



Increased longevity and anesthesia

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ABSTRACT

The increased life expectancy, associated with age-related comorbidities, results in the continuous growth of the geriatric surgical population. Due to this increase, every anesthesiologist will be involved, at some point in the care of an elderly patient. A better perioperative understanding of the problems related to anesthesia may help to improve the outcome, reducing the morbidity of the procedures. In this group, decreased physiological reserve impairs the body's ability to maintain homeostasis during periods of stress, leading to physical and cognitive dysfunction resulting in severe perioperative complications. Consequently, the importance of performing an individualized preoperative assessment and identifying potential risk factors needs to be kept in mind. The choice of anesthesia should be evaluated on a case-by-case basis, and tailored to the patient's health status, type of operation, coexisting diseases and patient's medications in order to provide the most effective perioperative treatment. The development of new techniques will provide minimally invasive procedures, with lower morbidity increasing safety, especially in high-risk patients. A larger contingent of elderly patients will undergo anesthesia in the future, not only because of the population increase, but also because of age-related increased probability that a person needs a surgical procedure.

Key words: Geriatric, Anesthesia; Elderly; Aging; Surgery; Anesthesiology; Complications

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At the beginning of the last century, old age represented a common contraindication to a number of basic surgical procedures. In the 1920s and 1930s, age was a definite contraindication for a prostatectomy. Even a small surgery, such as the repair of inguinal hernia in a patient over 50 years of age, was not justified. An article on head and neck procedures described that by the mid-1930s, a designation of "old age" itself was considered to be acceptable as a contraindication to any surgical attempt to cure, alleviate, or even prolong life in a serious disease such as cancer.¹⁻⁴

Time magazine of February 1957 described that surgeons and anesthesiologists used to fear some cases, but that the recent advances and better prospects for elderly patients made the surgery possible to be performed successfully in that age group also. Age ceased to be a contraindication to a

surgical procedure.⁵

Population aging is one of the most significant trends of the 21st century and represents both a cause of celebration and a challenge. People aged 60 and over accounted for 12.3% of the world's population by 2015; and by 2050 this number will increase to almost 22% (2 billion people). Most of the projected growth of the older population is expected to occur in developing countries. Asia is home to more than half of the world's 901 million elderly people, with 508 million people at 60 years and older. Another 177 million elderly people live in Europe, 75 million in North America, 71 million in Latin America and the Caribbean, 64 million in Africa and 6 million in Oceania.⁶

Although 12% of patients between 45 and 60 years of

age need surgery every year, this percentage increases to 21% in patients above this age range.⁷ Due to this increase, all anesthesiologists will be involved at some point in providing care to an elderly patient. A better understanding of the perioperative importance of anesthesia-related issues may help improve patient outcomes by decreasing the morbidity of the procedure.

Studies of the elderly population show a declining perioperative mortality rate from approximately 20% in the 1960s, 10% in the 1970s, and finally to 5% to 6% in the 1980s, where this rate is stabilized⁶. These data suggest that anesthesia and surgical techniques have improved the prognosis of many of these patients.

The aging process produces physiological, anatomical, and cognitive changes within the major organ systems of the body. Such changes have a significant impact on perioperative outcomes. It is not aging alone that alters the perioperative risk, but rather its effect in association with age-related comorbidities. It is essential that the anesthesiologist be aware of the changes associated with aging, coexisting diseases and patient medications in order to provide the most effective perioperative treatment for this group of patients. The perioperative evaluation and requests for interconsultations should be individualized.

Although the technical-scientific development provides the accomplishment of procedures with the minimum invasiveness, some factors can not be modified like those related with the specific procedures. Emergency surgeries have been associated with higher mortality regardless of the age group studied. Another risk factor for mortality is the surgical site. The thoracic and abdominal procedures exhibit higher mortality rates and complications.⁷

Elderly patients who perform small surgeries and do not have comorbidities, present mortality rates comparable to the younger population, and can perfectly perform outpatient procedures.⁸ However, the effects of coexisting diseases play a more important role in perioperative mortality than the patient's own age. In a study performed with patients over 80 years of age, the American Society of Anesthesiologists (ASA) physical status, the presence of two or more associated diseases, and the type of surgery were the most important predictors surpassing the age factor.⁹

Aging leads to many changes in the cardiovascular system causing the greater possibility of hemodynamic instability, and consequently, the increase of adverse events. Coronary artery disease is predominant, and is estimated to be more than 80% in patients over 80

years of age. In turn, the incidence of congestive heart failure is approximately 10% in the elderly.^{10,11}

The surgery site has a great influence on the postoperative pulmonary complications. Abdominal and thoracic surgeries lead to postoperative pulmonary restraint due to trauma. Functional residual capacity may decrease substantially from the preoperative value and this might remain so for up to one week, so maneuvers to maintain continuous positive airway pressure may decrease the incidence of complications.¹²

The preoperative optimization of many coexisting diseases can help to determine the postoperative outcome. During the preoperative evaluation it is important to take into account that the prevalence of pulmonary diseases in the elderly is high. The presence of COPD in the elderly is a serious health problem, with high rates of hospitalization.¹³ Smoking is the main risk factor associated with COPD. Smoking cessation should be encouraged at all times, even just before surgery, as it is associated with an immediate reduction of carbon monoxide levels and reduction of the risk of pulmonary complications.¹⁴

The decrease in upper airway reflexes makes the elderly patients prone to aspiration during periods of depressed mental state. A variety of other coexisting factors, such as smoking, obesity, chronic obstructive pulmonary disease, and other preexisting conditions may also predispose the elderly to pulmonary complications.

Appropriate diagnosis, adequate pulmonary rehabilitation, patient education, nutritional monitoring, cessation of smoking and optimization of medication are essential ingredients of a favorable postoperative outcome in the elderly patient.¹⁵

Two more common and serious problems in elderly patients are delirium and postoperative cognitive dysfunction. Associated factors include cognitive impairment, previous dementia, poor general condition, high-risk surgeries, suboptimal pain management, use of certain drugs, infections and metabolic disorders.¹⁶ Weak functional and cognitive recovery is associated with a longer hospital stay and increased hospital costs.¹⁷

It is important to control perioperative hypothermia. It can be more frequent, prolonged and intense in the elderly patient due to difficulty in regaining thermoregulation control after anesthesia. Possible complications include cardiac arrhythmias, myocardial ischemia, increased blood loss, decreased drug metabolism and prolonged hospitalization.¹⁸

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A careful selection of options for postoperative pain management in the elderly should be made, taking into account the general clinical condition, the dose required, drug interactions and the possible complications. Improved pain control techniques that also decrease side effects would be welcome.¹⁹

A larger contingent of elderly patients is expected to undergo anesthesia in the future, not only because

of the population increase, but also because aging increases the probability that a person will need a surgical procedure.^{20,21} Besides this aspect, we also need to develop techniques, both for surgery and for anesthesia, that offer minimally invasive procedures and increased safety, especially in patients at high risk.

Conflict of interests: Nil

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