Preoperative Evaluation of the Adult Outpatient

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Introduction
Preoperative evaluation is a fundamental component of anesthetic delivery because it guides anesthetic management and postoperative care. This is especially true in the ambulatory surgical setting where preoperative evaluation also informs patient selection. Patient selection, in turn, is the cornerstone for safe and efficient ambulatory anesthesia care.

In the outpatient setting the preoperative anesthesia assessment – which exists in a variety of forms - is a key tool for both optimizing medical and administrative outcomes. Proactive identification and management of medical problems avoids last minute surprises that at best interrupt ambulatory surgery center patient flow and at worst contribute to adverse medical outcomes. This lecture will review: 1) the basic requirements for preoperative evaluation as determined by payers and regulators 2) models of preoperative evaluation and their merits and 3) preanesthetic evaluation of selected co-morbidities which are particularly relevant to the outpatient setting such as obesity, sleep apnea, cardiac disease, and insulin requiring diabetes.

Ground Rules
The ground rules which govern US hospitals as set forth by the Joint Commission state that prior to any operative or other high risk procedure the patient receives a medical history and physical examination no more than 30 days prior to surgery. (Standard: RC.02.01.03, PC.01.02.03, EP 5) The American Society of Anesthesiologists has adopted standards (last amended in 2010) for preanesthesia care which is more specific http://www.asahq.org/For-Healthcare-Professionals/Standards-Guidelines-and-Statements.aspx; accessed 6/11)

Basic Standards for Preanesthesia Care
The anesthesiologist, before the delivery of anesthesia care, is responsible for:
1. Reviewing the available medical record.
2. Interviewing and performing a focused examination of the patient to:
   a. Discuss the medical history, including previous anesthetic experiences and medical therapy.
   b. Assess those aspects of the patient’s physical condition that might affect decisions regarding perioperative risk and management.
3. Ordering and reviewing pertinent available tests and consultations as necessary for the delivery of anesthesia care.
4. Ordering appropriate preoperative medications.
5. Ensuring that consent has been obtained for the anesthesia care.
6. Documenting in the chart that the above has been performed.

Furthermore the ASA Statement on Documentation (last amended in 2008) lists specific elements of the preanesthesia evaluation that should be recorded and further states that this is the responsibility of an anesthesiologist. (www.asahq.org/publicationsAndServices/sgstoc.htm, accessed 6-11) The content of this evaluation is to include medical history, anesthetic history, medications, appropriate physical exam including vital signs and documentation of airway assessment, review of objective diagnostic data and medical records, medical consultations when applicable, assignment of ASA physical status, formulation of anesthetic plan and documentation of risks and benefits of the plan “including discharge issues when indicated”. The Center for Medicare and Medicaid Services (CMS) issued “Revised Hospital Anesthesia Services Interpretive Guidelines” in December 2009 (with a clarification in January 2011) which reflect the ASA Statement for documenting preoperative assessment. What then is the best approach for satisfying these minimum requirements and professional society expectations? Clearly, the answer depends on the type of facility, patient population and procedures. Patient selection criteria, and hence evaluation paradigms, for a free-standing or office based practice will undoubtedly differ from a hospital
based practice in a tertiary care center. In spite of these differences, there are some unifying guiding principles that apply to all settings.

For starters, the basic requirements as outlined above need to be satisfied in a manner that is consistent and efficient. The goal is to determine who is fit for outpatient surgery and then to optimize those candidates. The extent and focus of the preanesthesia assessment is determined by the patient’s co-morbidities and type of surgical procedure.

Secondly, a plethora of studies indicate that laboratory exams should be obtained for medical indication only and that “routine” testing is of no value, especially in the ambulatory setting. (1-3) However, the information gained from a thorough history and physical exam and clear communication with members of the perioperative team is of considerable benefit. Investigators of the Australian Incident Monitoring Study database identified poor airway assessment, communication problems, and inadequate preoperative evaluation as contributing factors in 197 preventable major adverse events (incidence 3.1%) including death and major morbidity. (4) While laboratory exams may not be useful, basic patient evaluation and communication of salient features are still essential.

Over the past few decades, several models have been developed to facilitate preoperative communication, triaging, and medical evaluation. All of these models have their strengths and weaknesses, depending on the facility (free-standing center, office, hospital, etc.) and the patient population.

