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Preoperative anesthesia evaluation

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ABSTRACT

The preoperative evaluation is the first step in ensuring the safe conduct of anesthetic care in pediatric patients of all ages. Over time, this process has changed significantly from a time when patients were admitted to the hospital the night before surgery to a time when the majority of patients, including those scheduled for major surgical procedures, arrive the day of surgery. For most patients, the preoperative examiantion can be conducted over the phone by a trained nurse or on-line via a survey thereby eliminating the need for a separate visit merely for the preoperative evaluation. Regardless of where or how it occurs, the goals of the preoperative evaluation are to gain information regarding the patient's current status, comorbid conditions, and the intended procedure. This process allows the identification of patients who require additional preoperative testing or those patients who need to be seen by an anesthesiolgoist prior to the day of surgery. During the preopeative evalaution, decisions are made regarding further laboratory or investigative work-up that are required. The preoperative meeting provides an arena to develop the initial parent-physcian rapport, outline anesthetic risks, and discuss the intended anesthetic plan including options for postoperative analgesia. The process facilitates the care of patients during the perioperative period while limiting surgical cancellations resulting from patient-related issues. The following chapter reviews the essential components of the preoperative evaluation including the appropraite use of preoperative laboratory testing and other investigative procedures including radiologic imaging. Key components of the physical examinatino including the airway examination are reviewed.

Introduction

Regardless of the type of surgical procedure, the patient's clinical status, and the anesthetic technique that is planned, a preoperative evaluation is the first step in ensuring the safe conduct of anesthetic care in patients of all ages. A thorough and well preformed preoperative evalaution serves to facilitate the care of patients during the perioperative period while limiting surgical cancellations from patient-related issues and its resultant impact on operating room efficiency and fiscal outcomes.[1–4] The initial impetus behind the development of anesthesiology properative clinics was to optimize the medical condition of a patient prior to surgery. However, the interaction of the patient and the anesthesiologist allowed the opportunity for the consideration of the individual and specific needs of a patient before the day of surgery. The end result was that many benefits have resulted from the development of preoperative clinics including the enhancement of patient safety and improved patient satisfaction.[1–4] The preoperative clinic may also improve hospital resource utilization by reducing unnecessary preoperative consults and laboratory testing, reduce the duration fo hospital stay following major surgical procedures, and limit day of surgery cancellations.[4–7] Despite the cost associated with such clinics, the cost savings from the above-mentioned benefits justifies such expenses valuable operating room time and staff may be wasted by surgical delays or cancelations.

While some variation may occur, the same approach to the preoperative evaluation is used regardless of the age of the patient, their clinical status, and the procedure that is be accomplished (Table 1). In many centers, this evaluation is performed well in advance of an elective surgical procedure in a specialized clinic to allow for specific preoperative interventions, consultation or preparation that may be required to allow for the safe completion of the anesthetic care and surgical procedure. Alternatively, the

Abbreviations: ACCP, American College of Chest Physcians; ARDS, adult respiratory distress syndrome; ASA, American Society of Anesthesiologists; FVC, forced vital capacity; GA, gestational age; INR, international normalized ratio; MEP, maximum expiratory pressure; MH, malignant hyperthermia; NIV, non-invasive ventilation; NSAID, non-steroidal anti-inflammatory agent; NPO, nil per os; OSA, obstructive sleep apnea; PCA, post-conceptual agent; PCF, peak cough flow; PFT, pulmonary function testing; PONV, postoperative nause and vomiting; PT, prothrombin time; PTT, partial thromboplastin time; SDB, sleep-disordered breathing; URI, upper respiratory infection.

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Table 1
Goals of the preoperative assessment.

1. Meet the family and the patient with development of a physician-patient relationship.
2. Ensure that the patient is medically fit as possible for anesthetic care.
3. Identify acute illnesses or co-morbid disease processes that may increase the incidence of complications.
4. Preform a focused physical examination including the airway.
5. Evaluate the procedure to be performed to direct the anesthetic care.
6. Educate and inform that parents about the conduct of anesthesia, its goals, risks, and options available to the patient.
7. Discuss options for anesthetic induction, plans for intraoperative care including monitoring, and decide on a plan for postoperative analgesia.
8. Obtain informed consent.
9. Give parental instructions regarding *nil per os* (NPO) guidelines.
10. Discuss the eventual disposition of the patient including outpatient performance of the procedure versus the need for overnight admission.
11. Determine the need for additional workup or subspecialty consultation.
12. Determine if additional medications are required prior to anesthesia such as agents to decrease gastric contents/acidity or to prevent bronchospasm.

