Research paper

Early geriatric follow-up after discharge reduces mortality among patients living in their own home. A randomised controlled trial

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A B S T R A C T

Introduction: Post-hospital mortality rates are high among geriatric patients. Early geriatric follow-up has resulted in a significant reduction in readmission rate and length of hospital stay (LOS). With a reduction of LOS mortality becomes a major issue.
Material and method: The study is a quasi-randomised, controlled trial. Participants are geriatric patients 75 years or older, admitted to emergency department with one of following diagnoses: pneumonia, chronic obstructive pulmonary disease, dehydration, delirium, constipation, anaemia, heart failure, urinary tract infection, or other infections. Intervention group patients receive a follow-up visit by a geriatric team nurse and doctor on the first weekday after hospital discharge. Control group patients are screened by hospital staff for a visit by general practitioner and community nurse 7–14 days after discharge.
Results: A total of 1060 patients were allocated to intervention group and 1016 patients to control group. The 90-day mortality of the entire population was not significantly affected by the intervention (23% vs. 26%). Hazard ratio = 0.87 (95% CI 0.73–1.03). However, 90-day mortality of patients living in their own home was significantly reduced (18% vs. 22%). Hazard ratio = 0.79 (95% CI 0.63–0.99). Among nursing home residents 90-day mortality did not differ between the groups. Hazard ratio = 1.01 (95% CI 0.77–1.32). The 30-day mortality was not significantly affected by the intervention.
Conclusion: Early geriatric follow-up after discharge is a safe way of reducing readmissions and LOS among geriatric patients admitted acutely to hospital. Patients living in their own home may even benefit more from the intervention.

1. Introduction

Mortality rates during and following hospital admission are high among elderly whose 90-day mortality varies from 18 to 52% according to international studies [1–5]. A Danish study reports a 90-day mortality rate of 23.4% among patients aged 80 years or more who had been admitted to an emergency department (ED) [6].

Characteristics associated with in-hospital and post-hospital mortality include age, comorbidity, functional disability, nursing home residency, and cognitive impairment [4,6–10]. All of them are common characteristics of geriatric patients who are therefore an obvious target group for interventions tailored to reduce mortality.

Readmission is also recognised as a strong risk factor of mortality [11–14]. Readmissions are in fact one of the only risk

factors that interventions can be targeted at. Previous studies tested various interventions to reduce readmission rates and mortality in elderly patients discharged from hospital. Some interventions could reduce readmission rates, but to our knowledge, none managed to reduce mortality rates significantly among the geriatric patients [15–19].

A meta-analysis demonstrated reduced mortality in patients receiving hospital services at home. However, no significant effect in the subgroup analysis of patients above 74 years of age was observed [15].

Nursing home residents [4,20–22] are at especially high risk of dying during or following hospital admission. Sparse knowledge exists on the effect of follow-up interventions in these patients.

The effect of an early geriatric follow-up visit after discharge was assessed in a pilot study, which showed a statistically significant reduction in 30-day mortality. However, the intervention group was compared with a historical control group [23]. Changes in setting over time could lead to different

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circumstances in the two groups and thereby affect the results. Consequently, a randomised controlled trial is needed to increase reliability.

In 2016, we published a paper on the effect of an early geriatric follow-up visit after discharge tested in a randomised trial. The study showed a significant reduction in readmission rate and length of hospital stay (LOS). Mortality was investigated to determine if shorter LOS increased mortality. Mortality was not affected by the intervention. However, the mortality analysis was underpowered.

The primary aim of the present study is to ensure that mortality does not increase despite reduction in readmissions and LOS, when an early geriatric follow-up visit is made. A secondary aim is to perform subgroup analysis to determine any mortality rate differentials among nursing home residents and patients living in their own homes.

2. Material and method

2.1. Design

The study is part of a triple-aim quality development project to improve quality of care, reduce health costs and increase patient satisfaction. It was conducted in a quasi-randomised design using block randomisation. Closed envelopes of 10, (five stating control and five intervention) were prepared by an independent research assistant. Each day an envelope was drawn stating either control or intervention. Included in this randomisation were all patients assigned to the geriatrician in the emergency department (ED) on the day in question. Neither patients nor hospital staff were blinded to the randomisation [24].