**Models for Systematic Preoperative Evaluation**

Patients can be evaluated on the day of surgery or seen in a preoperative evaluation clinic, or some hybrid version. The preferred model depends on patient demographics and type of facility. Patients evaluated the day of surgery have usually had a screening telephone interview with a preoperative nurse several days in advance of the procedure with anesthesiologist consultation as necessary. This method can be quite effective and efficient if relevant patient records (i.e., history and physical, laboratory values) are available at the time of the telephone screen, the nurses are well trained at interviewing, and have algorithms for seeking physician consultation. At the other end of the spectrum are preoperative evaluation clinics where patients are seen well in advance of surgery by an anesthesiologist and/or advanced practice nurse. These clinics are usually found in larger tertiary medical centers and face-to-face visits are reserved for patients with extensive co-morbidities. These clinics require institutional support and delineated organizational infrastructure. (5)

Regardless of the method used, preoperative screening is cost effective and has the potential to yield substantial dividends by minimizing delays, cancellations, and opportunity costs. (6-8) While data for ambulatory surgery are limited, in a large urban medical center Ferschl and colleagues found same day surgery patients seen in the preoperative evaluation clinic had a cancellation rate of 8.4% as compared with a cancellation rate of 16% for same day patients who were not evaluated in clinic. Cancellations have significant negative financial impact, with estimates of over $1500/hr of lost revenue for every hour the OR sits idle (contribution margin).

Data are beginning to emerge using preoperative assessment to predict future hospital costs. In the National Surgical Quality Improvement Program (NSQIP), 51 preoperative risk factors such as Cr > 1.2 or previous cardiac surgery, predicted post-operative cost variation due to complications and extended hospital stay. (9) The authors speculate that preoperative optimization of these risk factors would mitigate the occurrence of postoperative complications and hospital costs. This remains to be determined.

Whether telephone screens or preoperative clinic visits are used, the model chosen for ambulatory anesthesia evaluation needs to emphasize patient selection using evidence-based algorithms developed by anesthesiologists and broadly shared with surgeons and their offices. This will permit effective triaging of patients and optimization of medical conditions preoperatively. For example, a patient with a drug-eluting cardiac stent placed within the year who abruptly discontinued clopidigrel would not be an appropriate candidate for elective surgery, irrespective of the venue. However, the same patient a year later may be perfectly appropriate for a hospital-based surgery center but not an office setting, depending on the procedure and other co-morbidities.
Medical Evaluation
This discussion will encompass medical co-morbidities that have considerable relevance to the outpatient setting due to the associated perioperative risks and dilemmas posed by discharging the patient within a few hours of surgery and anesthesia. Areas of focus include cardiac disease with an emphasis on stents and implantable cardiac rhythm devices, obesity and obstructive sleep apnea, and diabetes and perioperative glycemic control.

Cardiac
There is an abundance of data, guidelines and opinions to guide preoperative evaluation of cardiac risk. This section will focus on key studies and guidelines which are applicable to outpatients since the type of surgery is usually limited in scope, with minimal fluid shifts. However, most studies which form the backbone of current guidelines were extrapolated from (in) patients having extensive procedures.

In guideline parlance, outpatient procedures are generally considered “low risk” however, lumping these procedures can be misleading (i.e., a cataract repair is not equivalent to a rigid bronchoscopy). Consequently, it becomes incumbent on the anesthesiologist to sort out which patients are at risk and require more extensive evaluation. Risk stratification methods are useful but they all have their limitations, namely they are often observational studies at a single institution. Nevertheless, common themes emerge. A landmark study of 4315 patients over 50 years having noncardiac elective surgery was used to identify independent risk factors, comprising the Revised Cardiac Risk Index (RCRI). (10) Although major cardiac complications were rare (2%) six independent risk factors were identified:

- High risk surgery (intraperitoneal, intrathoracic, or suprainguinal vascular)
- History if ischemic heart disease
- History of congestive heart failure
- History of cerebrovascular disease
- Preoperative treatment with insulin
- Preoperative serum creatinine > 2.0 mg/dL

The authors specifically note that “(T)he Index is of uncertain generalizability in lower-risk populations, such as patients who undergo minor procedures….”. However, data specifically examining that population is lacking so this risk index is widely used.

