoperative evaluation of *ambulatory* surgical patients is also beneficial. For in-

stance, the preoperative evaluation of AMS patients has been shown to be cost saving through a reduction in the number and length of unexpected inpatient admissions [7]. What is not clear is if these relatively healthy adults benefit *medically* from an evaluation before the day of surgery [8]. It should be noted, however, that much of these data are over a decade old and do not reflect trends toward per-

Hyperlipidemia	25 %
Other	25 %

Interventions Made at Primary Phone Call

Stopped Anticoagulant	42.9 %
Stopped Others	28.6 %
Ordered EKG	14.6 %
Reviewed Local MD data	14.3 %

STAGE III

Did Screening MD Make An Intervention At Stage III

No	97.4 %
Yes	2.6 %

Intervention Made At Stage III

Stopped Anticoagulant Med	33.3 %
Changed Dose Diabetes Medicine	33.3 %
Added Antibiotic	33.3 %

STAGE IV

Patients Requiring Consultation (Stage IV)

No Show For Consult	50 %
Cleared After Consult	50 %

Fig. 2. Continued

forming AMS procedures on older, potentially less healthy patients. Nonetheless, the data we present herein at least suggests that patients are at a higher risk than previously thought.

In closing, this study suggests that in our AMS population, potentially serious medical conditions are being un-

derestimated preoperatively, a problem that fortunately can be readily addressed by using a simple and questionnaire-based methodology. Whether such early identification of patients at risk will lead to better outcomes in the AMS patient is unknown and is an important area for further study.

Fig. 3. Patient self-reported presurgical health status

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