Fractured neck of femur
Prevention and management

SUMMARY AND RECOMMENDATIONS OF A REPORT OF THE ROYAL COLLEGE OF PHYSICIANS

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SUMMARY

Introduction and definition

Reports from this College aim in general to improve standards of medical care, particularly in clinical areas in which we feel that the benefits of modern advances have not been widely translated into practical application. Fractured neck of femur is a common and important cause of death and its management demands major use of resources, both directly and indirectly through occupancy of a large number of beds that are in short supply. The incidence of fractured neck of femur in many Western countries has increased so considerably that it almost justifies the term ‘epidemic’. There is still much ignorance about its cause, prevention and treatment.

In this report attention is paid to these three important problems and recommendations are made which are based on the best current medical advice. Much emphasis is given to improving the management of fractured neck of femur, including streamlining of admission procedures and operative treatment and recognition of the importance of early and careful planning of post-operative management.

Most of our working parties find, when they examine specific clinical problems in depth, that there are still large areas of ignorance or confusion. Recognising this, the working party has made important recommendations about the need for future research.

We hope the report will assist those who deal with this common problem and that our recommendations for future research will be followed up, some through our own Research Unit. In particular, we need to understand more about the pathogenesis of the condition so that we can tackle the fundamental problem of prevention.
Definition

There are broadly two varieties of fractured neck of femur — those occurring within the capsule of the joint between the head of the femur and the pelvic acetabulum — intracapsular, and those occurring outside this joint capsule — extracapsular. In this report the term ‘hip fracture’ will be used as synonymous with fractured neck of femur and will embrace intracapsular and extracapsular fractures. This includes all fractures classified in the WHO International Classification of Diseases, 1975.

Epidemiology

Table 1 shows the hospital discharge rates per 10,000 population for hip fracture by age and sex in England for 1985. The larger number of elderly women in the population results in about 80% of all cases of hip fracture occurring in women who are mostly over age 65 (Table 2).

In England and Wales the average length of stay in hospital was 30 days in 1985 and the overall bed use was 3,500 beds per day. Mortality is high, both peri-operatively and subsequently, and only a minority of older patients regain their former mobility. In the UK, it is estimated that direct hospital costs of hip fracture are at present about £160 million per year (1987/8 prices, DHSS estimates).

Using current age- and sex-specific incidence rates for hip fracture in England and Wales, the probability that a woman will suffer a fractured hip before the age of 85 is 12%; for a man it is 5%. Table 3 shows the number of cases expected in 1996, 2006 and 2016.

Aetiology

The incidence of fractured neck of femur in the elderly relates directly to bone strength, the risk of falling and the effectiveness of protective neuromuscular responses to a fall. The best simple index of bone strength is its mineral density.

Osteoporosis

Bone mineral density is lower in women than in men and this must, at least in part, account for the sex differences in the incidence of fractured hip. There is a progressive loss of bone mineral density with age. In women, accelerated bone loss occurs at the menopause, and by the age of 90 bone mineral density will have declined to about half the peak value. The degree of osteoporosis in old age, therefore, depends on:

i peak bone density in youth;
ii the rate of bone loss after the attainment of peak bone mass.
Known determinants of bone density are:
- oestrogen lack
- immobility
- calcium
- alcohol and medications
- smoking

Falls

The risk of falling rises with age. Normal protective reactions tend to reduce the impact of a fall; fractured hips often occur in old people in whom such reflexes are impaired and whose local protective factors, notably fat and muscle around the hip, may also be reduced. Probably about 1% of falls in over 65 year olds result in hip fractures.

Risk factors for falls

Diseases. Normal balance and posture are governed by eyesight, the vestibular system and the proprioceptive nerves; diseases or altered function in any of these may lead to increased susceptibility to falls.

Medications and alcohol. Drugs and medications which impair cerebral perfusion may affect postural control. Alcohol has also been suggested as a cause of falls in the elderly although studies indicate that this is not a factor or cause in the United Kingdom. More important, multiple medications are strongly linked to a risk of falling.

Environmental risks. Among the 65- to 74-year age group external environmental hazards — traffic and uneven pavements, for example — are most important. It is in the familiar home environment that the very old and those in poor health are at greatest risk, and indeed over half of all falls occur as a result of tripping in the home.

Reason for the epidemic

In seeking causes for the current epidemic of fractured neck of femur, only two bear serious scrutiny, namely the increase in the prevalence of smoking during the first half of this century and a more recent decrease in mobility associated with a more sedentary life style.

