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Femoral neck fractures in Lithuania and Sweden. The differences in care and outcome

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Abstract

Purpose Hip fractures constitute a serious and common health problem from both individual and public health perspectives. Unified data collection and comparison between countries is recognised as an effective tool for care improvements. However, the variation in patients' demography, treatment methods and other local cultural aspects in different countries should be considered. The aim of our study was to compare femoral neck fracture patients treated in Kaunas and Lund, concerning functional outcome and quality of life.
Methods We investigated 99 patients treated by arthroplasty in Kaunas Clinics and 117 patients in Lund University Hospital. Patients were investigated according to the National Swedish Hip Fracture Register model and were followed up for a period of four months after the injury. The patient's place of residence, mobility, complaints of pain and additional hospital stay were recorded. The EQ-5D questionnaire was used to evaluate quality of life.

Results Patients in Kaunas were significantly younger, had lower ASA grade and were more mobile before trauma and at four moths follow-up. However, when comparing quality of life at four months follow-up between the institutions, Lund patients reported significantly better self care, felt less pain and discomfort, and had less symptoms of anxiety and depression.
Conclusions The difference observed in quality of life rating between institutions might be related to local cultures of the countries and should be considered when comparing the data.

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Introduction

Hip fractures constitute a serious and common health problem among older adults from both the individual and public health perspectives. They are associated with increased morbidity and mortality compared to the general population [1–3]. Treatment methods and the care of patients with hip fractures vary in different countries; such models are usually developed within the context of local cultures and health-care systems.

Lund University hospital (LUH) was the first institution in Europe to introduce national prospective registration of hip fracture patients in 1988 by developing the Swedish Hip Fracture register, eventually covering the whole of Sweden [4]. The scientific data from the register influenced changes in treatment methods, rehabilitation, and also resulted in the introduction of integrated care protocols for care of femoral neck fracture patients. All these changes have significantly improved patients functional outcome and their quality of life [5, 6].

At present Lithuania does not have well defined schemes for the treatment of femoral neck fracture patients. Lack of prospective studies investigating the outcomes impedes the implementation of effective models in clinical practice. The current situation in the country has encouraged us to start

a prospective registration of femoral neck fracture patients and compare our results with Lund University Hospital. A standardised prospective comparison has been efficient [7], and the results might change the treatment policies in our country.

The aim of our study was to compare the functional outcome and quality of life in femoral neck fracture (FNF) patients treated in Kaunas Medical University Hospital and LUH.

Patients and methods

We investigated patients with fresh FNF admitted to Kaunas Clinics, Lithuania, and LUH, Sweden. Patients 55 years and older with non pathological femoral neck fractures and treated with arthroplasty were included. We compared patients fracture type, American Society of Anesthesiologists (ASA) grade, demographic variables, mortality rates in the institutions. Functional outcome and quality of life at four months after the trauma were compared in both institutions.

All patients included in the study were investigated prospectively using the same study protocol in Kaunas and Lund. Patients were assessed according to the National Swedish Hip Fracture Register model and were followed up for a period of four months after the injury. The Swedish National Hip Fracture Register consists of three forms for data collection. The first form (form no. 1) is used to collect information about the patient's admission to the health-care institution, place of residence before the fracture, mobility, and the time and location of discharge. The second form (form no. 2) consists of information collected during the follow-up visit at four months after the injury. The patient's place of residence, mobility, pain and any additional hospital stay is recorded. The information was collected either via mail or patients were assessed in the outpatient department. Additional surgery, if performed during the follow-up period, is registered on form no. 3. Euro Qol-5D (EQ-5D) [8], a health related questionnaire for quality of life evaluation, was applied four months after the injury.

The study was approved by the ethical committee of the institution.

Statistics

The primary effect variable, used for power calculation analysis, was EQ VAS scoring. Assuming a difference in the means of 10, an SD of 15 for both groups, and aiming for a power of 0.95 and a risk of 0.05 for a type-1 error, 60 patients were required in the Kaunas Clinics and LUH. The Student's t-test was used to compare the means. Fisher's exact test was used to compare differences in the proportions of qualitative variables. The McNemar test used to compare differences in the proportions of categorical

variables for repeated measurements of the same patient group. For comparison between two categorical variables, the Z test was applied. Linear regression analysis (backward method) was used to evaluate factors including country, sex, age, mobility, use of walking aids before and after the injury, ASA class and type of implant, in relation to the patients' quality of life according to the EQ-5D outcomes.