While risk indices can be quite useful, Reilly used a simple – and practical - screening tool to predict perioperative risk, namely self-reported exercise tolerance. Poor exercise tolerance, such as the inability to walk 3 blocks or climb 2 flights of stairs (< 4 METS), is an independent predictor of serious perioperative complications (OR 1.94, CI 1.19-3.17). Moreover the likelihood of serious complications is inversely related to the number of blocks walked or flights of stairs climbed. (11)

A decade later, in a single-center observational study, Kheterpal used NSQIP data to identify preoperative and intraoperative predictors of adverse cardiac events. (12) Their findings are consistent with findings from a decade earlier, with some modifications. Those independent predictors are:

- Age > 68 yrs
- Active CHF
- BMI > 30 kg/m2
- Emergency surgery
- Previous cardiac intervention
- Cerebrovascular disease
- Hypertension
- Operative duration > 3.8 hrs
- Administration of one or more units of PRBCs

All of the aforementioned predictors except for two (emergency surgery and administration of ≥ 1 unit of PRBC) are commonly encountered in the ambulatory setting. On a related note, a supporting study by Correll and colleagues found that age > 65 was an independent predictor of preoperative electrocardiogram abnormalities. (13)
The findings from the aforementioned studies and many, many others led to the most recent (2007) American Heart Association/American College of Cardiology guidelines on perioperative evaluation for patients having noncardiac surgery. (14) (These guidelines were updated in 2009 with respect to perioperative beta-blockade.) There are some key points in these guidelines as they relate to ambulatory surgery. First, ambulatory surgery is considered as one entity and all ambulatory procedures are considered low risk with reported cardiac mortality < 1%. Secondly, in the absence of “active cardiac conditions”, “interventions based on cardiovascular testing in stable patients would rarely result in a change in management and it would be appropriate to proceed with the planned surgery.” In other words, in the absence of active cardiac conditions (unstable coronary syndromes, decompensated heart failure, significant arrhythmias, and severe valvular disease), additional interventions would rarely alter perioperative risk for low risk procedures. However, although additional testing may not be warranted (because it would rarely lead to a meaningful intervention), a complete and thorough history and physical exam which can probe the presence or absence of active cardiac conditions is essential. The AHA/ACC guidelines recognize that there are clinical risk factors (which are based on Lee’s Revised Cardiac Risk Index cited earlier). However, in the absence of active cardiac conditions, further action is rarely needed.

**Previous Coronary Interventions: Stents and Cardiac Rhythm Devices**

**Stents**

Approximately two million patients per year in Western countries have cardiac stents placed and 90% of those stents are drug eluting stents which will require long term antiplatelet therapy. About 5% of stented patients will present for noncardiac surgery within the first year of stent placement. (15,16) The implications of cardiac stents and antiplatelet therapy on preoperative assessment requires a clinical understanding of the associated risks and well defined preoperative policies to guide patient selection and evaluation.

With any coronary stent, there are risks, especially during the period of re-endothelialization. Until the period of re-endothelialization is complete, patients need to remain on dual antiplatelet therapy (i.e., aspirin and clopidigrel). Bare metal stents (BMS) are layered with endothelial cells after about 4-6 weeks. However, there is a risk that these stents are vulnerable to restenosis over time hence the development of drug eluting stents (DES). DES are coated with agents which impair cellular proliferation. This can prevent restenosis but also results in a longer period of time to stent re-endothelialization. During this period, patients must remain on dual antiplatelet therapy.

Premature discontinuation of dual antiplatelet therapy, especially in the perioperative period, can be catastrophic due to stent thrombosis. (17-22) If noncardiac surgery is performed immediately after stent placement and without antiplatelet therapy, there is a 30% risk of perioperative MI and 20-40% of those are fatal. The risk of MI and death is 5-10 times higher than waiting the appropriate amount of time.

Practice guidelines are unequivocal in stating that elective surgery be postponed until patients have completed an appropriate course of antiplatelet therapy. (14,18,22) The duration of antiplatelet therapy is currently estimated at minimum of 4 weeks for BMS and 12 months for DES, with aspirin continued indefinitely. However, some patients may be more prone to thrombosis and may need to remain on antiplatelet therapy for longer periods. Predictors of stent thrombosis are: bifurcated lesions, long stents, diabetes, renal failure and low ejection fractions. However, until more data are available, the practice guidelines are unequivocal.

