Patient Screening and Assessment in Ambulatory Surgical Facilities

ABSTRACT

Ambulatory surgical facilities (ASFs) provide surgical care to patients who do not require hospital admission for their postoperative care. The popularity and growth of ASFs on a national scale has been attributed to an increased throughput of patients, reduction in staff and surgical costs, and more personalized care. Along with the progression in volume, increasingly complex procedures are being performed at ASFs. In addition, patients with more complex medical conditions are having surgery in the ASF setting. Thorough initial assessment of patients is required to identify any concerns or disease processes, such as obstructive sleep apnea or cardiovascular disease, which could potentially cause intraoperative or postoperative problems. From June 2004 to December 2008, the Pennsylvania Patient Safety Authority received 467 reports related to the preoperative screening or assessment process in ASFs. Two hundred three of these reports indicate the patient experienced harm. Risk factors are discussed, as well as processes to ensure a thorough preoperative screening and assessment of patients to identify risk factors. (Pa Patient Saf Advis 2009 Mar;6[1]:3-9.)

Introduction

Ambulatory surgical facilities (ASFs) are defined by the Pennsylvania Health Care Facilities Act as a facility, not located upon the premises of a hospital, which provides specialty or multispecialty outpatient surgical treatment.[1] ASFs afford patients the opportunity to undergo surgical and procedural services in a nonhospital setting. ASF popularity and volume continues to grow, with the number of visits to freestanding ASFs estimated to have increased nationally by 300% from 1996 to 2006.[2] By 2006, an estimated 57.1 million procedures were performed during 34.7 million ambulatory surgery visits.[2] The proliferation of ASFs has been attributed to a number of factors, including increased throughput of patients, reduction in staff and surgical costs, and more personalized care.[3] Advances in anesthetic and surgical techniques have also contributed to the growth in the number and complexity of procedures in ASFs. Along with the greater complexity of procedures, there has been an increasing shift to performing procedures in ASFs on patients who have more complex medical conditions, including some that have been associated with a heightened risk of adverse postoperative outcomes.[2]

Reports submitted to the Pennsylvania Patient Safety Authority indicate that medical conditions that are not detected during the preoperative screening and assessment process may place patients at increased risk for postoperative complications requiring hospital admission. Identification of these medical conditions through a thorough preoperative screening and assessment process is integral to providing safe patient care in the ASF setting. This article will review medical conditions associated with increased perioperative risk in the ASF setting. Risk reduction strategies are presented to assist healthcare providers during the preadmission screening and preoperative assessment process, allowing early identification of patient risk factors.

Authority Reports

Reports submitted to the Authority from June 2004 to December 2008 were reviewed to identify potential issues involving the preoperative screening or assessment process. Of the 467 reports identified, 203 (43%) were reported as a Serious Event, most often involving a complication requiring transfer to an acute care setting. Two hundred thirty-four of the total reports (50%) involved an elderly patient (older than 65). Twenty-three reports (5%) involved a pediatric patient.

One hundred twenty-four event reports (27%) submitted by ASFs indicated that screening and assessment processes required improvement. In 85 reports (18%), the patient had a condition, such as an arrhythmia or sleep apnea, which may have put the patient at increased risk during the procedure, but no improvement to the ASF's screening and assessment process was recommended by the ASF. A variety of conditions were identified as potentially missed during the screening or assessment process; most frequently reported conditions include a cardiac history, arrhythmia, and poor respiratory status. The following are examples of reports to the Authority in which the ASF indicated that the screening and/or assessment process needed improvement:

> *No patient prescreening was obtained prior to admission. After reviewing patient information, it was noted the patient had a history of Clostridium difficile. Reviewed information with the anesthesiologist, and then contacted the infection control nurse at the medical center and was advised to cancel the procedure pending further data about the C. difficile [history].*

> *A patient with a history of drug abuse and smoking had an upper endoscopy procedure. The procedure was uneventful. At the end of the procedure the patient went into laryngeal spasms that required intubation and subsequent transfer to the hospital.*

> *A pediatric patient presented for surgery with a body mass index (BMI) greater than 30 and has a history of asthma. The case was canceled by the anesthesiologist because, per the facility guidelines, morbidly obese patients are not appropriate candidates to have a procedure at the surgi-center.*

The patient did not report a prior history of a low platelet count. The patient experienced postoperative bleeding and was transferred to the hospital. The preoperative screening tool was reevaluated to include an assessment of prior or current blood dyscrasias.

