out patients who would have died during noncardiac surgery, but who now die as a result of coronary surgery. Only a careful prospective investigation can establish the efficacy of prophylactic coronary artery surgery in reducing the mortality of subsequent noncardiac surgery or prolonging long-term survival. Until such studies have been performed, prophylactic coronary surgery should be reserved for those patients in whom it is indicated by conventional criteria.

In conclusion, a number of indices of perioperative cardiac risk are available. It is currently unclear as to how these may most efficiently be applied to screening a large geriatric surgical population. A number of strategies for risk reduction are available but none have been subjected to prospective investigation. Until a great deal more investigation has been done, risk assessment and reduction will remain matters for subjective interpretation by individual clinicians.

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Anaesthetic management of the geriatric patient

By the early twenty-first century, 16 per cent of the United States population will be over age 65 and this group will account for over one-third of all health care

costs. If the data of Fries[1] are examined closely, it is apparent that we will be seeing larger numbers of relatively healthy rather than sick older patients, presenting themselves for surgery. Advances in medical care, coupled with life style modifications[2] are producing a rectangularization of the human survival curve. Instead of further increasing the average life span of mankind we are now using improvements in health care to allow larger numbers of people to live closer to a genetically pre-determined species-specific age limit.[3] For the human race this has been estimated to be 85 years. The result is that more elderly people are arriving in the operating room looking healthier and asking for operations to improve their ability to enjoy their later years. They come for total hip replacements so they can square dance. They request intra-ocular lenses "so that I can see when I get old." They have shown us that coronary artery bypass surgery is not the exclusive domain of the hard driving middle-aged executive.

In one geriatric centre in Southern California,[4] for major operations performed on inpatients the overall surgical mortality for all patients over the age of 65 was 3.4 per cent during the primary admission for the surgical problem. For patients over the age of 80 the surgical mortality was 3.5 per cent.

Economic pressures have dictated an emphasis on outpatient management of elderly patients. A successful outpatient program depends upon convincing the patients that they do not need to stay in the hospital. Crucial to this is being sure that adequate care exists at home for the patient who returns home on the day of surgery. Patient screening is vital as is limiting the scope of the surgical procedure. Interviews by the staff prior to scheduling is important and this is followed by a phone call from the anaesthetist the evening before surgery. Instructions must be given in writing and compliance checked upon arrival in the operating room. Medication regimens, NPO status, and arrival times are the items most often confused by older outpatients.

Evidence of cardiac, pulmonary and metabolic disease was common. Anti-hypertensive, diuretic, cardiac and thyroid medications were the drugs most often being taken. Abnormal laboratory findings were mostly related to arrhythmias secondary to arteriosclerotic heart disease and chronic lung disease. It was rare to cancel procedures for medical reasons once the patients had been selected and screened. It was also rare to cancel a procedure for medical problems occurring prior to surgery on the day of operation. Compliance with instructions was good and occasionally a confused patient was counselled about a compliance problem during the anaesthetist's phone call the evening before surgery.

Cataract procedures are predominantly performed under local anaesthesia, plus light intravenous supplemental sedation. The drugs most often used have been diazepam, methohexitone and fentanyl. Currently experience is being gathered with sub-anaesthetic doses of etomidate and midazolam. Use of ultrasound surgical techniques has shortened cataract procedures to the point where usually all that is required is a small amount of sedation before the retro-bulbar block. Following this, the patient usually rests comfortably for the short period of time necessary to complete the operation. The occasional patient becomes so agitated that an immediate shift to general anaesthesia is necessary to permit completion of the procedure. In the few situations that this occurs, it will not necessarily interfere with the ability of the patient to go home the same day.

Rapid mobilization after immediate surgical repair of a fractured hip has long been a cornerstone of management, in order to reduce the incidence of pulmonary embolism. The debate between general and regional anaesthesia is now shifting in favour of regional block. Patients receiving spinal or epidural anaesthesia for fractured hip operations have fewer pulmonary emboli and fewer episodes of heart failure, along with less postoperative mental confusion. There is significant hypoxaemia in the preoperative period and it is beneficial to provide supplemental oxygen until the patient is fully ambulatory. Patients operated upon under regional block also have higher arterial oxygen tensions in the postoperative period. Immediate postoperative mortality is decreased for patients receiving regional block but survival after one year following operation has not been found to be statistically different.[5] Often the hip fracture patient is in abysmal general medical condition, with complex medical problems and the assistance of an internal medicine consultant is often crucial to careful management and survival.

The observations about the ability of regional anaesthesia to protect against postoperative pulmonary embolism are pertinent for total hip replacements as well. It is thought that the protective effect of regional anaesthesia against pulmonary emboli is related to the action of local anaesthetics on vascular membranes, as well as increased blood flow through peripheral vascular channels.

Inguinal hernia repair in the elderly patient has become a predominantly outpatient procedure, given stable medical conditions. Under these circumstances local anaesthesia has become dominant, if the surgical conditions allow. Sedation with intravenous medication similar to the techniques used for cataract surgery have been successful. Infiltration of the wound with long-acting local anaesthetics has helped to allow early mobilization and rapid discharge home.

New non-invasive diagnostic techniques have led to increased numbers of carotid thrombo-endarterectomy procedures being performed. Critical to management has been control of hypertension. These patients are usually hypertensive preoperatively and will require intraoperative and postoperative pharmacological control of hypertension. Neurologic complications have been linked to postoperative hypertension and failure to adequately control blood pressure. With larger numbers of elderly patients presenting for coronary artery bypass surgery there are more patients who will need combined procedures for coronary and carotid occlusive disease.

Benign prostatic hypertrophy is almost universal as males grow older. In addition, carcinoma of the prostate occurs with increased frequency as larger numbers of males live out their predicted life span. Transient blindness has been reported related to the use of large volumes of irrigating fluid. Information is accumulating similar to that cited above in relation to hip surgery, that patients receiving spinal anaesthesia for TUR of the prostate have less postoperative mental confusion than do patients receiving general anaesthesia.[6]

In summary, medical progress and changes in life style (diet, exercise, decreased cigarette and alcohol consumption, stress management) are allowing more people to live longer, with less chronic illness. Chronic illness is managed with more precise physiologic control. These elderly patients are coming more frequently to the operating room for operations which they have selected to improve their life style.

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