Preoperative Identification, Evaluation, and Optimization of Patients at Highest Risk

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Introduction: preoperative evaluation challenging if surgery performed in outpatient setting or if patient not hospitalized prior to surgery (which is increasingly common); inadequate evaluation does occur; robust preoperative process needed, including strong presence of and participation by anesthesia providers, to better prepare patients for their surgical course; Australian study found that 10% of incidents involving anesthesia failure were related to the preoperative process (57% of those incidents believed to be completely preventable); preoperative evaluation not simply testing, but rather assessment and management; important to identify specific issues that can be changed rather than simply gather information

Case example: patient with history of Hodgkin lymphoma as teenager including extensive radiation treatment and chemotherapy; survived cancer but suffered many comorbidities; presented with severe restrictive lung disease; wheelchair bound; required treatment for breast cancer (likely presented with severe restrictive lung disease; wheelchair bound; required treatment for breast cancer (likely secondary to radiation); requested bilateral mastectomy and immediate reconstruction; surgeon concerned about ability of patient to survive anesthesia, and pulmonologist deemed risk excessively high; patient could receive no further radiation therapy and only limited chemotherapy; discussed in clinic more realistic goal of addressing cancer and delaying any preventive treatments or reconstruction; treatment plan — epidural placed in pain clinic after consulting with pain specialist (paravertebral block may be used for unilateral breast surgery and epidural block for bilateral breast surgery); arranged operating room team familiar with management of pulmonary hypertension; intensive care unit (ICU) bed reserved for postoperative recovery; prophylactic ICU stay can often be limited to ≤1 day in contrast to admission of patient only after problems arise, which usually involves longer stay

Identification of high-risk patients: large study from United Kingdom found that 12% of surgical patients accounted for >80% of deaths; targeting this population likely to improve outcomes; predictors of complications include older age, comorbidities (particularly unstable or poorly controlled comorbidities), and major surgery; using risk stratification tools and calculators, patients can be identified based on history and planned procedure alone, before any tests administered; National Surgical Quality Improvement Program Surgical Risk Calculator — available online; quantifies risk for specific complications and helps assess need for postdischarge placement in assisted-care facility; preoperative factors plus planned surgery more predictive of costs than postoperative complications; key questions to ask of patients — include “How much do you exercise?” “What is your functional capacity?” “Can you walk 1 flight of stairs?” “Can you walk 2 blocks (and, if so, do you become dyspneic or experience chest pain)?”; limited ability to exercise and be physically active — repeatedly shown to be strong predictor of several poor outcomes; dyspnea common symptom that can be linked to many disorders; objectively confirm dyspnea by asking patient to walk in preoperative area

Workup for dyspnea: one-third of patients will have a cardiac condition, one-third a pulmonary condition, and one-third miscellaneous conditions; common cardiac conditions include ischemia, congestive heart failure (CHF), and valvular disease; common pulmonary conditions include chronic obstructive pulmonary disease and asthma; common miscellaneous conditions include anemia, hypothyroidism, renal failure, and obesity; deconditioning — associated with increased risk for hypertension, cardiovascular disease, and decreased resiliency to illness; older patients, even those physically active, decondition more rapidly than younger patients after period of inactivity (eg, following hip fracture); deconditioning as cause of dyspnea diagnosis of exclusion; comprehensive pulmonary exercise testing (CPET) — bicycle test combines cardiovascular and pulmonary assessments; test should be performed only to objectively confirm condition already suspected based on clinical evaluation; poor cardiovascular and metabolic reserve and increased risk indicated if CPET demonstrates early switch from aerobic to anaerobic metabolism (with production of lactate); ventilatory equivalent of CO₂ measured at anaerobic threshold (>35 predictive of increased risk); patients who perform well have much better outcomes at 30 days and up to 1 yr as well as increased probability of returning to baseline functioning and living independently; 6-min walk test — may be used in preoperative clinic; CO₂ measured before and after 6-min walk; important findings include inability to walk 6 min, distance walked in 6 min, O₂ saturation at conclusion of 6 min, and provocation of symptoms; timed up-and-go test — measurement of length of time it takes for patient to get out of chair and stand up; correlates with risk