A patient admitted for surgery revealed a history of a recent myocardial infarction, congestive heart failure, and chronic obstructive pulmonary disease. The patient's cardiologist was notified and determined the patient was not an appropriate candidate for the surgery center.

The preoperative interview determined that a patient admitted for a cystoscopy was morbidly obese and had a history of sleep apnea and congestive heart failure. The preoperative screening process will be evaluated.

Risk Factors

In a previous *Patient Safety Advisory* article, the following factors identified in the literature that predict an increased risk for hospital admission or death following outpatient surgery were discussed:[4]

- Patient age greater than 85 years
- Peripheral vascular disease
- Operating room (OR) time greater than one hour
- Malignancy
- Positive HIV status
- Heart disease
- A requirement for general anesthesia

Additional factors have been identified in the literature that may place a patient at risk in the ambulatory setting. These factors support the importance of identifying patient conditions to help avoid unfavorable outcomes related to surgery in ASFs, and they include obstructive sleep apnea, cardiovascular disease, hyperactive reactive airway disease, obesity, and end-stage renal disease (ESRD).

Obstructive Sleep Apnea

Obstructive sleep apnea (OSA) is undiagnosed in an estimated 80% of affected patients, and the incidence of presumed or diagnosed OSA is predicted to rise five- to tenfold during the next decade.[5,6] The number of patients with OSA undergoing surgery in the ambulatory surgery setting may be expected to increase commensurate with these estimates; however, there are currently no corroborative studies. Nonetheless, the American Association of Anesthesiology (ASA) Practice Guidelines support the preoperative evaluation of patients for identification of OSA. According to ASA, comparative literature is insufficient to evaluate the impact of preprocedure OSA status identification on outcome but does suggest that OSA characteristics may put a patient at risk for perioperative airway management issues.[7] The guidelines emphasize that patient selection for ambulatory surgery depends on the severity of OSA, coexisting diseases, invasiveness of surgery, type of anesthesia, anticipated postoperative opioid requirements, and adequacy of postdischarge observation.[7,8] The ASA Practice Guidelines include a scoring system that can be used to help determine the appropriateness of ambulatory surgery in patients with OSA.[7]

Cardiovascular Disease

Cardiovascular adverse events are the most common adverse events occurring during ambulatory surgery.[9] A broad range of cardiovascular disease, from hypertension to severe valvular disease, may be encountered.[10] All patients require assessment of the presence of symptoms that could suggest cardiac disease with positive responses addressed according to risk assessment guidelines, such as the guideline by the American Heart Association (AHA) and the American College of Cardiology (ACC). The AHA/ACC guideline suggests that the cardiovascular evaluation of a patient undergoing noncardiac surgery should include an assessment of disease, functional status, and extent of surgery.[10,11] A baseline cardiac assessment is recommended for patients who have known coronary artery disease (CAD) or who have onset of signs or symptoms of CAD. Cardiac conditions that would necessitate evaluation and treatment before noncardiac surgery include significant or new onset arrhythmias (e.g. new onset atrial fibrillation) and severe valvular disease.[11] Patients with unstable coronary syndromes or decompensated heart failure are not considered appropriate candidates for procedures in the ambulatory surgery setting.[12]

Patients with cardiovascular disease require assessment for the presence of a pacemaker.[10] An ASA practice advisory suggests that preoperative evaluation include determining the reason for the pacemaker, the exact type of pacemaker, the patient's underlying rhythm, and medications.[13] Ensuring patient safety and proper maintenance of the device includes a number of considerations, such as whether electromagnetic interference is likely to occur and whether reprogramming of the device is required.[13] Patients also require assessment for the presence of an automatic implantable cardioverter defibrillator (ICD), which must be disabled before and reset after the procedure. The presence of a pacemaker or an ICD requires the immediate availability of backup defibrillation or cardioversion equipment during the perioperative period.[13]