Results

Between March 1, 2008 and September 1, 2010 there were 176 FNF treated in Kaunas Clinic and 262 femoral neck fracture patients treated in Lund. A flow chart of all patients treated in both institutions is shown in Fig. 1.

The data of all patients treated in both institutions with arthroplasty is presented in Table 1. Patients in Kaunas were younger, had lower ASA grade and all were treated with total hip arthroplasty, whereas in Lund 84 % of patients received a Bipolar prosthesis.

Before the end of four months follow-up out of the remaining 147 patients treated with arthroplasty, 15 (10 %) patients died in Kaunas as compared to 29 (17 %) out of 167 patients in Lund ($p=0.07$). Patients who were unable to answer the EQ-5D questionnaire due to cognitive impairment, who were lost to follow-up or underwent additional surgery, were also excluded from functional outcome and quality of life analysis (Fig. 1). Thus functional and quality of life outcome at four months was investigated in 99 femoral neck fracture patients treated with arthroplasty in Kaunas and 117 in Lund.
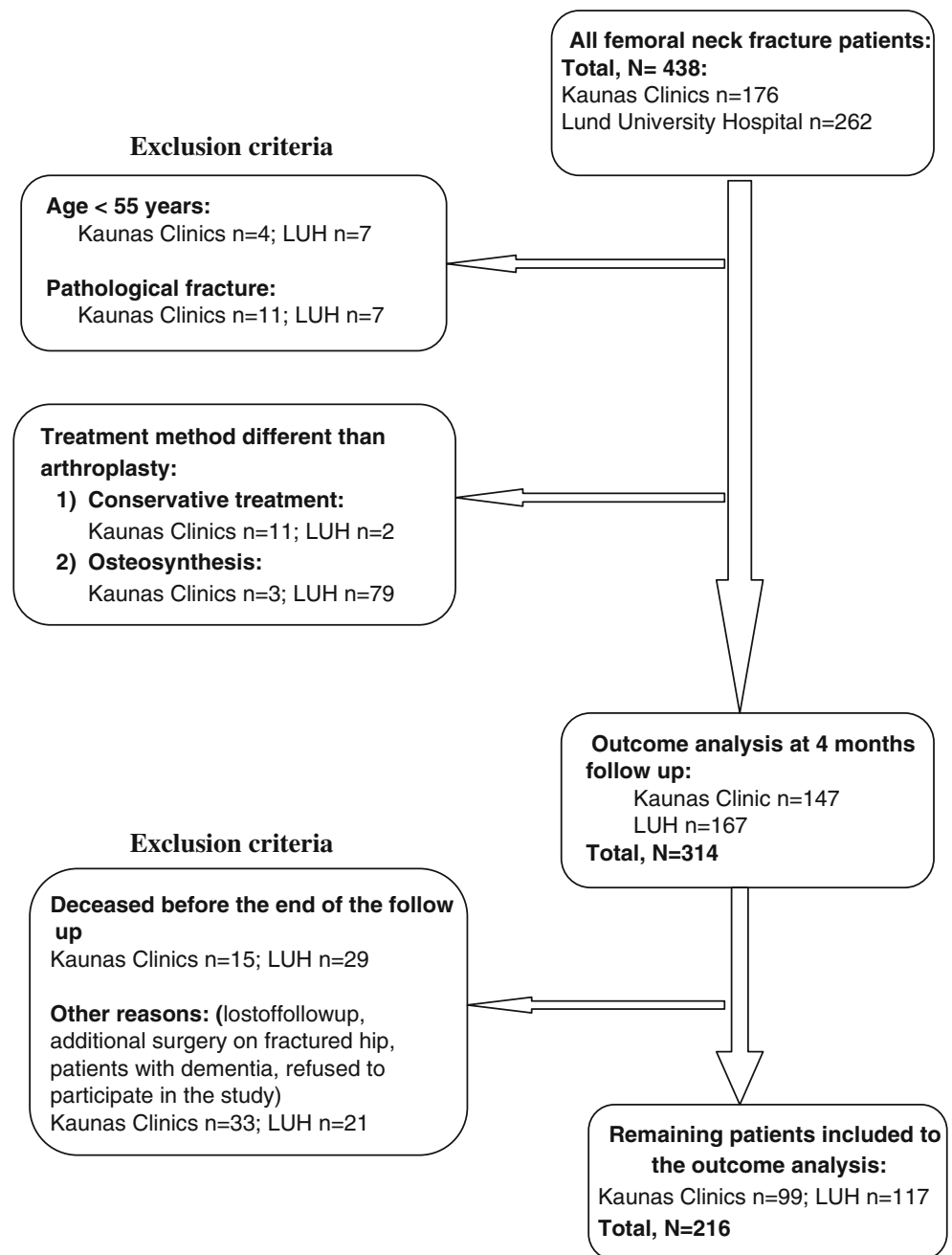
A four-month period after the trauma was not sufficient for patients to regain their pre-fracture mobility in both institutions. Significant differences were observed between the institutions before trauma and at four months follow-up; patients in Kaunas were more mobile ($p<0.001$) and were using fewer walking aids ($p<0.001$; Table 2).

