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Appendix: questionnaire format

Name……………………………………….Hosp No. …………………………..Age………..
M/F………………….Pack years smoked……………………….Current Cigs/day……………

Questions 1–6 should be addressed to the patient

[1] What is your diagnosis?………………………………….
[2] What is/are the cause(s) of your health problems? ………………………………………………………………………
……………………………………………………………………………………………………………………………
………………………………………………………………………………………………………………
[3] Has a doctor, nurse or other health professional ever explained to you what is wrong with you and why?………
Yes/No/Can’t remember
[4] Has a doctor, nurse or other health professional ever told you that you must stop smoking?
Yes/No/Can’t remember
[5] Has a doctor, nurse or other health professional ever given you any support to help to quit smoking?
Yes/No/Can’t remember
[6] How likely is it that you will stay off cigarettes after you leave hospital?
Very likely
Somewhat likely
Not likely

Question 7 relates to the patient’s notes

[7] Is there any evidence in the notes on this admission that the patient has received any advice on…
[a] smoking cessation Yes/No
[b] smoking as a causative factor in their illness Yes/No

In-hospital hip fractures: prevalence, risk factors and outcome

SIR—The incidence of hip fractures is increasing worldwide [1] and despite the advances in perioperative care during the last 20 years a decrease in mortality after surgical treatment has not been observed [2, 3]. Demographic studies from 1986 documented that the risk of a hip fracture was 11 times greater in hospitalised patients than for non-hospitalised persons of comparable age, and that 24% of all hip fractures occurred in elderly patients hospitalised for other reasons [4]. That in-hospital fractures still present a significant problem today is highlighted by Canadian data (2000–2003), where 0.9/1000 admissions of elderly patients suffered a hip fracture during hospitalisation [5]. These data, however, offer no description of preoperative characteristics, fall circumstances, preventive measures or outcome for these patients as opposed to the general hip fracture population.

Therefore, the aims of the present study were four-fold: to establish the prevalence of in-hospital fractures among the total hip fracture population in a large urban general hospital with both acute and rehabilitation services, to determine the circumstances of the fall leading to the fracture, to describe the use of pre-fracture preventive measures undertaken and to examine how these patients differed in preoperative characteristics and postoperative outcome from the remaining hip fracture population.

Patients and methods

Six hundred consecutive, unselected patients with primary hip fracture admitted to the hip fracture unit at the department
of orthopaedic surgery between September 2002 and July 2004 were analysed prospectively. The study was conducted at Hvidovre University Hospital, which is a general hospital with both acute and rehabilitation services that receives patients from the urban part of Copenhagen, Denmark. No standardised fall prevention program is in effect at the institution and preventive measures are at the discretion of the individual physician/staff member. All patients received a well defined, multimodal fast-track rehabilitation regimen [3, 6, 7]. Rehabilitation was conducted in the orthopaedic ward for all patients who suffered their fracture in the community. Patients who had in-hospital fracture were discharged to their previous ward for further rehabilitation after recovery from the specific surgical problems.

In-hospital fractures were defined as any fracture occurring in patients already hospitalised. Fractures sustained before hospitalisation but not recognised upon initial admittance were not considered in-hospital fractures. All patients who suffered in-hospital fractures had their charts reviewed independently by the first and second author. Data were gathered on available circumstances related to the fall leading to the fracture and previous history of falls, and whether any preventive or protective measures had been initiated before the fracture.

Statistical analysis was conducted with SPSS for Windows version 10.1. Tests for significant differences between groups were investigated with the chi-squared test for categorical data and with the Mann–Whitney test for continuous numerical data.

The project is part of Hvidovre University Hospitals hip fracture project, which has been approved by the local ethics committee.

Results

Forty-four (7%, CI 95% 0.05–0.09) of 600 consecutive patients presenting with a primary hip fracture suffered the fracture while already hospitalised. Patients with in-hospital fractures had a lower pre-fracture functional level and more co-morbidities, and also had significantly worse postoperative outcome (Table 1).

Admission circumstances and fall data are presented in Table 2. The patients who suffered in-hospital fractures were primarily (77%, CI 95% 0.65–0.90) admitted to acute medical or surgical wards. The fracture occurred from 3 to 78 days (median 9.5) after admittance. At the time of the accident leading to the fracture, 24 of the 44 patients already had a planned date of discharge. Eight of these 24 patients were awaiting nursing home placement or transfer to further rehabilitation and five patients suffered their fracture on the day of or the day before a planned discharge.

Of the 44 patients with an in-hospital fracture 23 patients had been described as either demented or confused before the fracture. Twelve patients had a current or previous stroke, 16 had cardiovascular disease and six had current pneumonia.

