11-year results in 2,846 patients of the Peterborough Hip Fracture Project

Reduced morbidity, mortality and hospital stay

Martyn J Parker, Glyn A Pryor and John Myles

Peterborough District Hospital, Thorpe Road, Peterborough PE3 6DA, U.K. Tel +44 1733–874000. Fax –874515.
E-mail: mjparker@globalnet.co.uk
Submitted 99-08-29. Accepted 99-11-22

ABSTRACT – 3,025 consecutive patients presenting over an 11-year period with an acute hip fracture were prospectively studied to determine the effectiveness of a designated hip fracture service. After the introduction of the service, the mean length of hospital stay per patient was reduced from 51 days to 21 days. This reduction was accomplished by a progressive increase in the proportion of patients discharged directly home from the admission ward (50%–86%) and a reduction in the numbers of patients transferred to care of the elderly wards (28%–6%) and other outlying wards (15%–3%). This change was accompanied by a reduction in the 30-day mortality rate from 22% to 7%. There was no significant increase in the re-admission rate or proportion of patients requiring institutional care.

We conclude that the provision of designated staff and treatment regimes for hip fracture patients can result in a significant reduction in both mortality and morbidity, combined with substantial savings in patient bed-days.

■

A hip fracture remains one of the commonest reasons for an elderly person to be admitted to an acute orthopaedic ward. An estimated 1.3 million such fractures occurred globally in 1990, with numbers expected to increase to 2.6 million by the year 2025 and 4.5 million by the year 2050 (Gullberg et al. 1997). Recent reports have indicated that studies of different treatment regimes are required to determine the optimal management for this injury in order to cope with these increasing numbers of patients (Royal College of Physicians of London 1989, Todd et al 1995, Parker et al. 1998). A previous report, which included results of a hip fracture unit (Strömberg et al. 1997), suggested benefits could be obtained from a designated hip fracture service. This report details the long-term outcomes of the Peterborough Hip Fracture Project.

Patients and methods

The Peterborough Hip Fracture Project began in October 1986. Its initial aim was to designate specific staff to treat hip fracture patients, to minimise complications and streamline their hospital care (Parker et al. 1991). The hip fracture patients admitted via casualty would be scheduled for operation the following morning with the surgery being undertaken using the single theatre team. After surgery, early discharge of patients was encouraged and wherever possible the Hospital at Home community nursing service was used (Pryor and Williams 1989). All patients were followed-up in a designated hip fracture clinic. Over the years, the project evolved such that the theatre team became incorporated in their departments, but a designated hip fracture surgeon remained. The team management for the rehabilitation of hip fracture continued with the introduction of a hip fracture ward to which the patient is admitted and stays for their entire in-patient rehabilitation.

Throughout the project, data have been recorded prospectively on all patients admitted. For the first 2 years, the average length of follow-up for

Table 1. Number of patients admitted each year, mean days hospital stay on the orthopaedic ward, mean total hospital stay, median total hospital stay, mean cost per patient, total bed days/year and cost/year in millions pounds for hip fracture patients

	Number patients	Orthopaedic stay	Total stay	Median	Cost per patient (£ thousands)	Bed use per year (thousands)	Cost/year (£ millions)
Pre	179	23	51	–	–	–	–
1986	70	16	44	15	6.3	–	–
1987	209	16	38	14	6.4	7.9	1.3
1988	207	17	37	15	6.5	7.6	1.3
1989.1	78	26	50	17			
1989.2	145	24	41	16	9.8	9.8	1.7
1990	225	19	28	16	5.2	6.3	1.2
1991	240	14	26	14	5.0	6.4	1.2
1992	258	16	25	13	5.0	6.4	1.3
1993	268	17	22	14	4.7	5.5	1.2
1994	260	15	21	13	4.6	5.5	1.2
1995	303	17	22	11	4.8	6.7	1.4
1996	285	17	20	11	4.7	5.8	1.3
1997	299	16	21	11	4.7	6.2	1.4