The ACC/AHA 2007 Perioperative Guidelines state: “Elective procedures for which there is significant risk of perioperative or postoperative bleeding should be deferred until patients have completed an appropriate course of thienopyridine therapy (12 months after DES implantation if they are not at high risk of bleeding and a minimum of 1 month for bare-metal stent implantation).” (14) Similarly, the ASA Practice Alert issued in 2009 affirms the position of the ACC/AHA Perioperative Guidelines. (22)

Since ambulatory surgery procedures are usually elective, patients need to defer surgery until 4-6 weeks after placement of a BMS and one year after DES. Aspirin should be continued in the perioperative period if at all possible. To avoid confusion and compromised patient care, it is extremely useful for surgery centers to have policies which reflect these guidelines.
**Cardiac Rhythm Devices**

The perioperative assessment management of the adult surgical outpatient with a cardiac implantable electronic device (CIED) – either a pacemaker, an implantable defibrillator or both, is commonplace in 2011. This poses clinical and administrative challenges. (23-25) Indeed, perioperative management of these devices is the topic of an updated ASA Practice Advisory. (25)

The indications for the CIED should be fully appreciated, as this often reflects significant underlying cardiac disease. (23) Permanent pacemakers are indicated for symptomatic third-degree heart block, type II second-degree heart block, sinus node dysfunction, recurrent neurally mediated syncope as well as some forms of cardiomyopathy. For example, biventricular pacemakers, are considered in patients with significant heart failure (ejection fraction <35%) despite medical therapy. Implantable Cardiac Defibrillators (ICDs) are indicated in patients who have had a cardiac arrest that is not due to a temporary condition. This includes a wide array of problems including ischemia, long QT syndrome, hypertrophic cardiomyopathy or familial cardiomyopathy. Thus the first question to be asked is: WHY was THIS device placed? The second question is whether the patient (and procedure) are appropriate for outpatient surgery given the status of the cardiac disease.

If the patient and procedure are appropriate for the facility, then basic information about the devices should be obtained either during a preoperative visit or telephone call. This should be done well in advance of surgery, so that there is time to 1) decide if device interrogation or reprogramming by appropriate personnel will be necessary and 2) have enough time to coordinate personnel for preoperative and postoperative care.

Preoperatively, the following information should be obtained (ASA Practice Advisory):

1. Indication for CIED
2. Is patient device dependent?
3. Type of device and manufacturer (available from manufacturer’s identification card)
4. Assess CIED function
   - Date of last interrogation and results
   - Current setting
   - Does the device capture when it paces?
   - Effect of magnet on pacemaker function (ie, defaults to DOO at # bpm)
   - Does CIED automatically reset to preoperative settings when a magnet is removed?
5. Likelihood of device interference
   - Will electromagnetic interference (EMI) be likely during the procedure? (EMI is unlikely if the device is < 10 years old and bipolar cautery is > 15 cm from device lead or generator)
   - Based on the likelihood of EMI, is reprogramming the CIED to asynchronous mode or disabling rate responsive function with a magnet or reprogramming indicated?
   - Should antitachyarrhythmia functions be suspended? (By whom?)

Appropriate arrangements need to be made preoperatively so that the device can be reprogrammed (if necessary) in advance of the procedure and immediately after the procedure, without unduly inconveniencing patients or providers. If the device required reprogramming by the cardiology service/manufacturer’s representative preoperatively then original settings will need to be restored postoperatively and before discharge from PACU. Until those settings are restored, patients need to have cardiac monitoring with the capability to defibrillate immediately (i.e., defibrillator pads in place).

**Obesity**

Approximately 34% of the adult US population is obese and ~ 67% are overweight and obese (http://www.cdc.gov/nchs/fastats/overwt.htm, accessed 6/11). Obesity poses considerable perioperative challenges, and this is especially true in the outpatient setting where patients are expected to be discharged within a few hours after surgery. Associated co-morbidities such as obstructive sleep apnea and pulmonary dysfunction impact postoperative recovery/discharge and hence the patient selection process. A thorough understanding of the common
obesity associated co-morbidities is useful to help formulate not only ambulatory anesthetic management but also patient selection criteria.

**Cardiovascular**

There is a direct and independent relationship between obesity and hypertension. (26-28) Furthermore, obese patients without documented hypertension are prone to occult diastolic dysfunction, probably secondary to increased circulating blood volume and chronic LV wall stress. (29) Systolic dysfunction associated with obesity is a later development, and is most often seen among obese patients with body mass index (BMI) $>40$kg/m2 for $>10$ years. (30) Cardiac function can be difficult to assess preoperatively due to diminished functional capacity. Consequently, non-invasive testing with appropriate modalities (such as stress echocardiography) may be required if patients have multiple risk factors or have limited functional capacity. (31,32)

Reconciling the AHA/ACC cardiac evaluation and care algorithm for non-cardiac surgery in obese patients having ambulatory surgery requires clinical judgment. Indeed, this issue was highlighted in the recent advisory from the AHA regarding the cardiac evaluation of severely obese patients: "(T)hese categorizations (low, intermediate and vascular surgery) are used in the decision algorithm for further testing but it is unknown if obesity influences these categorizations." (33) Consequently, this AHA advisory recommends a preoperative ECG in severely obese patients (BMI $>40$kg/m2) with one risk factor for heart disease. If there are signs of CV disease (e.g., CAD, RVH consistent with pulmonary hypertension), additional workup based on functional capacity be pursued – if it will change management.