Educational Objectives

The goals of this program are to improve surgical outcomes of high-risk patients and to enhance working relationships in departments of anesthesiology by incorporating feedback into the evaluation process. After hearing and assimilating this program, the clinician will be better able to:

1. Identify high-risk surgical patients.
2. Consider preoperative interventions that can lower perioperative risk.
3. Explain the impact of age on perioperative risk.
4. Assess peer relations on a departmental level.
5. Incorporate feedback to effect change in professional behavior.

Faculty Disclosure

In adherence to ACCME Standards for Commercial Support, Audio Digest requires all faculty and members of the planning committee to disclose relevant financial relationships within the past 12 months that might create any personal conflicts of interest. Any identified conflicts were resolved to ensure that this educational activity promotes quality in health care and not a proprietary business or commercial interest. For this program, members of the faculty and planning committee reported nothing to disclose.
B-type natriuretic peptide (BNP) and N-terminal BNP: primarily secreted by cardiac myocytes in response to cardiac conditions (eg, CHF, arrhythmias, ischemia, cardiomyopathy, pulmonary embolism); N-terminal BNP \( \geq 367 \) pg/mL reliable predictor of 30-day outcomes; normal BNP more predictive than abnormal BNP (if cardiac condition suspected, normal BNP largely excludes significant cardiac disease and is highly predictive of successful outcome); if normal in patient with dyspnea, cardiac workup not recommended; serial BNP useful follow-up test in patients with cardiac disease

Smoking cessation: should be achieved before elective surgery (particularly total joint replacement); at speaker’s institution, surgeons have agreed not to perform any joint replacements or spine operations on patients who continue smoking; urine cotinine levels positive for several days after last cigarette and effective for screening purposes; antimoking therapies should be prescribed in preoperative clinic; nicotine lozenges recommended; patch helpful to sustain cessation of smoking, but less effective for initial cessation; initiation of bupropion (Wellbutrin) or varenicline (Chantix) not recommended because they require several days or weeks to achieve effectiveness and may have undesired side effects; cessation for even 24 hr helpful; smoking cigarette on morning of surgery doubles risk of ischemic event in patients with coronary artery disease

Anemia: common problem; many patients present without full evaluation; while often ignored preoperatively, strong marker of increased risk; treatment of anemia recommended; transfusion also associated with increased risk and therefore not recommended; intravenous iron can be effective within days and definitely within 2 wk; anemia of chronic disease — may not be associated with iron deficiency, but increases hormone hepcidin, which decreases gut absorption of iron (leading to functional deficiency of iron); therefore, patients may not respond to oral iron therapy; erythropoietin effective

Age: advanced age associated with diminished resiliency to illness and ability to recover from stress (eg, surgery); after complications, outcomes of older patients significantly worse than those of young patients; increased risk starts at 55 yr of age and increases at \( \geq 75 \) yr of age; important to distinguish sick from healthy older patients; adding frailty score to American Society of Anesthesiologists (ASA) score boosts predictive value; frailty score not based on laboratory or cardiopulmonary testing; score includes whether patient exercises, grip strength, history of weight loss, and level of daily activity; Department of Veterans Affairs study — classified patients based on activities of daily living (eg, ability to take care of self, cook, and clean house, and degree to which dependent on others); diminished activity strongly predictive of perioperative complications (eg, pneumonia, mortality, cardiovascular complications, wound infections); patients classified according to ASA physical status as well as functional activity (ie, A indicated functionally active and B indicated dependent on others); study demonstrated that functional level altered risk (eg, patient classified as ASA 3A equivalent to patient classified ASA 2B)

