Early discharge after hip fracture

Prospective 3-year study of 645 patients

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The effectiveness of providing additional community resources to enable early discharge following hip fracture surgery has been prospectively evaluated in a consecutive series of 645 patients. For those discharged under the scheme, the average hospital stay was 9.3 days, and this resulted in a substantial saving of hospital bed days.

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The incidence of proximal femoral fractures has recently increased to such an extent that it has been described as an epidemic (Royal College of Physicians Report 1989). The average length of stay in the hospital for the patient is approximately 1 month (Beringer et al. 1984), and therefore this group of elderly patients consumes considerable hospital resources.

Ideal rehabilitation should include rapid return to home together with flexible support services ranging from hospital-level nursing initially to an intensive home-help service. This support can then adapt to the individual patient's return to normal function. Such an early discharge scheme has been described in a small number of patients by Sikorski et al. (1985) in Australia. In Essex, the COPE scheme (Community Orthopaedic Project in Essex) has been established for this group of patients (Taylor 1989). In 1978, such a scheme was established in Peterborough, entitled "Hospital at home" (HAH; Mowat and Morgan 1982). In 1986, the Peterborough Hip Fracture project was commenced, and began using the resources of HAH for early discharge of patients with hip fractures. Two preliminary reports of this scheme (Pryor et al. 1988, Pryor et al. 1989) have been described. The present paper details further results of the scheme over a 3-year period, enabling larger numbers of patients to be studied and a more detailed calculation of costs performed.

The Hospital at Home (HAH) scheme

Following admission, the patient with a hip fracture is assessed by an orthopedic surgeon (employed as a research registrar), and wherever possible, surgery is then performed on the morning after admission. The same team of theatre staff work together to perform the surgery. The team includes an anesthetist, theatre scrub nurse, operating department assistant, and radiographer. The aim is to consistently achieve a stable fixation allowing mobilization with full weight bearing on the morning after surgery.

Those patients who are admitted from their own homes are then considered for early discharge using the resources of the HAH scheme. Within this scheme, nursing care of patients within the community is organized by a central administrative office. They use the available resources of trained nurses and nursing auxiliaries within the community that are available for part-time work, frequently looking after patients who live in their local community, and are therefore able to provide nursing care within the patient's home for up to 24 hours daily. Medical treatment is undertaken under the supervision of the patient's general practitioner, who is always informed before the patient's discharge.

HAH normally provides short-term care, up to 30 days, and hip fracture patients generally only need 10–14 days cover after which Community Care Services take over. Longer periods of support are occasionally used particularly in cases of terminal care. The scheme also includes a hospital-based liaison nurse who will assess the abilities and needs of each patient and then coordinate the patient's discharge from the hospital as soon as is practicable.

For the hip fracture patients admitted to the scheme, additional support is provided by a part-time occupational therapist and community physiotherapist, who are employed specifically for these patients. The occupational therapist assesses the patients in the hospital and provides the necessary aids and appliances for use within the home; in addition, she arranges any necessary adaptations to the home prior to the patients discharge, and ensures that the home environment is

Table 1. Characteristics of the two groups of patients

	Hospital at home (HAH)	
	Yes	No
Number of patients	284	126
Average age	77	77
Female (percentage)	79	83
Average mobility score (range 0–9)	6.2	6.7
Percentage living alone	47	42
Percentage able to do their own shopping	43	44
Percentage home-bound	30	29

Table 2. Calculation of mobility score

A. Is the patient able to get about the house?	
B. Is the patient able to get out of the house?	
C. Can the patient do her own shopping?	
Able to without difficulty	Score 3
On their own, but with an aid	Score 2
Only with someone else's help	Score 1
Not at all, i.e., bedridden, chair-bound, or house-bound	Score 0

made as safe as is possible. On an average, she makes five follow-up visits to each patient following discharge.

The physiotherapist works alongside the HAH staff to assist the rehabilitation of the patient within the home (Meeds and Pryor 1990). She supervises the patient using the most appropriate walking aids and, if required, going up and down stairs and around and other obstacles that the patient's home may present. The patient's walking ability is checked at later visits, and more appropriate walking aids are provided as mobility improves.

Patients and methods

The HAH scheme covers only two thirds of the catchment population for this hospital: namely, Peterborough City itself and the villages to the south of Peterborough. There is no such scheme available for those patients from Stamford town or the villages to the north of Peterborough, and this has allowed us to make a comparison between the two groups based on a geographic randomization.

Whenever possible, patients were discharged to their homes as soon as practicable using the HAH scheme. Patients from outside the HAH area and those patients who were unsuitable for HAH were either discharged to their homes directly from the orthopedic unit or to their homes after a period of rehabilitation in either a peripheral orthopedic unit or following transfer to a geriatric unit.

Details of length of stay were recorded; and at 6 months, all the surviving patients were either reviewed in a special clinic or contacted to ascertain their home circumstances. The cost effectiveness of the scheme was evaluated by offsetting the saving created by the reduction of the hospital stay against the cost of providing the additional community resources. To obtain an accurate figure for the hospital costs for this particular group of patients, a breakdown of speciality costs was made; and from this, an estimate was made as to the extent that patients used different departmental resources.

Between September 1986 and September 1989, 645 patients with hip fractures were admitted. Of these, 169—for whom the scheme is not applicable—were admitted from a residential home or a long-stay hospital bed. A further 6 patients did not reside within the area. This left 470 patients available for our study.

