

Orthopaedic surgery in the elderly

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Demographic estimations for the UK predict an increase in the number of major orthopaedic surgical procedures in elderly people. The two major indications for surgery are osteoporotic fractures and severe osteoarthritis of weight-bearing joints. Coexisting medical disease makes elderly patients a surgical high-risk group, and mortality and morbidity after emergency surgery remains high.

It is estimated that the number of people in the UK over 65 years of age will increase from 9 million (15.7% of population) in 1990 to more than 12 million (20.4%) by the year 2020 (International Database on Aging, 1989). In the same period, the number of those aged over 80 years will increase disproportionately from 2 million to 3.5 million. The remaining life expectancy in this group is also increasing. British women who reach their 80th birthday will, on average, survive for a further 8.6 years and similar trends apply to men. The life expectancy of these 'survivors' (in terms of population statistics) exceeds that of younger people with chronic medical conditions, such as heart failure, by a substantial margin. Orthopaedic surgery in these patients, such as replacement of major joints, can offer important benefits in terms of physical independence and life quality (Brander et al, 1997).

IMPLICATIONS OF AGING

Osteoporosis severity and fall incidence increase exponentially with older age and so, therefore, does the rate of osteoporotic fractures (Lawrence et al, 1989). The incidence of hip fractures (currently about 66 000 cases per year) is predicted to double over the next 20 years (Royal College of Physicians (RCP), 1989). The cost of this increase is estimated to be over £300 million per year and approximately 20% of NHS orthopaedic beds are currently needed for hip fracture management. Disabling osteoarthritis (Lawrence et al, 1989), requiring replacement of major weight-bearing joints, follows the same demographic trends.

These developments represent a major challenge for the NHS and its funding. Unfortunately, existing programmes for the prevention of osteoporosis and falls only modestly reduce risk and are unlikely to reverse fracture trends in the foresee-

able future. It will probably be more than a decade before such measures affect national figures. The same considerations apply to osteoarthritis, currently the commonest indication for replacement of hip and knee joints (Doherty, 1998). Our understanding of its underlying pathophysiology is limited and there are currently no firm concepts of disease prevention or modification. In spite of considerable research efforts, medical joint protection has not proved clinically successful to date.

As a result, demands for orthopaedic surgery will increase further over the coming years and the average patient will be older and frailer. The health profile of the elderly differs considerably from younger counterparts. Three common problem areas are pre-existing medical disease with reduction in physiological reserve, a high incidence of postoperative medical complications, and difficult or prolonged rehabilitation. The most important of these is reduction of physiological reserve, as it is often the starting point of a downward spiral of illness. It leads to peri- and postoperative complications which result in poor surgical healing, loss of muscle mass, physical deconditioning and difficult, often unsatisfactory, rehabilitation. A common sequence of events is illustrated in *Case 1*, which is, of course, a worst case scenario.

EFFECT OF MEDICAL PROBLEMS

Surgical mortality correlates well with concomitant medical disease, whereas age in itself is not an adverse prognostic factor (Seymour, 1999). About a third of all elderly patients are likely to suffer from three or more medical conditions at assessment before surgery (Vaz and Seymour, 1989). In one observational study, preoperative evaluation for joint replacement revealed medical pathology in need of treatment in one third of patients, and surgery had to be delayed as a

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result in nine out of 238 patients (Clelland et al, 1996). Osteoporotic fractures are often 'surgical interludes in a medical problem' (Andrews, 1987) and in many patients the fall causing the trauma is itself the result of an acute medical problem, such as infection or cardiac disease.

The high incidence of concomitant disease makes the elderly a surgical 'high-risk' group. About 75% of all perioperative deaths occur in those over 70 years of age (National Confidential Enquiry into Perioperative Deaths (NCEPOD), 1996) but this figure is somewhat misleading, especially for elective procedures (Fender et al, 1997). Anaesthesia and elective orthopaedic surgery in the UK has become remarkably safe. Deaths from anaesthetic accidents have become exceedingly rare and account for <0.1% of surgical mortality (NCEPOD, 1996). Published mortality rates for hip replacements are well below 1%, with excellent outcome and functional results in patients over 80 years of age (Fender et al, 1997). As is often the case, greater benefits are seen in those with higher preoperative disability.

The majority of fatalities in orthopaedics occur after emergency surgery, in particular following fractured neck of femur. In a Scottish study (Scottish Intercollegiate Guidelines Network, 1997), 30-day in-hospital mortality after hip fracture repair ranged from 3.8% to 11.4%. An audit in East Anglia reported 90-day mortality ranging from 5% to 24% (Todd et al, 1995). Review of 494 cases from 1996–99 at the Chelsea and Westminster Hospital confirmed 36 in-hospital deaths (7.3%), most of which were the result of medical conditions, e.g. heart disease, renal failure or infections (Chin and Kroker, 1999). Most fatalities occurred more than 3 days after the index operation — a trend confirmed by NCEPOD (1996). According to autopsy figures, bronchopneumonia accounts for nearly half of all in-hospital deaths (Perez et al, 1995).