Patients in Lund reported significantly better self care, felt less pain and discomfort, and had less symptoms of anxiety and depression according EQ-5D (Fig. 2).

An additional analysis of patients rating their current health-related quality of life state (EQ VAS) at four months follow-up in Kaunas was 55 (SD 22) as compared to 69 (SD18) in Lund ($p<0.001$).

In regression analysis worse mobility from EQ-5D was related to worse mobility before fracture and higher ASA grade. Sweden as country of residence, better mobility before and after the trauma and lower ASA grade significantly affected better patient self care from EQ-5D. Better rates of usual activities from EQ-5D were significantly related to Sweden as country of residence, younger age and better mobility before and after the trauma. Better rating of pain/discomfort dimension from EQ-5D was related to Sweden as

Fig. 1 Flow chart of all
femoral neck fracture patients
treated in both institutions

All femoral neck fracture patients:
Total, N= 438:
Kaunas Clinics n=176
Lund University Hospital n=262

Exclusion criteria

Age < 55 years:
    Kaunas Clinics n=4; LUH n=7

Pathological fracture:
    Kaunas Clinics n=11; LUH n=7

Treatment method different than
arthroplasty:
    1) **Conservative treatment:**
        Kaunas Clinics n=11; LUH n=2
    2) **Osteosynthesis:**
        Kaunas Clinics n=3; LUH n=79

Outcome analysis at 4 months
follow up:
        Kaunas Clinic n=147
        LUH n=167
Total, N=314

Exclusion criteria

Deceased before the end of the follow
up
Kaunas Clinics n=15; LUH n=29

Other reasons: (lostoffollowup,
additional surgery on fractured hip,
patients with dementia, refused to
participate in the study)
Kaunas Clinics n=33; LUH n=21

Remaining patients included to
the outcome analysis:
Kaunas Clinics n=99; LUH n=117
Total, N=216

country of residence and to usage of less walking aids at follow-up. Better rating of anxiety/depression from EQ-5D was significantly related to country of residence (Sweden) and better mobility at follow-up (Table 3).

Discussion

Comparing the whole group of patients admitted during the inclusion period and treated with THA in both institutions we found that the patients in Lithuania were significantly younger than those in Sweden (78 years versus 82 years). This age

difference might have been related to general age differences in the population between Lithuania and Sweden. The older age in Lund might have been associated with a longer life expectancy in Sweden (79.4 for men and 83.5 for women in 2009) compared to Lithuania (67.5 for men and 78.7 for women in 2009) [9]. The older age of the patients and the possibly related higher number of leading co-morbidities might explain our finding of higher ASA scores in Lund. Furthermore, that the occurrence of FNF in Sweden in older patients suggests that the older population in Sweden either has more efficient osteoporosis management or better fall prevention for the elderly compared to patients in Lithuania.