Outcomes: interventions to optimize condition of patients lowers risk (eg, management of CHF, enrollment in exercise and nutritional programs); preoperative exercise programs for even time-urgent procedures (eg, cancer surgery) can improve outcomes and hasten recovery; data on patients with lung cancer have shown that delaying surgery for up to 6 wk improves results, with improved survival at 1 yr; attendance in preoperative clinics lowers rates of cancellations, reduces delays, results in decreased number of tests, and significantly decreases mortality; preoperative evaluations performed by internists result in more tests, greater costs, and increased mortality compared with preoperative evaluations performed by anesthesia providers

Suggested Reading

Using Feedback for Change: How to Move From Opinion to Action
David A. Zvara, MD, Professor and Chair, Department of Anesthesiology, University of North Carolina School of Medicine, Chapel Hill

360° departmental review: upon appointment as chair, speaker conducted complete review of department; composed survey based on mission and value statement of University of North Carolina (UNC); statement addressed pursuit of highest-est levels of safety and quality, treatment of individuals with courtesy, honesty, respect, and dignity, and recognition of personnel for their achievements and capabilities; mission statement then converted to item for 360° survey and given to all staff, residents, and administrators; items included “Are you treated with courtesy, honesty, respect and dignity?” “I receive effective feedback on my performance” and “I am recognized for quality of my work”; 17 items in total; response choices included strongly agree, agree, disagree, and strongly disagree

Results: survey initially performed in 2010; 154 anonymous responses; 585 comments; individuals skeptical about anonymity; \( \approx 25,000 \) words, 68 of which expressed bitterness toward particular individual and edited out; results indicated contrast between physicians and certified registered nurse anesthetists (CRNAs); most faculty affirmed that their professional views were encouraged and respected, whereas CRNAs disagreed; no CRNA strongly agreed that policies were applied equally and consistently, and 32% strongly disagreed

Evaluations: Joint Commission requires assessment of providers to ensure quality; focused professional practice evaluation (FPPE) and ongoing professional practice evaluation (OPPE) tools used for assessment; peer-to-peer evaluation system in Department of Anesthesiology at UNC — every month randomly generated evaluation performed by anonymous individual; evaluations used for FPPE and OPPE; providers did not know who performed evaluation or when evaluation occurred; for first 30 days everyone evaluated new employee (used for FPPE); OPPE consisted of 3 evaluations per month; CRNAs and physicians equally involved in performing evaluations of other CRNAs and physicians; specific clinical decisions (eg, drugs, dosages) not part of evaluation because appropriateness can be difficult to determine; subject matter addressed on evaluation form — clinician well organized and prepared for clinical assignment; clinician reliably and effectively provides clinical assistance and support to colleagues; clinician exemplifies professional behavior; clinician adapts well to changing clinical demands of manpower allocation during day and on-call; clinician demonstrates respect toward coworkers; clinician exemplifies best clinical care; comfortable transferring care of
my patient to this clinician; clinician practices evidence-based medicine with up-to-date knowledge of specialty

**Review:** after 3 yr, 6263 peer-to-peer evaluations reviewed; evaluations usually performed after shared night call; 4-point evaluation used (4 = strongly agree, 1 = strongly disagree, with obligatory comment if rated ≤2); major issues for CRNAs in initial 2010 survey included shortcomings in respectful and professional behavior and lack of assistance with preoperative evaluations; concerns raised that evaluations would be used to persecute unpopular individuals; however, ≈75% of evaluations positive and only ≈25% negative; 5% of faculty (4 individuals) received 22% of negative comments; evaluation process considered compelling means of providing feedback; example — young faculty member cited on FPPE for not being part of team, inadequately responding to call for assistance, and quick to question CRNAs; immediate feedback given; subsequent feedback showed exemplary behavior

**Limitations:** demand for multiple evaluations can lead to fatigue and poor sampling; vindictive evaluations (which need to be filtered) can be generated; in assessing evaluations, need to look at aggregate and detect clustering; evaluation system not validated; once tagged as poor performer, clinician requires extended period of time to overcome negative attitudes; implementation requires strong support of information technology (eg, requires generation of random evaluations and distribution of evaluations)