Hyperactive Reactive Airway Disease

Literature related to pulmonary risk following ambulatory surgery is limited; however, hyperactive reactive airway disease has been associated with an increased risk for perioperative complications during outpatient surgery.[14] Chronic obstructive pulmonary disease (COPD) and asthma both involve hyperreactivity of the airway. In a prospective study of preexisting medical conditions in ambulatory surgery, patients with asthma and smokers were identified as having increased risk for postoperative respiratory events.[15] A four-center study of 6,914 patients undergoing ambulatory surgery demonstrated that patients with asthma and COPD had an increased risk of

bronchospasm.[16] Asymptomatic patients with asthma have been demonstrated to be at low risk for perioperative complications; however, those with asthma symptoms have been shown to have a 50% incidence of postoperative respiratory complication compared with less than 2% of those without symptoms.[17] Smoking cessation for 30 days before surgery and delay of surgery for symptomatic asthma patients has been recommended.[18]

Obesity

Obesity is defined as an excess of adipose tissue or body weight greater than or equal to 20% more than ideal weight or a BMI of greater than or equal to 30 kg/m^{-2}.[19] A recent study evaluated whether obesity is an independent risk factor for unplanned hospital admission or readmission among patients scheduled for ambulatory surgery. Two hundred thirty-five obese patients scheduled for ambulatory surgery in a tertiary medical center were matched to a normal-weight control by age, sex, surgical procedure, type of anesthesia, and date of surgery. Comorbidity was more frequent in the obese cohort. The study demonstrated that obesity is not a significant independent risk factor for unplanned admission after ambulatory surgery.[20] While obesity alone has not been associated with unanticipated admission following ambulatory surgery, obesity has been associated with an increase in intraoperative respiratory events. In a cohort study of 17,638 patients, 2,779 had a BMI of greater than or equal to 30 kg/m^{-2}. Obese patients did not experience increased cardiovascular risk but were at a significantly increased risk of intraoperative events, including desaturation and bronchospasm.[17] Lower respiratory events were more common in obese members of a 7,000 patient cohort undergoing ambulatory surgery.[18]

End-Stage Renal Disease

Patients with ESRD may have one or several other diseases, including coronary artery disease, diabetes, or congestive heart failure, which may place them at risk in the ambulatory surgical setting.[10,12] A patient with ESRD who undergoes an ambulatory surgical procedure requires a detailed history and physical assessment that includes consideration of their underlying disease processes. The most commonly performed procedure in patients with ESRD in the ambulatory surgery setting is hemodialysis vascular access.[12] Important concerns for these patients include fluid and electrolyte balance, particularly potassium.[10,12] Timing of dialysis treatments is important because the patient has relative volume depletion on the day of dialysis. Patients with ESRD are at increased risk for bleeding due to platelet dysfunction. Anemia is also common in this patient population. Gastric emptying may be impaired, placing these patients at risk for aspiration.[10,12]

Risk Assessment

The preoperative assessment process starts when the surgeon or the proceduralist schedules the case. In general, the goal of the preoperative anesthesia assessment is to identify and manage any risks associated with anesthesia and surgery as early in the process as possible. However, the assessment process continues up to the point of surgery.

ASA Physical Status Classification System

Patient conditions that may increase risk during procedures performed in the ASF setting have been identified. However, research has not yet provided clear-cut support to guide patient selection decisions for ASF procedures. Nonetheless, there are guidelines used by anesthesia providers to evaluate a patient's risk for anesthesia and surgery, such as the ASA patient classification system, which is excerpted as follows:[21]

ASA 1. A normal healthy patient.

ASA II. A patient with mild systemic disease.

ASA III. A patient with severe systemic disease.

ASA IV. A patient with severe systemic disease that is a constant threat to life.

ASA V. A moribund patient who is not expected to survive without the operation.

ASA VI. A patient that has been declared brain-dead, whose organs will be removed for donor purposes.