Table 1 The comparison of baseline data of femoral neck fracture patients treated with arthroplasty in Kaunas and Lund

Hospitals	Age	Gender	ASA grade	Type of fracture	Method of surgery
Kaunas clinics, n=147	78 (SD 9)	Male 38 (25.9 %)	I – 2 (1.4 %) II – 80 (54.4 %)	Non-displaced 8 (5.4 %)	Bipolar 0, 0.0 %
		Female 109 (74.1 %)	III – 61(41.5 %) IV – 4 (2.7 %) V – 0	Displaced 139 (94.6 %)	THA 147, 100.0 %
LUH, n=167	83 (SD 8)	Male 49 (29.3 %)	I – 6 (3.6 %) II – 59 (35.3 %)	Non-displaced 4 (2.4 %)	Bipolar 141, 84.4 %
		Female 118 (70.7 %)	III – 96 (57.5 %) IV – 6 (3.6 %) V – 0	Displaced 163 (97.6 %)	THA 26, 15.6 %
p value	<0.001	0.53	0.007	0.3	<0.001

When analysing the distribution of implant types we found that all patients in Kaunas were treated with THA compared to only 16 % of patients in Lund, whereas the remaining patients received a bipolar prosthesis. The explanation for this is that use of bipolar prostheses is not a common practice in Lithuania due to the policy of the State Patients Fund. One may suspect that the significant differences in the types of prostheses used might influence comparisons of the functional and quality of life outcomes between the two institutions. However, recent studies showed that there was no significant difference in quality of life in the short-term follow-up when bipolar or THA was implanted in patients with FNFs [10, 11].

The majority of the patients in Kaunas before and after injury were living in their own homes, whereas in Lund a significantly greater number of patients were living in social facilities. These differences related to a higher amount of well-organised service houses with a wider spectrum in Sweden [7], whereas in Lithuania there is a shortage of social care institutions for elderly people. Another influencing factor could be older mean age of the patients in Lund, whereas it is known that older age due to all co-morbidities is a risk factor for institutionalisation.

The patients in Kaunas were more mobile and used walking aids less before trauma and at the four-month follow-up compared to the patients in Lund. One possible explanation for this is that patients in the Kaunas clinics were significantly younger and had a lower ASA grade compared to the patients in LUH. Both of these factors (younger age and lower ASA grade) could explain why

Table 2 Comparative data according to hip fracture register forms of patients before fracture and after four months in both institutions (Z-test)

Variables	Before trauma, n (%)			At 4 months, n (%)		
	Kaunas clinics, n=99	LUH, n=117	p	Kaunas clinics, n=99	LUH, n=117	p
Place of residence						
Home	78 (78.8)	91 (77.8)	0.86	92 (92.9)	81 (69.2)	0.001
Social facilities	2 (2)	21 (17.9)	<0.001	5 (5.1)	31 (26.5)	<0.001
Health care institutions	19 (19.2)	5 (4.3)	<0.001	2 (2)	5 (4.3)	0.36
Mobility						
Walked alone out of doors	83 (83.8)	73 (62.4)	0.001	54 (54.6)	50 (42.7)	0.09
Walked out of doors only if accompanied	10 (10.1)	3 (2.6)	0.03	19 (19.2)	1 (0.9)	<0.001
Walked alone indoors but not out of doors	6 (6.1)	35 (29.9)	<0.001	21(21.2)	42 (35.9)	0.02
Walked indoors only if accompanied	0	4 (3.4)	0.06	2 (2)	14 (12)	0.005
Unable to walk	0	2 (1.7)	0.2	3 (3)	10 (8.5)	0.1
Walking aids usage						
Can walk without aids	63 (63.7)	68 (58.1)	0.42	20 (20.2)	28 (23.9)	0.53
One or two walking stick, crutch or tripod	33 (33.3)	12 (10.3)	<0.001	58 (58.6)	20 (17.1)	0.001
Walking frame	3 (3)	34 (29)	<0.001	18 (18.2)	53 (45.3)	<0.001
Wheelchair /bedbound	0	3 (2.6)	0.1	3 (3)	16 (13.7)	0.006