Delay to surgery in the in-hospital group was significantly longer than in the remaining patients (39% operated <24 hours versus 83%). Of the 14 patients with an in-hospital fracture who did not receive surgery the day after their fracture six had a delayed diagnosis in their ward of origin, another six were delayed due to logistics in the operating theatre and four for medical optimisation.

According to the patient’s records 52% (CI 95% 0.37–0.68) of patients with in-hospital fracture had a known history of falls. Fall evaluation had been prescribed in four patients, three of whom had Holter-monitoring prescribed and one of whom was awaiting a geriatrics fall assessment. One patient had continuous supervision (24 hours), which had just been suspended at the time of fracture. No patients had hip protectors prescribed or worn at the time of fracture.

Postoperative length of stay was significantly longer and mortality was almost twice as high in the group with in-hospital fractures. When those patients who had a planned date of discharge before their fracture and survived to discharge (15 of 24 patients) were analysed separately, the estimated excess length of stay due to their hip fracture amounted to a median of 30 days (inter-quartile range 19–61).

Discussion

The present study is the first in the last 20 years that specifically investigates the characteristics and outcome of in-
hospital fractures compared with the general hip fracture population [4]. It is shown that in-hospital hip fractures still contribute a significant part (7%) of the overall number of hip fractures presenting themselves for surgery. Furthermore, these patients are in a poorer pre-operative condition and have a worse outcome both in terms of length of stay and mortality compared with the remaining hip fracture population. None of the patients who suffered an in-hospital hip fracture had any preventive measures undertaken at the time of the fall leading to their fracture. A history of previous falls was evident in half of these patients, and in one out of three even during their current hospitalisation.

That in-hospital primary hip fractures are still a common problem is highlighted by the Canadian health indicators with an overall incidence of 0.9/1,000 elderly patients [5]. The lower incidence of in-hospital hip fractures in our study than that reported in 1986 [4] may be explained by the increasing number of hip fractures [1], leading to a relative decrease in in-hospital fractures assuming that the number of hospital beds remains the same or decreases.

Hip fracture prevention falls into two categories, namely fall prevention [8–9] and fracture prevention [10–11]. Assessment tools for prediction of falls have been validated and found to be predictive [12, 13]. Previously assisted ambulation, confusion, and prior in-hospital falls have been identified as risk factors for falls and in-hospital hip fracture [14, 15], which is consistent with the findings of the present study, although the incidence of factors such as confusion and previous falls potentially is underestimated due to the sampling method used. A Cochrane analysis concludes that fall prevention programs can reduce the number of falls, however, a reduction in the number of hip fractures has not been demonstrated [8, 16]. Nonetheless preventive fall assessment is considered best practice [9].

Hip fracture prevention via external hip protectors [17] have the potential to reduce hip fractures but the evidence is controversial as no fracture reducing effect has been shown [10, 18]. The studies are potentially confounded by the universally poor compliance in the available studies [18, 19]. At present no studies have examined the effect of hip protectors in acute care wards, despite the fact that potential compliance problems could be minimised in this setting. It is noteworthy that about 75% of the patients in our study suffered their fracture in the acute care unit within the first two weeks of admission, whereas all studies of in-hospital fall prevention and hip protectors pertain to rehabilitation and long term nursing wards [8, 10, 16, 18].

Outcome in pre-fracture hospitalised patients was significantly poorer than that of patients admitted from the community. This can partly be explained by the overall poorer medical and functional condition of these patients at the time of surgery. The excess mortality of 100% is comparable with previously reported data [2, 4]. The in-hospital fracture patients had a significantly longer delay to surgery, of which only a small fraction could be attributed to medical optimisation. Postoperatively the patients were quickly transferred from the ward specialising in hip fracture rehabilitation to their ward of origin, despite the fact that half the patients were no longer in active treatment/diagnostic process at their ward of origin at the time of their fracture. This practice may be questionable considering the present data and an individualised assessment of each case may be preferable.

In conclusion, hip fractures amongst hospitalised patients contribute to about 7% of the overall hip fracture population, are in a physically and mentally poorer condition and have an excessively poor outcome. Half of these patients had a previous history of falls and 75% suffered their fracture in the acute care wards, calling for further research on fall prevention and hip protectors within this setting.

### Key points
- In-hospital hip fracture constituted a significant proportion of hip fractures and had a very poor outcome.
- The majority of in-hospital fractures occurred in acute care wards, which have been neglected in previous studies of fall prevention and hip protectors.
- Half of the patients with in-hospital fracture had a previous history of falls, but no preventive measures had been instigated at the time of fracture.

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### Conflicts of interest
None

Nicolai B. Foss¹,²*, Henrik Palm², Henrik Kehlet³
¹Department of Anaesthesia, Hvidovre University Hospital, Copenhagen DK-2650, Denmark

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