Of these 470 patients, 60 (13 percent) died in hospital before discharge. Of the remaining 410 patients, 284 came from within the HAH catchment area and 126 from outside the area (Table 1). The mobility score was calculated according to the questions shown in Table 2. A "home-bound patient" was defined as a patient who could not leave her/his home without the assistance of another person. In addition, it was noted whether the patient was able to shop on her/his own. The treatment for the hip fracture was Dynamic hip screw fixation in 42 percent, hemiarthroplasty in 38 percent, reduction and internal fixation with three AO screws in 16 percent, other surgical fixation devices in 2 percent, and conservative treatment in 2 percent. There were similar proportions of each type of operation within each group.

Results

Of the 284 potential HAH patients, 171 (60 percent) were actually discharged using the HAH scheme. For these 171 patients, the average length of hospitalization was 9.3 days. The reasons for the remaining 40 percent not having HAH support varied. In the majority of the cases, treatment of medical or postoperative problems prevented early discharge. In some, the home situation was not suitable; and in a small proportion, either the patient, relatives, or general practitioner objected.

Table 3. Results for those patients who lived within the HAH area as compared with those from outside the area (95 percent confidence leves or *percentage*)

	Hospital at home (HAH)		
	Within area	Outside area	*P*
Number of patients	284	126	
Average number of days on orthopedic ward	16 (14–18)	23 (19–27)	< 0.001
Average total number of days in hospital	29 (24–34)	38 (30–45)	0.035
Number readmitted within 6 months	22 *8*	2 *2*	0.021
Number still in hospital 6 months after injury	13 *5*	7 *6*	NS
Number in residential homes 6 months after injury	15 *5*	8 *6*	NS
90-day mortality	40 *14*	14 *11*	NS

The results of the two groups of patients, divided by geographic boundaries into those living inside or outside the HAH area, are tabulated in Table 3. The statistical evaluation between the two groups was done using the chi-square test and the *t*-test. A *P*-value of > 0.05 was considered as being not significant (NS). Also, 95 percent confidence limits are quoted.

The reasons for readmission were either for the treatment of postoperative complications or failure of the rehabilitation. In a number of cases, the patient had been discharged for a trial period at home, with additional support from HAH, to see if the patient could cope once they were within their home environment.

From our study of the cost of treatment, we found that following surgery patients accumulated few hospital expenses other than "hotel cost" and nursing care. The average cost for 1 day on an orthopedic ward during the study period was £65, and for the geriatric wards £40 per day. From Table 3, it can be seen than the reduction in the hospital stay was achieved by saving 7.4 orthopedic bed days and 0.9 geriatric bed days for those patients from within the HAH area. Using these figures, the overall saving for all the patients over the 3-year period was £146,828.

This has to be offset against the cost of the additional community resources used in HAH. This mainly involved nursing time (£34,300), but also included administration (£5,330), travelling expenses of HAH staff (£6,870), and physiotherapy (£16,000). The resulting total expense was £62,500 over 3 years, giving an overall saving of £84,328.

Discussion

Traditionally, in the United Kingdom rehabilitation occurs within the setting of the orthopedic ward to which the patient was originally admitted. This, however, may not be the most appropriate environment for this group of elderly patients, and may result in an increased mortality and fewer patients being discharged back to an independent living in the community (Kennie et al. 1988). It is also an inefficient use of acute orthopedic beds.

The development of an orthopedic/geriatric rehabilitation ward has been advocated to correct this problem following the initial pioneering work of Devas and Irvine (1969). Units that have been established and have reported favorable results include those of Hastings, England (Campbell 1976), Nottingham, England (Boyd et al. 1983), Christchurch, New Zealand (Sainsbury et al. 1986), Islington, England (Murphy et al. 1987), and Bournemouth, England (Hempsall 1990). These reports were purely descriptive of the organization and results of treatment. Two randomized trials have been published comparing conventional orthopedic ward rehabilitation with an orthopedic geriatric unit. Gilchrist et al. (1988), in Glasgow, reported such a trial, and failed to show any difference in mortality, length of hospital stay, and final placement of patients. Kennie et al. (1988), in Stirling, however, reported a clear benefit. Currie (1989) emphasized that the success of any such schemes requires organization and enthusiasm, and may result in additional expenditure.

Nursing home rehabilitation is used more extensively in the U.S.A. (Bonar et al. 1990) and Scandinavia (Jenson and Bagger 1982, Borgquist et al. 1991), but Fitzgerald et al. (1988) reported an increase in the proportion of patients still within residential care 1 year after injury of 9 percent versus 33 percent. A study in Britain found similar results (Bond et al. 1989).

The patient's own home provides an ideal place for rehabilitation and an alternative to the hospital environment, which tends to discourage independent thought or action in any patient, especially the elderly. Once they are within the HAH scheme, patients are encouraged to participate in all the aspects of self-care, taking an increased responsibility for their own welfare. The patient is less likely to become confused in a familiar environment, and social support and contact with friends and relatives are maintained. Rehabilitation can be concentrated on those aspects relevant to the patient, and progressive reacquisition of activities of daily living can be encouraged with the gradual withdrawal of nursing care and home support. Rehabilitation can be conducted at the patient's own pace

without any pressure on bed space, with patients at greater risk being followed-up for a longer time by the occupational therapist and physiotherapist.

The response from the patients is one of almost universal approval, and it has been shown that following discharge to HAH patients return more rapidly to their normal activities (Pryor 1989). Our findings support the concept that the best place for rehabilitation of this group of elderly patients is not within an institution, but within the patient's own home.

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