Prevention

The main method of preventing hip fractures is to reduce the decrease in bone density with increasing age and so to decrease the development of osteoporosis. To this end, six main approaches are available:

i post-menopausal oestrogens
ii post-menopausal calcium supplementation for those whose diet may lack calcium
iii not smoking
iv adequate nutrition to maintain body weight
v avoidance of excessive alcohol consumption
vi reasonable mobility and exercise

Whether post-menopausal oestrogens should be universally recommended depends on the balance of risks and benefits. The risk of endometrial cancer is increased, though the disease appears to be responsive to treatment and the concurrent use of a progestogen may well prevent this excess risk. The risk of breast cancer may be increased in those who have taken oestrogens alone for many years, although the risk at present appears small. Against these adverse effects is the potential benefit of oestrogen in protecting against cardiovascular disease. The effect of progestogens in cardiovascular disease is not known.

At present the balance of benefits and risks of hormone supplementation cannot be fully assessed quantitatively in either medical or financial terms, but it seems to rest on the side of benefit. The use of HRT would probably be justified in women at high risk of developing osteoporosis if they could be identified early enough.

Screening

Women aged about 50 years should have their bone density measured either radiographically or by photon absorptiometry. Oestrogens should be offered to those whose bone mineral density is below a specified cut-off level. Women with low density in the intermediate range might attend for further screening 5 or 10 years after the initial examination.

Prevention of falls

Although it is impossible to prevent all falls, it is important to identify those individuals who are at greatest risk of falling and of hip fracture.

Primary medical care. The general practitioner is in a special position to help reduce falls in these individuals by taking particular note of contributory factors arising from problems with eyesight or the feet, and from medications or clinical disorders that cause unsteadiness.

Home environment. Falls can be prevented by attention to the home environment. Whilst alterations may be advisable in the interests of safety, there are virtues in maintaining the familiarity of an old person’s home environment.

Planning and design. Safety through fall prevention in the elderly should be a high priority among planners, architects and safety authorities.

Management of hip fracture

Pre-operative care

It is recommended that immediately on arrival in the A & E department patients with suspected hip fractures be put on a soft surface (hydrophilic gel cushion or sheepskin for example) with protection for sacrum and heels. Urgent attention should be given to pain relief and to keeping the patient comfortably warm.
Patients should be transferred to the ward as quickly as possible. An early priority X-ray and a clinical assessment with appropriate investigations should be carried out, preferably within one hour of hospital admission. In cases of painful hip following a fall, a normal X-ray does not exclude an undisplaced fracture, and continuing observation, and further investigations, such as tomography or isotope bone scan, together with hospital admission should be considered.

It is recommended that, unless their medical condition precludes it, patients should be operated upon within 24 hours of admission.

Operative management

The choice of operation used depends upon the site of fracture — intracapsular or extracapsular.

Intracapsular fracture. The main methods of dealing with intracapsular fractures are:

a. Reduction of fracture and internal fixation
b. Arthroplasty

Some patients may need post-operative traction following hip replacement operations. In the confused and/or frail elderly this may lead to local post-operative complications particularly pressure sore or to delay or failure to become remodelised or rehabilitated.

Extracapsular fracture. The aims of surgery are the reduction and stable internal fixation of the fracture in order to provide rapid mobilisation as well as the relief of pain.

Non-operative treatment

Treatment of hip fractures in elderly subjects by prolonged periods of traction is not recommended except as a means of keeping extremely frail, confused or demented patients free of discomfort.

Medical considerations. The best predictor of rapid and effective rehabilitation is the mental test-score together with evidence of a good pre-fracture level of independence. Other important factors to consider are hydration and nutrition, monitoring for deep vein thrombosis, medication such as analgesia, restriction of sedation, care of intercurrent illnesses, and treatment of post-operative complications.

Psychiatry of old age. Liaison with psychiatric services for the elderly for either clinical assessment or the arrangement of community psychogeriatric care (day centre, nursing or other services) is of great value, since a major determinant of hospital discharge following hip fracture is the mental state of the patient.

Nursing. Interested, experienced and committed nursing is critical to the recovery of hip fracture patients. In the running of many successful services a liaison nurse — hospital or community based — has proved to be a key figure in coordinating rehabilitation policies in hospital, in organising discharge from hospital and continuing rehabilitation at home. District nursing services are frequently an important and integral part of the discharge plan and post-hospital rehabilitation in hip fracture patients.