In Pennsylvania, surgery in an ASF is limited to patients that are a physical status (PS)-1, PS-2, or PS-3. Physical status is consistent with ASA physical status classification.[1]

The relationship of ASA classification to patient outcomes following ambulatory surgery has been studied; however, conclusions are inconsistent. A retrospective case-controlled review of 896 ASA III patients demonstrated no significant difference in postoperative complications within the first 24 hours of surgery in ASA III and ASA I and II patients.[22] More than 75% of anesthesiologists surveyed in a Canadian study were willing to include ASA III patients in their selection criteria. In the same study, more than 75% of the respondents found ASA IV patients—including patients with high-grade angina pectoris and congestive heart failure, sleep apnea with postoperative narcotics, morbid obesity with comorbidities, and no patient escort—to be unsuitable for ambulatory anesthesia.[23] Other studies have not found a correlation between ASA classification and outcome.[5] Potential problems related to ASA IV patients undergoing surgery in the outpatient setting include the requirement for invasive monitoring, vasoactive drug infusions, and postoperative ventilator support.[24]

Risk Classification

The ASA classification system has been considered limited unless the risk of the surgical procedure is also considered.[25] A risk classification system developed at the Johns Hopkins University School of Medicine proposed that risk of surgery is a function of several factors, including procedure invasiveness, associated

blood loss and fluid shift, entry into specific body cavities, postoperative anatomic and physiologic alterations, and need for postoperative intensive care monitoring. Procedures are classified from category 1 (i.e., minimal risk, minimally invasive, with little or no blood loss) to category 5 (i.e., major risk, highly invasive, with blood loss greater than 1,500 ml).[25] The author notes that both the ASA classifications and the Johns Hopkins risk classification system are consensus-driven.

Risk Reduction Strategies

Since current research has not provided clear-cut patient selection criteria, all ASFs need to ensure that their patient selection and assessment criteria will adequately guide the preoperative screening and assessment process. ASFs also need to ensure that reliable methods are implemented to ensure timely and adequate preoperative assessment. Such efforts will help to provide a high level of care and produce the best patient outcomes.

Preoperative Screening

The initial screening process is the first step in identifying any concerns or diseases processes that could potentially cause intra- or postoperative problems. The Association of periOperative Nurses (AORN) has issued a guidance statement for nursing preoperative evaluation in the ambulatory surgery setting.[26] An initial element of a comprehensive preoperative policy and procedure is careful preoperative screening, which can take place by telephone or in a face-to-face interview in a preadmission clinic setting. AORN recommends that a professional registered nurse (RN) conduct the preoperative screening to include assessment of the following:[26]

- A baseline physical assessment
- Allergies and sensitivities
- Signs of abuse or neglect
- Cultural, emotional, and socioeconomic assessment
- Pain assessment
- Medication history, including over-the-counter medications, herbal medications and supplements, and illicit drugs
- Anesthetic history
- Results of radiological examinations and other preoperative testing
- Discharge planning
- Referrals
- Identification of physical alterations that require additional equipment or supplies
- Preoperative teaching, including which medications are to be taken or withheld before surgery, preoperative shower and NPO (nils per os; nothing by mouth) requirements
- Informed consent and/or knowledge of the procedure
- Development of a care plan
- Documentation and communication of all information per facility policy

ASFs can also consider a number of strategies used successfully by other facilities to assist in the gathering of appropriate information during the preoperative screening process. One Pennsylvania ASF with a low surgical cancellation rate (1%) uses a comprehensive preadmission packet and automated preoperative phone calls in its presurgical process.[27] When the decision for surgery is made, the surgeon's office begins completing the packet, which includes the surgical consent, registration forms, health history questionnaire, surgical admission form with orders, and patient instructions. The surgeon completes a history and physical form or dictates it by means of the hospital's transcription service. The anesthesiologists use consensus guidelines for preoperative testing and have agreed on which response on the health history will trigger a call to the patient's physician before the surgery. A nurse practitioner reviews the flagged charts. The preadmission packets are processed by the hospital's presurgical office. The following are elements of the process:[27]

- Secretaries send registration forms to the admissions department and file the rest of the packets by date of surgery, adding test results and other information when received.
- Secretaries flag charts meeting criteria for further review.
- A nurse practitioner reviews the flagged charts for anesthesia issues and orders tests or consults as needed.
- Two days or more before surgery, secretaries begin assembling the chart. A worksheet on the front tracks information. Secretaries follow up on missing information.
- On the day before surgery, an RN reviews the charts and completes the preoperative checklist.
- The master surgical schedule notes any information missing in red.
- Preanesthesia and nursing assessments are conducted on the day of surgery.
- Automated phone calls communicate preoperative information to patients. The calls cover preoperative instructions, arrival times, and follow-up after surgery.
- Staff contact patients who were not reached by the automated call.

