Preoperative assessment from a clinical point of view

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Perioperative management and care of a patient requiring surgery represents the single most complex and cooperative task in medicine. Considering the evolutionary concept of performing perioperative medicine instead of simply administering anaesthesia, every anaesthesiologist today is confronted with the unique challenge and chance of qualifying in this field. Optimal and efficient preoperative assessment of the patient is the crucial step at the beginning of this whole process, and is often decisive in determining what follows.

This paper focuses on the objective practice and impact of evidence-based preoperative assessment with a view to reducing perioperative morbidity and mortality on one side and to achieving cost containment on the other, reviews current guidelines and standards with the aim of providing an integrated approach and finally looks into the future of preoperative evaluation on the even more sophisticated level of functional genomics.

Perioperative risk

Recent decades have seen a lot of research focused on the assessment of perioperative risk: in 1954, a retrospective review [1] of approximately 600,000 anaesthetics identified the three major causes of perioperative mortality: anaesthesia, surgery and patient disease, with a respective primary contributory roles in mortality in 1 out of 2,680, 1 out of 420 and 1 out of 95 cases in this study. This three-component concept has been maintained in subsequent work [2], and multifactorial risk indices focusing on patient disease, the main contributor to poor outcome, have been developed [3-5]. Although discussed controversially [6], large studies [7] could underline the basic validity of these indices for predicting perioperative mortality when applied appropriately [8].

The high prevalence of cardiovascular diseases in western industrial countries and the increasing percentage of older patients presenting who are eligible
for surgery imply an increasing challenge to anaesthesiology, since the major cause of morbidity and mortality after noncardiac surgery are cardiac complications. Coronary artery disease is the major risk factor for perioperative myocardial infarction [9] and is considered to be associated with preceding ischaemic episodes [10]. Patients undergoing major elective surgery, such as vascular surgery, experience perioperative cardiac death or nonfatal myocardial infarction in 1-6% of cases [11-13]. Risk rates in orthopaedic surgery are comparable [14]. Considering the large number of patients who are given anaesthesia each year (an estimated 27 million patients in the United States), the medical impact and the resulting cost are substantial (approx. $20 billion annually in the United States) [15].

Apparently there is no significant difference in the rate of perioperative myocardial infarction between patients with established prior myocardial infarction and patients only at risk of coronary artery disease (3.8% vs 1.5-5%). This underlines the importance of preoperative risk assessment.

**Goals of effective preoperative assessment**

To decrease perioperative morbidity and mortality and to increase the quality while reducing the cost of perioperative care is one of the two major goals of preoperative medical assessment of the patient. To educate the patient about anaesthesia [16], reduce anxiety and obtain informed consent is the second important goal, but this is not discussed here.

Reviewing pertinent medical records, performing a patient interview and a physical examination are the essential first steps in identifying anaesthesia-relevant specific preexisting conditions (e.g., age, smoking, previous myocardial infarction, difficult airway, pulmonary disease, functional capacity). Based on the results, further tests may be indicated, but automated screening should be discouraged because of cost considerations and the possibility of false-positive results. At the end of this complex process, which is summarized in Fig. 1 as a pyramid, the individual risk should be estimated, leading to one of the following strategies:

1. Perform surgery under specific anaesthetic considerations and intraoperative management (e.g., transoesophageal echocardiography)
2. Postpone surgery to optimise the patient’s condition, or even cancel
3. Initiate a preoperative intervention procedure (e.g., coronary artery bypass graft, PTCA, stenting, insertion of a pacemaker)
4. Give perioperative medication as a possible method of reducing periope-