Physiotherapy. Physiotherapy and nursing care are the two most important extrinsic determinants in the speed and completeness of recovery of mobility and independence in hip fracture patients.

Occupational therapy. A home assessment visit with the patient should be made before discharge if joint evaluation indicates that this will be of help.

Social services. Close involvement of a member of the social services team is vital in the care and discharge plan of a significant proportion of patients.

Models of organisation

A model operating policy for combined management of hip fracture between orthopaedic and geriatric departments is illustrated in Fig. 1.

Conclusions

Despite the plethora of different schemes for the management of hip fracture patients, which are now receiving attention, it seems likely that in the UK only a minority of
such patients are receiving satisfactory treatment. It is the positive attitude to the treatment of such patients, emphasis on a team approach, careful planning of hospital discharge and close liaison between hospital and community services which will lead both to increased efficiency in the use of resources and to better quality of life for these patients.

RECOMMENDATIONS

Prevention of hip fracture

1. Urgent research is required to identify the reasons for the increase in the age-specific incidence of hip fracture.
2. While the benefits of post-menopausal oestrogen treatment in the prevention of osteoporosis, and thus of hip fracture, are evident, clarification of the balance of benefits and risks in such treatment should be provided, both for women in general and for women identified to be at high risk of hip fracture through screening. Such an assessment should consider the efficacy and safety of combined oestrogen-progestogen preparations as well as of oestrogen alone.
3. Further information on the determinants of peak bone mass is required.
4. The use of techniques for measuring bone density and methods of identifying patients at risk of bone density loss at the menopause should be further investigated.
5. Studies should be carried out on the value of community screening for osteoporosis and hip fracture, including an assessment of the sensitivity and specificity of the screening method adopted.
6. Development of osteoporosis may be accelerated by long-term smoking; hence the risk of hip fracture through smoking could be increased. This is a further reason to strongly discourage smoking.
7. Adequate dietary intake of calcium and regular moderate exercise probably reduce the rate of bone loss in the elderly and are recommended.
8. Further studies of the relationship between falls, fractured hip, and medications or alcohol should be carried out.
9. Identification of elderly persons most at risk of falling may be carried out by general practitioners. Medical supervision and advice concerning medications, adjustments in the home environment and in the way of life of highly at-risk individuals may lead to a reduction in falls and hence hip fractures.
10. All unnecessary immobilisation of elderly people should be avoided because of the risk of accelerated bone loss.
11. The planning of public spaces and buildings should be responsive to the needs of the elderly. The design of buildings such as hospitals, nursing homes or sheltered housing facilities for the elderly should incorporate features to minimise the risk of falls.

Management of hip fracture

12. In each health district someone should be made responsible for reviewing local services for hip fracture, for producing a strategy, and for monitoring standards of care and outcome. Each district should review case fatality rates and, although difficult to achieve, morbidity from hip fracture annually to assess quality of care.
13. Hip fracture patients should spend no more than one hour in casualty. Pre-operative clinical planning for the patient should involve not only technical examination of the fracture but a more general examination including assessment of other co-existing medical problems, mental function, and social circumstances. In many instances this will require pre-operative assessment by a member of the geriatric medical team. Discharge planning should begin here.
14. Operative treatment is recommended for almost all hip fracture patients within 24 hours of admission to hospital. This should, wherever possible, be carried out by or supervised by senior orthopaedic and anaesthetic staff. Hip fracture operations should be performed by day in an orthopaedic operating theatre with the participation of a designated radiographer.
15. Post-operative care should be carried out by a team. Plans for mobilisation, rehabilitation and discharge/transfer should be made systematically for all patients within about four days of operation. All hospitals treating hip fracture patients should ensure that a close working relationship exists between orthopaedic surgeons and the geriatric department. In many circumstances a specific rehabilitation unit may be the best way to achieve this.
16. In addition to experienced nursing, it is necessary to make specific provision for physiotherapy and occupational therapy staff for optimal management of hip fracture patients to be achieved.
17. In formulating discharge and continuing treatment plans for hip fracture patients, we emphasise that close liaison between hospital services, community services and carers is of paramount importance. A number of models for implementing such liaison have been examined. The will to optimise the rehabilitation and care of such patients via hospital/community liaison is critical.
18. Further properly controlled studies of different management strategies and specific treatments for hip fracture incorporating assessment of the quality of care, discharge outcomes, and financial implications of such strategies and treatment are recommended.

The full report is available from the College, price £5.00.