Pre, the patients treated in 1985/6 immediately before the project started.
The period in 1986 is for October to December only.
The period 1989.1 is the 5-month period in which the project was temporarily curtailed.
The period 1989.2 refers to the remaining months of 1989.

the surviving patients was 226 days. For the last 8 years, a 1-year follow-up by phone was introduced for patients discharged from the clinic, with any patients in whom the hip appeared to be markedly symptomatic being requested to re-attend the clinic for assessment. 4 patients were lost to follow-up during this period and for these, an enquiry was made to the Office of Population Censuses and Surveys, to ascertain if death had occurred within 1 year of injury. The cost of treatment was determined for all patients by adding the cost of hip fracture treatment (Hollingworth et al. 1993). This included all hospital costs related to the initial treatment and subsequent out-patient visits and any re-admission for the hip fracture in the first year after injury. Costs were based on 1988/89 prices and added for each patient treated to give the total cost for each year of hip fracture treatment.

During the period January to mid-May 1989, there was no research registrar on duty and the hip fracture project and all its staff were disbanded. Data on the patients admitted over this period, including a 1-year follow-up assessment, was collected on resumption of the project in May 1989. In addition, data on 179 patients treated in the 10 months immediately before starting the hip fracture project were collected retrospectively. Patients were identified by theatre operation records and ward admission books. Information was collected on these patients about the length of the hospital stay and a 30-day mortality. Length of hospital stay was until the patient was discharged from hospital or transferred back to the original ward in the case of those patients who fell while in hospital. Patients still in hospital at one year from injury had their hospital stay deemed to be 365 days.

Results

Since inception of the project in October 1986 till the end of 1997, 2,768 patients with a hip fracture have been treated under the scheme. 78 patients more were treated between January 1989 and May 1989 while the scheme was temporarily discontinued (Table 1). The average age of the patients was 79 (16–103) years, 78% were female. At the time of the fall, 74% lived in their own home, 15% were in residential care, 6% in nursing homes and 5% fell while a hospital in-patient. 2% of the frac-

Table 2. Mortality at 30 and 120 days after fracture, number of patients transferred to a geriatric ward, other wards, discharged directly home and re-admission rate (percentage)

	Mortality at		Transfer to		Direct discharge	Re-admissions
	30 days	120 days	geriatric	other		
Pre	40 (22)	– –	– –	–		
1986	14/68 (21)	23/66 (35)	17 (24)	6 (9)	35 (50)	2 (3)
1987	14/207 (7)	43/194 (22)	54 (26)	11 (5)	132 (63)	9 (4)
1988	20/201 (10)	47/179 (26)	43 (21)	23 (11)	135 (65)	5 (2)
1989.1	11 (14)	24 (31)	22 (28)	12 (15)	35 (45)	2 (3)
1989.2	19 (13)	48 (33)	28 (19)	43 (30)	70 (48)	7 (5)
1990	10 (5)	41 (18)	41 (18)	33 (15)	156 (69)	5 (2)
1991	14 (6)	41 (17)	49 (20)	18 (8)	160 (67)	8 (3)
1992	18 (7)	47 (18)	24 (13)	12 (5)	201 (78)	13 (5)
1993	26 (10)	59 (22)	21 (8)	18 (7)	210 (78)	13 (5)
1994	13 (5)	40 (15)	28 (11)	14 (5)	210 (81)	9 (3)
1995	22 (7)	71 (23)	31 (10)	6 (2)	250 (83)	14 (5)
1996	21 (7)	52 (18)	27 (9)	14 (5)	227 (80)	8 (3)
1997	22 (7)	45 (15)	19 (6)	8 (3)	256 (86)	4 (2)

Direct discharge refers to those patients who were discharged directly home from the ward to which they had been admitted. The re-admission rate is the number of patients who were re-admitted to hospital within 30 days from discharge either because of medical complications related to the hip (e.g., deep vein thrombosis), surgical complication (e.g., wound infection) or failure to manage at home.

tures were treated non-operatively with the remainder being treated operatively (Dynamic hip screw 42%, Austin Moore hemiarthroplasty 30%, multiple parallel screws 23%, bipolar hemiarthroplasty 1%, total hip replacement 1%, intramedullary nail 1%).