OPTIMAL MANAGEMENT OF PATIENTS

In 1989, the RCP issued a report on the 'prevention and treatment of fractured neck of femur'

which outlined good clinical practice. Its recommendations were mainly based on process parameters, e.g. delay until surgery, and are only partly supported by grade A evidence. Nevertheless, this report represented a watershed and its conclusions and recommendations are widely accepted. The report led to substantial changes in orthopaedic management of elderly people (Audit Commission, 2000). The Department of Health recently commissioned a further report, published in 1999. Its focus is on evidence-based outcome parameters, of which there are still surprisingly few (Fairbank et al, 1999).

One recommendation for good clinical practice is the routine involvement of an elderly care physician in the management of hip fracture patients. A recent survey found that only one quarter of trusts had such a service (Audit Commission, 2000). No such recommendations exist for routine medical involvement in the care of older elective orthopaedic patients. Optimal management of the elderly orthopaedic patient requires close cooperation of surgeons, anaesthetists, old age physicians and an extended multidisciplinary team, including dieticians, social workers, physiotherapists and occupational therapists. There are four key areas:

- Preoperative multidisciplinary assessment
- Appropriate anaesthesia and early surgery
- Close postoperative monitoring and early treatment of complications
- Early mobilization within defined time frames.

Preoperative assessments should include not only anaesthetic and surgical issues (e.g. which type of operative technique or anaesthesia is appropriate), but also medical review by an orthogeriatrician to detect and treat relevant disease in order to optimize physiological parameters. This can give important guidance for the required postoperative surveillance, expected medical complications and realistic rehabilitation targets.

As recommended in the RCP report, major emergency surgery for fractures is now increasingly performed by senior anaesthetists and surgeons (Audit Commission, 2000). There is little to choose between regional and general anaesthetic techniques (Parker et al, 2000). However, spinal anaesthesia might be the better option in selected patients, e.g. in Parkinson's disease or chronic lung disease, whereas general anaesthesia might be favoured in the presence of valvular stenoses. Surgical techniques are well established and are largely determined by fracture type. Failure rates of most procedures are low and are certainly superior to conservative management. There are some minor controversies, such as use of total hip replacement, internal fixation or hemi-arthroplasty

CASE 1

A previously independent 82-year-old patient, with known congestive cardiac failure, developed pulmonary oedema 3 days after a hip fracture repair with a dynamic hip screw. The cardiac decompensation was precipitated by postoperative hypoxia causing cardiac ischaemia and impairment of ventricular contractility. The pulmonary oedema responded to intravenous treatment with diuretics but she became confused and her previously normal renal function deteriorated as a result of urinary retention and urinary tract infection. Her further clinical course was complicated by a fall on the ward and antibiotic-induced diarrhoea. Seven weeks after admission, she was transferred to a nursing home after unsuccessful prolonged rehabilitation.

for displaced subcapital hip fractures, or use of bone cementing in older patients.

Postoperative medical complications after major orthopaedic emergency surgery occur in >50% of patients. A prospective audit in the Chelsea and Westminster Hospital between 1997 and 1998 (Kroker and Lyon, 1998) found that important acute medical disease in the postoperative period occurred in 66 out of 115 patients (57%) with fractured neck of femur. Acute confusional states, urinary retention, faecal impaction and cardiac disease headed the list. Classical surgical complications such as deep vein thrombosis, gastrointestinal bleeding, wound infections and renal failure were relatively rare. Complications are the major cause of unsuccessful rehabilitation and increased length of hospital stay and are often recognized and treated late. Any delay in meeting rehabilitation targets may signify an underlying medical complication, so goals agreed after the preoperative phase should be closely monitored. It is not unusual for 'slow to rehabilitate' to be the presenting symptom of an occult infection.

THE FUTURE

Future reviews of elderly orthopaedic care will need to concentrate on standardized clinical outcomes, e.g. mortality and postoperative functional independence, rather than on service performance parameters, e.g. length of hospital stay. The key to successful management of these patients is close collaboration between the various medical and paramedical subspecialties as surgical, medical and social problems commonly coexist.

A number of different models have been established to facilitate this multidisciplinary cooperation but no single approach has proved superior (Cameron et al, 2000). The actual service model that is adopted may be of lesser importance and will probably be determined by the demographics and needs of the local population. However, transfer to rehabilitation beds without prompt attention to medical complications may miss a window of therapeutic opportunity.

Most guidelines (e.g. Scottish Intercollegiate National Guidelines, 1997) emphasize the need for closer cooperation between medical subspecialties to serve the increasing number of elderly orthopaedic patients. As major improvements in surgical and anaesthetic techniques are not expected, reduction of medical comorbidity seems the most promising target to effect better outcomes and reduce pressure on orthopaedic departments. The value of these measures are not yet fully evaluated (Seymour, 1999), but it is unlikely that they will be able to compensate for the demographic shift towards an older population. **HM**

Conflict of interest: none.

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KEY POINTS

- Osteoporotic fractures and osteoarthritis are common conditions that are likely to increase over the next 20 years.
- Outcome is very favourable after elective joint replacement for osteoarthritis, even in the very elderly.
- Complications and adverse outcomes are common after emergency orthopaedic surgery in older people because of their comorbidity.
- Routine, early involvement of a dedicated multidisciplinary team and a specialist in elderly medicine should improve outcome in this patient group.
- Early therapeutic intervention in 'high-risk' patients should maximize the potential for rehabilitation.