Fig. 2 Comparative results of patient self reporting health status, according to the EQ-5D questionnaire between countries. *no significant difference
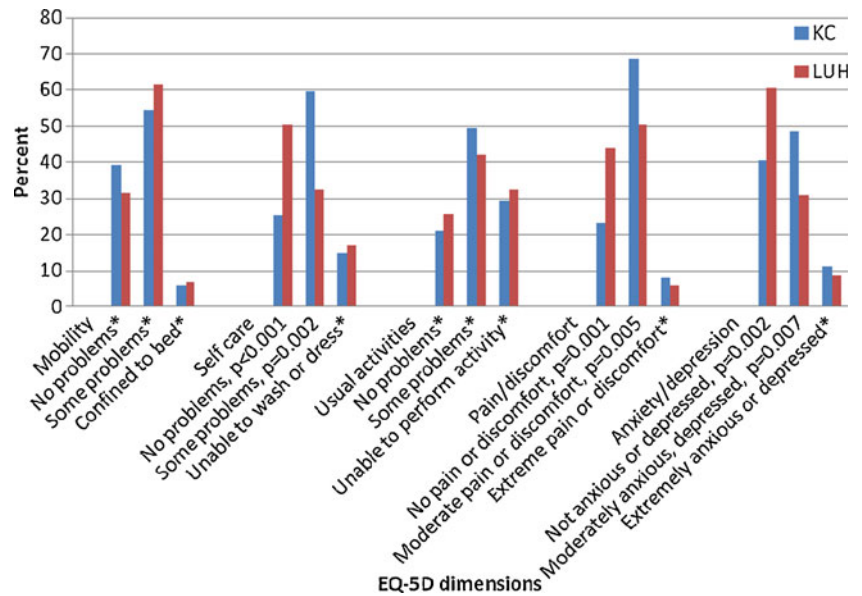
the patients in Lithuania had better health conditions pre-fracture and at the four-month follow up after surgery, though patients did not regain their pre-fracture functional status at four months follow-up in both institutions. This is in accord with reports that 50–75 % of hip fracture patients never reaching their former functional capacity level [12–15].

We can expect that more mobile patients who are younger and have lower ASA scores rate their quality of life after treatment as being better. However, when comparing the results of the different EQ-5D dimensions at the four-month follow-up in both institutions we found the opposite case. The patients in Lund reported significantly better levels of self-care, less pain and discomfort and fewer

symptoms of anxiety and depression. Mobility and the activities of daily living dimensions of the EQ-5D did not significantly differ between the countries. These findings might have been associated with differences in the self-reporting of quality of life questionnaires between the countries. Molzahn et al. assessed the HRQL of adults over 60 years of age [16]. Testing was simultaneously completed in 22 centres. The authors reported that Lithuanian people rated their quality of life as being the lowest; however, in Sweden the quality of life ratings were among the highest. This is in agreement with our regression analysis results, where country of residence was found to be the most significant factor affecting patients' self care, usual activities, pain/discomfort and anxiety/depression.

Table 3 Factors affecting quality of life according to EQ-5D (multiple linear regression analysis data)

EQ dimensions	Variables	Regression coefficient (B)	95 % Confidence interval		p value
			Lower	Upper	
Mobility	Mobility before fracture	0.2	0.1	0.3	<0.001
	ASA	0.2	0.05	0.3	0.008
Self care	Country of residence	−0.5	−0.7	−0.4	<0.001
	Mobility before fracture	0.2	0.1	0.3	0.001
	ASA	0.2	0.1	0.4	<0.001
	Mobility at follow-up	0.2	0.1	0.3	<0.001
Usual activities	Country of residence	−0.4	−0.6	−0.2	<0.001
	Age	0.01	0.005	0.02	0.004
	Mobility before fracture	0.2	0.1	0.3	<0.001
	Mobility at follow-up	0.3	0.2	0.3	<0.001
Pain/discomfort	Country of residence	−0.3	−0.4	−0.1	<0.001
	Walking aids at follow-up	0.1	0.04	0.2	0.001
Anxiety/depression	Country of residence	−0.4	−0.5	−0.2	<0.001
	Mobility at follow-up	0.2	0.1	0.3	<0.001

We conclude that femoral neck fracture patients in Kaunas were younger and more mobile before and at follow-up compared to the patients in Lund; however, the patients in Lund rated their quality of life higher after treatment. This could be related to the local cultures in the different countries and should be considered when such data are compared.

Conflict of interest   No competing interest declared.

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