The mean hospital stay fell from 51 days to 21 days (Table 1).

The mortality at 30 and 120 days after fracture decreased from 21% and 35% (1986) to 7% and 15% (1997), respectively (Table 2). Patients who were transferred from the orthopaedic ward to another ward decreased during the study period and the percentage discharged home directly from the admitting ward increased from 50% to 86% (Table 2; Figure 1).

Figure 2 gives the percentage of patients who were admitted from their own home and the percentage discharged back home or to institutional care.

Discussion

There have been few previous reports of hip fracture projects. A report from Australia (Farnworth et al. 1994) about the first 6 months of a hip fracture project documented a reduction in the mean hospital stay of 7 days for patients admitted from their own home. A report from a hip fracture unit in Sweden (Strömberg et al. 1997), showed a reduced length of hospital stay for a hip fracture unit as compared to patients treated at a hospital without such a unit. The mean total hospital stay in the hip fracture unit was 31 days compared to 61 days in other hospitals without such a unit. The mean hospital cost of treatment per patient was reduced from 16.5 to 7.3 thousands of US dollars for patients treated in the hip fracture unit.

The main reason for the reduced hospital stay was the direct discharge of patients from the acute orthopaedic ward, instead of transferring them to care in the ward for the elderly. When transferring a patient there is frequently an administrative delay until a bed becomes available and, during this time, the rehabilitation process is often curtailed. In addition, transfer of any frail elderly patient is not without problems. The patient may become more disorientated by the change in environment and also lose sight of the eventual goal of treatment–i.e., to return home. Such delay in discharge of patients who are transferred was also highlighted by the East Anglian audit of hip fracture patients (Parker et al. 1998).

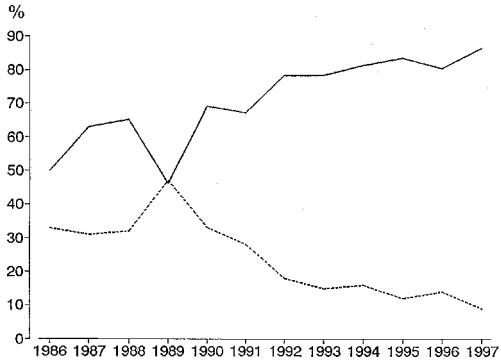

Figure 1. Percentage of patients admitted from their own home being discharged directly home (—) and percentage who were transferred to another ward (- - -).

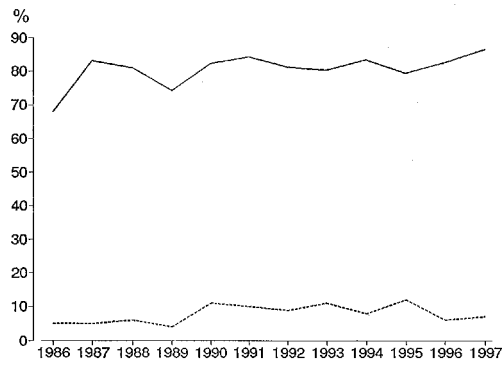

Figure 2. Percentage of patients who were admitted from their own home and discharged back home at the end of their total hospital stay (—) and the percentage who were discharged to institutional care (- - -). The difference between the sum of the 2 lines and 100 represents the hospital mortality (%) for this group of patients.