Obesity and obstructive sleep apnea are associated with pulmonary hypertension which poses considerable perioperative risk. However, diagnostic criteria (such as signs of right heart failure) in the absence of an echocardiogram are vague, especially in the morbidly obese. The associated postoperative mortality in patients with pulmonary hypertension across several different inpatient procedures is estimated to be 7-10%. (35,36) Due to several factors, including intense intra and postoperative monitoring, these patients may not be candidates for the vast majority of ambulatory procedures and need to be carefully evaluated on a case by case basis.

**Obstructive Sleep Apnea (OSA)**

The prevalence of OSA in obese patients presenting for bariatric surgery is 71% -77%, depending on (BMI). (37) OSA is usually not a solitary diagnosis in an obese patient; associated co-morbidities include: hypertension and increased risk of cardiovascular disease, including stroke and sudden death. (38-40) Sudden cardiac death in (non-surgical) obese patients is associated with a nocturnal pattern which is distinctly different than in other populations. A review of polysomnograms and death certificates from 112 persons who experienced sudden cardiac death demonstrated that those with OSA had peak in sudden death from cardiac causes during sleeping hours (midnight to 6am). In contrast, those without OSA had peak incidence of sudden death after 6am. (41)

In the perioperative setting, patients with OSA have an increased incidence of postoperative complications: Hwang measured home nocturnal desaturations preoperatively in 172 subjects. Patients with $>5$ desaturations/hr had significantly higher rate of postop complications (15%) vs. those with $<5$ events/hour (3%). Complications were primarily respiratory. (42) Chung evaluated 177 patients deemed at risk for OSA by various screening tools and then performed polysomnography. (43) Those with apnea-hypopnea index (AHI) $>5$ as confirmed by polysomnography had postoperative complication rate that was more than double those with AHI $\leq 5$ (27% vs. 12%).

Discerning who actually has OSA is challenging, as the diagnostic “gold standard” is polysomnography, which many patients do not obtain. Diagnosis based on screening questionnaires is unreliable. A meta-analysis of clinical screening tests for OSA illustrates that it is possible to predict severe OSA with a high degree of accuracy. However, aside from severe OSA, false negative rates range from 14-38% which will miss a significant proportion of patients. (44)

Nevertheless, simple screening methods have been developed for preoperative use including the STOP-BANG questionnaire which has a sensitivity from 84% (AHI$>5$) to 100% (AHI $>30$). Patients who answer yes to three or more items are considered to be at high risk of OSA. (43) Other similar validated tools incorporate upper airway anatomy to enhance predictive modeling. (45)
STOP-BANG (Chung 2008)

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
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<tbody>
<tr>
<td>1. <strong>Snoring</strong></td>
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<tr>
<td>Do you snore loudly (louder than talking or loud enough to be heard through closed doors)?</td>
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<td>2. <strong>Tired</strong></td>
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<td>Do you often feel tired, fatigued, or sleepy during daytime?</td>
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<td>3. <strong>Observed</strong></td>
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<td>Has anyone observed you stop breathing during your sleep?</td>
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<td>4. <strong>Blood pressure</strong></td>
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<td>Do you have or are you being treated for high blood pressure?</td>
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<td>5. <strong>BMI</strong></td>
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<td>BMI more than 35 kg/m²?</td>
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<td>6. <strong>Age</strong></td>
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<td>Age over 50 yr old?</td>
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<td>7. <strong>Neck circumference</strong></td>
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<td>Neck circumference greater than 40 cm?</td>
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<td>8. <strong>Gender</strong></td>
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<td>Male gender?</td>
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A main concern for patients with OSA is their suitability for ambulatory surgery. Is it safe to send these patients home to an unmonitored setting after anesthesia and surgery? Data are scant since important determinants such as severity of OSA, type of anesthetic and type of procedure have not been individually examined. Instead, we have expert opinions extrapolated from inpatient setting and used as guide. The ASA Practice Guidelines for the Perioperative Management of Patients with OSA (approved by ASA HOD October 2005) state that literature is insufficient to make recommendations and those guidelines are based on consultant opinion. (46) Moreover, the clinical screening tool suggested in ASA Guideline has not been clinically validated. The ASA Guidelines recommend that anesthesiologists determine whether a given surgical procedure and individual patient with (or at risk for) OSA is appropriate for outpatient setting. Factors to consider include:

