Chapter 1.

Introduction

1.1 Background

A hip fracture is an injury with serious consequences for life expectancy, recovery, and quality of life. It especially affects elderly women. The management of treatment, rehabilitation, and after care is a challenge for orthopedic surgeons, geriatricians, and health care administrators.

Because of demographic changes the incidence of hip fractures is expected to increase for the next decades. Therefore, hip fracture patients will increasingly need orthopedic and surgical beds in hospitals and rehabilitation beds in other institutions.

In treating hip fracture, surgeons use techniques aimed at unrestricted weight bearing as soon as possible. Although the results of this surgical intervention are expected to improve with newly developed osteosynthesis material, a major improvement in recovery and quality of life of the elderly hip fracture patient is not likely.

Cost considerations have pressed hospital administrators to shorten the hospital stay of hip fracture patients. This has shifted the rehabilitation process to locations outside the hospital. In the Netherlands, elderly hip fracture patients are rehabilitated in a nursing home when discharge to their own home is not possible. Almost all hospitals in the Netherlands have an agreement with neighbouring nursing homes to transfer hip fracture patients for rehabilitation. Because of this policy, the average hospital stay has decreased from 26 days in 1993 to 23 days in 1998. A further decrease is expected.

The consequences of early discharge of hip fracture patients on recovery and quality of life remain unclear. We also do not know whether early discharge results in cost saving. These aspects therefore require further investigation.

1.2 Study Objectives

The *main objective* of the present study was to assess the function and quality of life of elderly hip fracture patients and the costs to the health care sector when these patients are discharged early from the acute hospital to a rehabilitation ward

of a nursing home.

Secondary objectives were to prospectively investigate characteristics and outcomes of elderly hip fracture patients in detail and to determine which measurement instruments are most appropriate for assessment of outcome during follow-up.

The study therefore aims at answering the following *questions:*

Q 1. What is the *outcome* of elderly hip fracture patients in regard to mortality, recovery of function and quality of life?
Q 2. What are the *effects of early discharge* from hospital on mortality, recovery of function and quality of life?
Q 3. Does accelerated discharge result in a *reduction of costs*?
Q 4. What *complications* occur after surgery for hip fracture and does early discharge change the number and nature of complications?
Q 5. Which *measurement instruments* are appropriate to measure recovery in regard to function and quality of life?

1.3 Study Design

In order to address the study questions, a " before and after" study design was developed that corresponded to an organisational change from conventional to accelerated discharge arrangements. Randomisation of patients was not considered feasible since the change from conventional to accelerated discharge arrangements required organisational adjustments that made a simultaneous offer of both service models not possible.

A sample size of 2 x 100 patients was calculated to provide 80% power to detect a reduction in hospital stay of 5 days. Between October 1996 and October 1998, we prospectively recruited consecutive patients, who had been admitted with a fresh hip fracture to the University Hospital or a general hospital (Havenziekenhuis) in Rotterdam, the Netherlands. Patients under 65 years of age and patients with a hip fracture because of metastatic cancer or multitrauma were excluded.

A group of 100 patients were followed up to 4 months after hospital admission with the conventional discharge policy. Thereafter the discharge policy was changed for the next 100 studied patients (actually, the realized number was not exactly 100 but 102 and 106 respectively). Discharge was accelerated by measures, which were

initiated by the investigator and executed by the hospital staff. These included a protocol in which ward physicians were encouraged to make a decision regarding the discharge destination on day 5 postoperatively. Procedures for the indication for type of care both for discharge home or transfer to the rehabilitation ward of the nursing home were speeded up (only one nursing home was involved: Antonius-Binnenweg, Rotterdam).

We selected a follow-up of 4 months because no further recovery could be expected after this period. Moreover, mortality declines in line with the general population mortality rate at 3-8 months after injury. One investigator interviewed and evaluated all patients at 1 week, 1 month, and 4 months after admission to the hospital. Walking ability, basic and instrumental activities of daily living, and health-related quality of life were evaluated. Two functional status measure instruments (Rehabilitation Activities Profile and Barthel Index) and two generic health-related quality of life instruments (Nottingham Health Profile and COOP/WONCA charts), were compared on their performance in regard to score distribution, internal consistency, construct validity, and sensitivity to change.

All medical events up to 4 months after surgery that required nurse-physician monitoring or therapeutic intervention were recorded as complications.

Costs were studied from a societal perspective. Real costs were estimated based on a detailed measurement of investments in manpower, equipment, materials, housing and overhead. Fees and charges were only used in case of uncommon interventions and standard laboratory analyses. Medical costs were included as well as the costs borne by the patient and family (e.g. costs of informal care and travelling). Costs were estimated for a 7-month period, 3 months pre-operatively and 4 months post-operatively.

1.4 Structure of the thesis

Chapter 2 is a literature review on incidence, determinants, length of hospital stay, rehabilitation programmes and costs of hip fracture patients.

The remaining chapters contain the results of our study. First the characteristics and outcomes of a group of 102 elderly hip fracture patients are described which are discharged from hospital according to the current policy in the Netherlands

(chapter 3). Next, the intervention study results are described, in which the 102 conventionally managed patients are compared with a group of 106 patients with an early discharge policy (chapter 4). Costs of conventional and early discharge policy are compared in chapter 5. Complications during the first four months after surgery are reported in chapter 6. Finally, we compared the performance of four health status measures in the evaluation of health-related quality of life after hip fracture (chapter 7). The results of chapters 2 to 7 are discussed in chapter 8. Summaries of the thesis in Dutch and English are included.

Because the results of the study are presented in the form of papers (published in, or submitted to, medical journals) that address different aspects of the same study, it is unavoidable that there is some overlap in the information, especially between chapters 3, 4, and 5.