preoperative evaluation can be performed using a standardized survey, via the phone, internet or some other electronic system.[8] This allows for quick, cost-effective, and efficient screening of healthy patients who require limited work-up as well as identification of patients who may require additional evaluation with a more in-depth phone interview with specialist referral, preoperative laboratory evaluation, or further clinical investigations. Much of this can be accomplished by specially trained nurses with back-up by a pediatric anesthesiologist for review of medically complex patients. Time and experience has demonstrated that the majority of pediatric patients can be effectively screened, interviewed and prepared for surgery without a formal in-person evaluation thereby accomplishing the objective of limiting day of surgery cancellations and avoiding the costs of evaluating all patients in person. This also eliminates the need for a separate trip to the hospital for the preoperative visit thereby eliminating parent and parent inconveniences. For patients who are already admitted to the hospital, or those presenting for emergent or urgent surgical procedures, the preoperative evaluation can be performed immediately prior to the surgical procedure.

The goals of the preoperative evaluation are to gain information regarding the patient's current status, comorbid conditions and the intended procedure. This informs decisions regarding laboratory or investigative work-up that may be needed prior to the procedure. The preoperative meeting and examination provides the anesthesiologist an opportunity to meet the patient and their parents or guardians. This provides an arena to develop rapport, , outline anesthetic risk, and present the anesthetic plan for the day of surgery include *nil per os* (NPO) times, premedication, and options for postoperative analgesia. There should also be ample time for questions to be answered and for informed consent to be obtained.

Preoperative examination: Medications, allergies, and medical history

The preoperative evaluation includes a review of the history of present illness, past medical problems including medication allergies, past surgical and anesthetic history, family history of anesthetic complications, and review of the patient's current and prior medical record including the medication list. The medication list should include prescription and non-prescription medications. Specific questions should be asked regarding the use of non-steroidal anti-inflammatory agents (NSAIDs) given their effects on platelet function and concerns of perioperative bleeding. Other non-presciption medications may also include homeopathic and natural health remedies that may have significant effects during the perioperative period including effects on coagulation function.[9,10] A recent survey of 894 pediatric patients demonstrated that 3.5% of them had been given an herbal or homeopathic medication during the 2 weeks prior to surgery, generally by their parents.[10] The use of these medications did not differ between children with or without coexisting diseases, among ethnic groups or by residence setting (city, suburban, rural). There was increased use in West Coast centers as high as 7.5% in California versus the rest of the country. The most prevalent agent administered was echinacea which has been proposed ,but not proven in evidence-based medicine, to augment the immune system and reduce the symptoms of colds and flu.

Presciption medications are also reviewed and a decision made as to which should be continued during the perioperative period. For the most part, prescription medications are continued throughout the perioperative period with adjustments made in the anesthetic plan based on the potential interactions of these medications and anesthetic needs. Patients with chronic pain problems who are receiving opioids and other analgesic adjuncts should continue these perioperatively with the understanding that these medications may alter the postoperative analgesic needs. Anticonvulsant medications are administered preoperatively and continued intraoperatively and during the postoperative period.[11] At times, these medications must be administered with a small amount of applesauce or other semi-soft food such as pudding to encourage their ingestion. Such flexibility with NPO guidelines is mandatory to ensure the safe care of the pediatric patient. Antidepressants and other psychoactive agents may alter the requirements of inhalational and intravenous anesthetic agents.[12] However, withholding such medications may increase the risk of recurrent psychiatric illnesses. An individual decision must be made at the time of the preoperative evaluation regarding the risk-benefit ratio of these medications. More complex decision processes include patients on long term anticoagulation (coumadin, enoxaparin, and aspirin) and those receiving cardiac medications such as antihypertensive agents, diuretics, and digoxin. For these patients, consultation with a pediatric cardiologist is generally recommended. Patients on long-term anticoagulation and at risk of thrombotic issues such as those with mechanical heart valves require hospital admission and bridging with intravenous heparin during the perioperative period. Given the risk of bleeding and the limited beneficial effect, even in adults, the American College of Chest Physicians (ACCP) recommends that patients scheduled for noncardiac surgery who are at low risk for cardiac disease stop aspirin intake 7-10 days before surgery.[13,14]

Information regarding known medications, food, and environmental allergies is obtained. Food allergies may provide some insight into potential medication allergies such as seafood allergies and interactions with iodinated contrast agents; peanut, egg or soy allergy and potential interactions with propofol (see reference 7 to refute these concerns); kiwi, banana, avocados and chestnut allergies and a higher incidence of latex sensitization; and reactions to Gummi Bears or immunizations as a potential marker for gelatin allergy which may be found in topical thrombotic agents such as Floseal®.[15–17] While the majority of anaphylactoid