Another Pennsylvania ASF considers a close relationship with the primary care physician's office an integral part of the preoperative screening process. (The Patient Safety Authority learned of this screening process through the ASF's interaction with the Authority's Patient Safety Liaison Program.) The ASF sends a history and physical form to the patient's

primary care physician for completion. The form elicits information about the patient's medical history and current status that the ASF may not otherwise obtain. One to two days before surgery, an RN calls the patient to provide preoperative instructions and completes a preadmission phone call form, which is reviewed by anesthesia services. On the day of surgery a preoperative RN or licensed practical nurse sees the patient and performs an assessment before the patient's admission. If potential issues are identified, an anesthesia provider further screens the patient before admission. The patient is then admitted, and a preoperative and anesthesia form is completed.

Preoperative Nursing Assessment

After the preoperative screening is completed, the preoperative nursing assessment is an opportunity to verify information and obtain missed or forgotten information that may affect patient outcome. The AORN guidance statement recommends that an RN conduct a preoperative nursing assessment on the day of surgery.[26] The data collection process involves the patient and his or her significant other or guardian. Information obtained during the preadmission screening is verified. The guidance statement provides an extensive list of information to be obtained and documented. Additional guidelines address communication of the assessment to surgical team members, formulation of a nursing care plan, and development of a process for reporting and acting on abnormal findings. The following interventions should be considered in the assessment:[26]

- Verification of the patient's identity using two identifiers
- Review of the preadmission screening/assessment
- A baseline physical assessment
- Assessment of NPO status
  - Hypothermia assessment and management
  - Pain scale assessment
- Identification of the presence of an advanced directive
- Identification of the planned procedure by the patient, significant other, or guardian
- Verification of site, side, or level, as applicable
- Implementation of the prescribed surgical preparation
- Assessment for prosthetic devices and implantable electronic devices
- Evaluation of the availability of safe transportation home and aftercare
- Obtaining contact information of the patient's significant other
- Assessment of the patient's understanding of preoperative teaching and discharge planning

Preoperative Anesthesia Assessment

The preoperative anesthesia assessment is the part of the overall preoperative assessment process that identifies issues related to perioperative anesthesia management of the patient.[28] ASA guidelines for ambulatory anesthesia endorse the following as a baseline for preanesthesia patient care:[29]

- Preoperative instructions and preparation
- An appropriate preanesthesia evaluation and examination by an anesthesiologist or before anesthesia and surgery
- Verification of information and repeat of key elements of the evaluation if nonphysician personnel are involved in the process
- Preoperative studies and consultation as medically indicated
- An anesthesia plan discussed with the patient

The following is a summary of the ASA Practice Advisory for Preanesthesia Evaluation recommendations, which are based on a synthesis of opinion surveys, literature, and ASA task force consensus:[30]

- Content of the preanesthesia evaluation includes (1) readily accessible medical records; (2) patient interview; (3) a directed preanesthesia examination, which includes at a minimum, an assessment of the airway, lungs, and heart; (4) preoperative testing as indicated; and (5) other consults as appropriate.
- Timing of the preanesthesia evaluation can be guided by surgical invasiveness and severity of disease.
- Routine preoperative tests, which include tests to discover disease or disorder in an asymptomatic patient, do not make an important contribution to anesthesia preoperative assessment and management.
- Selective preoperative tests, ordered after consideration of information from the medical record, patient interviews, physical examination, and type or invasiveness of the procedure, may assist in preoperative assessment and management.
- Decision-making parameters for the type and timing of preoperative tests cannot be determined based on the current literature. Specific tests and timing should be patient-specific.

One Pennsylvania ASF's approach to preanesthesia assessment is to conceptualize two goals. First, the patient's condition—whether it is optimal or as good as possible at this point in time—is evaluated, considering all the elements of the history and physical, including the review of systems. The following are also components involved in meeting the first goal:

- Have all indicated and abnormal labs, electrocardiogram, and other diagnostic studies been addressed?
- Is the patient on appropriate medical therapy?
- Is the current medical therapy effective?