We found little change in the time the patient spent on the orthopaedic ward, but there was a dramatic reduction in total hospital stay. This reduction occurred slowly over some years, indicating that the value of this type of scheme may not become fully apparent for some time. Continuous audit of such schemes for at least 5 years is therefore essential. In addition, problems in the scheme, such as the temporary suspension in 1989 for this scheme, can confuse results. During this period when the scheme was suspended, there was an immediate deterioration in outcome measures with return to previous levels again on resumption of the service after May 1989. This indicates that the improvements noted are due to the project and not to other unrecognised influences during the same period.

The mean total hospital stay for patients in our study is higher that that of some other reports (Borgquist et al. 1990, Berglund-Rödén et al. 1994). These studies give a mean length of hospital stay of around 17 days, they had more patients discharged to nursing homes. The costs of treating patients in this study were lower than in previous studies (Borgquist et al. 1991, Zethraeus et al. 1997) as they only relate to hospital costs. The additional costs incurred by the community will be mainly related to the number of additional patients discharged to institutional care.

This 11-year outcome study suggests that the designation of resources and staff specifically for the treatment of hip fractures may not only reduce mortality, but also lead to a substantial reduction in morbidity and hospital stay. This reduction in the hospital stay has enabled the increasing numbers of hip fracture patients to be treated without any increase in the use of hospital beds. In addition, this designation of specific resources for the care of hip fracture patients can be cost-effective. We recommend that more designated hip fracture units should be established to permit better evaluation of the benefit of such treatment methods.

Berglund-Rödén M, Swierstra B A, Wingstrand H, Thorngren K-G. Prospective comparison of hip fracture treatment: 856 cases followed for 4 months in the Netherlands and Sweden. Acta Orthop Scand 1994; 65: 287-94.

Borgquist L, Nordell E, Jarnlo G-B, Strömqvist B, Wingstrand H, Thorngren K-G. Hip fractures in primary health care: evaluation of a rehabilitation program. Scand J Prim Health Care 1990; 8: 139-44.

Borgquist L, Lindelöw G, Thorngren K-G. Costs of hip fracture: rehabilitation of 180 patients in primary health care. Acta Orthop Scand 1991; 62: 39-48.

Farnworth M G, Kenny P, Shiell A. The cost and effects of early discharge in the management of fractured hip. Age Ageing 1994; 23: 190-4.

Gullberg B, Johnell O, Kanis J A. World-wide projections for hip fracture. Osteoporos Int 1997; 7: 407-13.

Hollingworth W, Todd C, Parker M J, Roberts J A, Williams R. Cost analysis of early discharge after hip fracture. Br Med J 1993; 307: 903-6.

Parker M J, Pryor G A, Myles J W. Early discharge after hip fracture: prospective 3-year study of 645 patients. Acta Orthop Scand 1991: 62: 563-6.

Parker M J, Todd C J, Palmer C R, Camilleri-Ferrante C, Freeman C J, Laxton C E, Payne B V, Rushton N. Inter-hospital variations in length of hospital stay following hip fracture. Age Ageing 1998; 27: 333-7.

Pryor G A, Williams D R R. Rehabilitation after hip fractures, Home and hospital management compared. J Bone Joint Surg (Br) 1989; 71: 471-4.

Royal College of Physicians of London. Fractured neck of femur: prevention and management. London; Associated Book Publishers UK Ltd. 1989.

Strömberg L, Öhlén G, Svensson O. Prospective payment systems and hip fracture treatment costs. Acta Orthop Scand 1997; 68: 6-11.

Todd C J, Freeman C J, Camilleri-Ferrante C, Palmer C R, Hyder A, Laxton C E, Parker M J, Payne B V, Rushton N. Differences in mortality after fracture of the hip: the East Anglian audit. Br Med J 1995; 310: 904-8.

Zethraeus N, Strömberg L, Jönsson B, Svensson O, Öhlén G. The cost of a hip fracture: estimates for 1,709 patients in Sweden. Acta Orthop Scand 1997; 68: 13-7.