1. severity of sleep apnea status
2. anatomical and physiologic abnormalities
3. status of coexisting diseases
4. nature of surgery
5. type of anesthesia
6. need for postoperative opioids
7. patient age
8. adequacy of postdischarge observation
9. capabilities of the outpatient facility

Specifically in reference to outpatients, the ASA Guidelines recommends: “These patients should not be discharged from the recovery area to an unmonitored setting (i.e., home or unmonitored hospital bed) until they are no longer at risk for postoperative respiratory depression.” The Guidelines also recommend observing patients while breathing room air in an unstimulated environment and note that this may require a longer ambulatory stay (i.e., 3 hours longer than non-OSA counterparts and median of 7h after last episode of airway obstruction or hypoxemia while breathing room air in an unstimulating environment). Practical application has been challenging because patients frequently do not have formal preoperative diagnosis of OSA and severity is difficult to estimate. Most likely, recommendations in this arena will continue to evolve as more relevant data become available.

**Diabetes**

Approximately 15% of US adults aged >20 years and ~27% of individuals >65 years have diabetes or impaired fasting glucose. (http://www.cdc.gov, accessed 6/11) In order to evaluate potential end-organ damage and maintain metabolic homeostasis these patients require a focused assessment to a) gauge appropriateness for procedure on an outpatient basis, with a focus on potentially difficult airway in patients with long-standing Type I diabetes and b) guide preoperative fasting and insulin instructions.

Cardiovascular disease is the major cause of morbidity and mortality amongst patients with diabetes, with the most common conditions being hypertension and dyslipidemias. The most recent American Diabetes Association guidelines recommend that patients with diabetes be treated to a blood pressure < 130 mm Hg systolic and < 80 mmHg diastolic. Furthermore, it is recommended that all patients with diabetes have serum creatinine
measured and cardiovascular risk factors such as dyslipidemia, hypertension, smoking, positive history of coronary disease and presence of micro- or macroalbuminemia assessed annually. This is part of routine health maintenance and is independent of surgical need. Further cardiac testing – irrespective of the need for surgery - should be considered in diabetics with typical or atypical anginal symptoms or an abnormal resting ECG. (47)

Patients with diabetes may be on complicated regimens to achieve glycemic goals in order to reduce the risk of micro and macrovascular complications. In addition to insulin and conventional oral hypoglycemic agents, treatment may include relatively new classes of gastrointestinal hormones – namely incretins and amylin – which impact glucose homeostasis. (48) In adults glycemic goals are: A1C ≤ 7 % and preprandial glucose 70-130mg/dl and peak postprandial glucose < 180 mg/dl. (47) Due to concerns about perioperative hypoglycemia as delineated in the NICE-SUGAR study, perioperative glycemic goals as suggested by the ADA are in the range of 120 – 180 mg/dl. (47,51)

To achieve those targets and simplify preoperative instructions, ambulatory surgery centers usually have protocols which address the type and quantity of insulin (and other hypoglycemic agents) to be administered preoperatively, recommendations for monitoring blood sugar preoperatively and treating hypoglycemia while adhering to NPO guidelines. A common feature in these protocols is to include a basal form of insulin on the day of surgery (usually as a fraction of the typical intermediate acting insulin or long acting insulin) and withhold oral hypoglycemic agents and incretins. (48-50) A basic understanding of the time course of commonly used insulin’s, as outlined below, is integral to developing effective preoperative instructions.

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<th>Insulin Comparison</th>
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**Summary**
Outpatient evaluation is the basis for patient selection, which is fundamental for safe and efficient ambulatory anesthetic management. Models of evaluation include: assessment on the day of surgery, telephone triage, or preoperative clinic visit. Each model has its advantages, and adoption depends on the facility and patient demographics. Irrespective of the method, patients are evaluated with discharge planning in mind. Patients should be suitable for elective surgery with the expectation that they can be safely discharged home within a few hours of their procedure. Several co-morbidities affect this process and serve to refine patient assessments and selection criteria.
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