2.2. Population

The population comprised patients acutely admitted to the ED at Aarhus University Hospital, Denmark, in the period 1 June 2014 to 31 August 2016. The patients were 75 years of age or older. They were admitted with one of the following diagnoses: Pneumonia, chronic obstructive pulmonary disease (COPD), dehydration, delirium, constipation, anaemia, heart failure, urinary tract infection or other infections. Excluded were patients living outside the municipality, terminal at admission, already in contact with a geriatric team or included in the study in the previous 30 days. Patients transferred to other departments or to one specific temporary nursing home with geriatric medical assistant were also excluded.

2.3. Method

2.3.1. All patients

All the patients were allocated to a geriatric doctor and a nurse or a therapist. Comprehensive geriatric assessment (CGA) was performed in the ED. Patients were then discharged directly home or transferred to the geriatric ward (Fig. 1). Patients discharged from the geriatric ward were all escorted home by a nurse or a therapist. Patients could continue various treatments in their home after discharge; for instance, intravenous antibiotics or subcutaneous fluid replacement, which were administered by municipal home care nurses.

2.3.2. Intervention group

Patients in the intervention group received a follow-up home visit from a geriatric team the first working day after discharge. This team comprised a doctor and a nurse from the geriatric department. The follow-up visit was individualised for each patient. There were no standardised demands. The discharging doctor could request the team to take care of specific issues or prescribe supplementary tests (ex. blood samples). Furthermore, medications, nutritional status, performance status and social status were assessed. Home care personal and the closest relatives were invited to participate in the visit.

In case of relapse or complications, the team could initiate acute treatments in the patient's home in co-operation with the home care service.

Furthermore, the patients had the possibility to phone the team. The follow-up period lasted for at least one week and included one or more contacts. When the follow-up was completed, the responsibility for the patient was returned to the patient's GP. No GP-follow-up visit was scheduled or expected.

2.3.3. Control group

At discharge, patients were screened to determine the need for a follow-up visit from their general practitioner (GP) and the
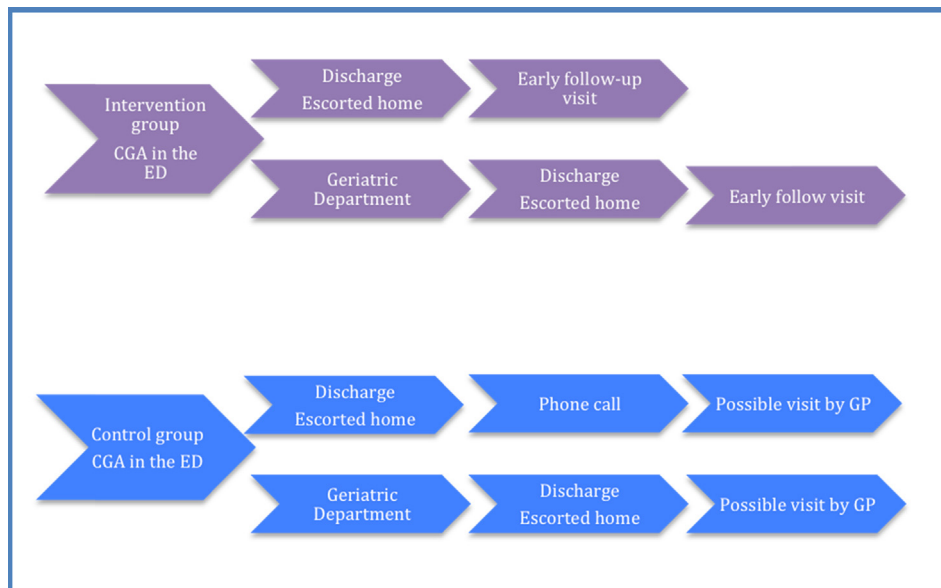

Fig. 1. Flowchart of the control and intervention groups. The figure shows the flow of a control and intervention group of geriatric patients discharged from the emergency.