**Advantages:** small cohort attained exemplary evaluations in all 9 characteristics; these individuals, as well as individuals who attained exemplary evaluations in any category, recognized for their achievements

**Outcomes:** 2010 survey revealed fractured department with poor policies and inadequate accountability; follow-up survey in 2013 identical to 2010 survey; slight improvement in respect of professional views; more individuals felt culture of accountability; although many factors may have contributed to improvement (eg, hiring of new people), speaker believes that peer-to-peer evaluation process played major role; belief that policies applied consistently affirmed by 60% to 70% of the department compared with much lower rate in 2010; improvement observed in receiving appropriate and timely feedback on performance; in 2010, comments on hiring, retention, morale, and relationships accounted for ≈60% of feedback; in 2013, number of comments on hiring, retention, morale, and relationships reduced dramatically; safety and quality more prominent in 2013 survey; speaker interpreted change as moving from gossip and bickering to concern for patient care; results of first survey indicated need to address relationships and accountability by providing venue for communication; with new set of concerns, focus of evaluation changed to safety and quality of care

**Suggested Reading**


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**Estimated time to complete the educational process:**

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<th>Activity</th>
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<tr>
<td>Review Educational Objectives on page 1</td>
<td>5 minutes</td>
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<td>Take pretest</td>
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<td>Listen to audio program</td>
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<td>Review written summary and suggested readings</td>
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<td>Take posttest</td>
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1. A large study from the United Kingdom found that _______ of surgical patients accounted for >80% of deaths.
   (A) 2%  (B) 12%  (C) 22%  (D) 32%

2. On comprehensive pulmonary exercise testing for dyspnea, the ventilatory equivalent of CO₂ is predictive of increased risk if it is at least _______ when measured at the anaerobic threshold.
   (A) 26  (B) 31  (C) 36  (D) 41

3. Which of the following is most effective for initial cessation of smoking?
   (A) Nicotine lozenge  (C) Varenicline
   (B) Nicotine patch  (D) Bupropion

4. A patient in a preoperative clinic with anemia of chronic disease should receive:
   (A) Blood transfusion  (C) Intravenous iron therapy
   (B) Oral iron therapy  (D) No treatment

5. A frailty score is based on all the following, EXCEPT:
   (A) History of weight loss  (C) Grip strength
   (B) Level of daily activity  (D) Treadmill test

6. In the initial 360° survey conducted in the Department of Anesthesiology at the University of North Carolina (UNC), which of the following groups was most likely to disagree that their professional views were respected and encouraged?
   (A) Certified registered nurse anesthetists  (C) Faculty anesthesiologists
   (B) Residents  (D) Administrators

7. The Joint Commission requires _______ to assess quality.
   (A) Focused professional practice evaluation  (C) A and B
   (B) Ongoing professional practice evaluation  (D) Neither A nor B

8. All the following were subject to evaluation by peers in the Department of Anesthesiology at UNC, EXCEPT:
   (A) Clinical assistance  (C) Organization and preparedness
   (B) Clinical decisions  (D) Respect toward coworkers

9. Which of the following statements about peer-to-peer evaluations in the Department of Anesthesiology at UNC is true?
   (A) Vindictive evaluations could be generated
   (B) Evaluations were used mainly to persecute unpopular individuals
   (C) Strong support of information technology was not required
   (D) The evaluation system was fully validated

10. Compared to the initial departmental survey at UNC in 2010, which of the following concerns became more prominent in the follow-up survey in 2013?
    (A) Accountability  (B) Morale  (C) Relationships  (D) Quality of care

Answers to Audio Digest Anesthesiology Volume 58, Issue 15: 1-A, 2-D, 3-D, 4-C, 5-D, 6-A, 7-C, 8-A, 9-B, 10-A