Accompanying Patient Safety Tools

Visit the Pennsylvania Patient Safety Authority Web site (http://www.patientsafetyauthority.org) to view or download the following resources based on this article.

- "Health History," a sample form that may be sent to the primary care physician or the referring physician for completion before the day of surgery at an ambulatory surgery facility (ASF).
- "Nursing Preoperative Screening," a sample form that may be used for nursing preadmission screening before the day of surgery at an ASF.

Determination of whether medical therapy is effective in patients with chronic disease is usually conducted by their primary care provider. In patients with multiple, serious, or complex medical problems, an appropriate medical specialist may be needed to determine optimization or make recommendations for optimization of the patient's condition before surgery.

The second goal is to determine whether the planned procedure and anesthesia are appropriate for the patient. For example, a patient with an ischemic cardiomyopathy or with renal disease may be an appropriate candidate for an ASF procedure that is performed under minimal or moderate sedation but not for an ASF procedure that requires deep sedation or general anesthesia. It is also possible that outpatient surgery is not appropriate for such a patient.

Conclusion

As the popularity of ASFs continues to grow and increasingly complex procedures are performed in the ASF setting, thorough screening and assessment and preparation of patients before ambulatory surgery are essential to ensure optimal patient outcomes. Although the body of evidence to support that certain comorbidities may make some patients less suitable for surgery in the ambulatory setting is not large, a number of patient comorbidities have been associated with increased risk of intraoperative and postoperative complications. Consideration of these comorbidities during screening and assessment is an important part of a thorough preoperative evaluation.

Notes

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Self-Assessment Questions

The following questions about this article may be useful for internal education and assessment. You may use the following examples or come up with your own.

1. Risk reduction strategies to help ensure timely and adequate preoperative anesthesia assessment include all of the following EXCEPT:
   a. Conducting routine preoperative tests
   b. Conducting a preanesthesia evaluation that is guided by surgical invasiveness and severity of disease
   c. Repeating key elements of the anesthesia evaluation if nonphysician personnel are involved in the initial assessment
   d. Discussing the anesthesia plan with the patient
2. Which of the following statements is inaccurate about preoperative risk assessment in ambulatory surgery?
   a. The relationship of the American Association of Anesthesiology (ASA) classification to patient outcomes has been studied but is inconclusive.
   b. Procedure risk classification systems consider the risk of surgery to be a function of surgical invasiveness, associated blood loss and fluid shift, and the need for postoperative intensive care monitoring.
   c. Potential problems related to ASA IV patients undergoing surgery in the outpatient setting include the need for invasive monitoring, vasoactive drug infusions, and postoperative ventilator support.
   d. Routine preoperative tests make an important contribution to anesthesia assessment and management.
3. All of the following are clinical conditions that have been associated with an increased risk of adverse outcomes in the ambulatory surgical setting EXCEPT:
   a. Patient age greater than 85 years
   b. A BMI (body mass index) greater than 25 kg/m^2
   c. Obstructive sleep apnea
   d. Asthma
4. A 76-year-old patient with end-stage renal disease and new-onset atrial fibrillation is scheduled for the placement of a hemodialysis vascular access in an ambulatory surgical facility (ASF).

   Which of the following statements is inaccurate about the preoperative assessment of this patient before surgery in an ambulatory surgical setting?
   a. Important concerns for this patient include preoperative evaluation of fluid and electrolyte balance, particularly potassium.
   b. The patient's new onset of atrial fibrillation is a cardiac condition that may necessitate evaluation and treatment by a cardiologist before placement of a hemodialysis vascular access in an ASF.
   c. The patient's age is a factor identified in the literature that predicts an increased risk for hospital admission following surgery in an ASF.
   d. The preoperative evaluation of this patient includes, in consultation with the patient's cardiologist as appropriate, determination of the reason for the pacemaker, the exact type of pacemaker, the patient's underlying rhythm, and medications.
5. A comprehensive preadmission screening of a patient before an ambulatory surgical procedure includes all of the following EXCEPT:
   a. Medication history
   b. Allergies
   c. Anesthetic history
   d. Exercise tolerance test

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