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

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Abstract

Background and purpose: Unified data collection and comparison between countries is recognized as an effective tool for care improvements. However the variety in patients' demography, treatment methods and other local culture 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.

Patients and methods: We investigated 99 patients treated by arthroplasty in Kaunas Clinics and 117 patients in Lund University Hospital according to the National Swedish Hip Fracture Register model and followed them for a period of 4 months after the injury. EQ-5D questionnaire was used for evaluating quality of life.

Results: Patients in Kaunas were significantly younger, had lower ASA grade and were more mobile before trauma and at 4 moths follow up. However while comparing patients quality of life at 4 moths follow up between the institutions, Lund patients reported significantly better self care, felt less pain and discomfort and had less anxiety and depression symptoms.

Interpretation: The difference observed in quality of life rating between institutions might be related local cultures of the countries and should be considered when comparing the data.

Introduction

Hip fractures constitute a serious and common health problem among older adults from both the individual and public health perspectives. It is associated with increased morbidity and mortality compared to the general population (Zuckerman 1996, Van Balen et al. 2001 Leonardsson et al. 2010).

Lund University hospital was the first institution in Europe to commence national prospective registration of hip fracture patients in 1988 by developing the Swedish Hip Fracture register, eventually covering the whole Sweden (Thorngren 1993). The scientific data from register influenced the changes in treatment methods, rehabilitation, and also resulted in implementing integrated care protocols for care of femoral neck fracture patients. All these changes have significantly improved patients functional outcome and their quality of life (Hommel 2007, Thorngren 2008).

At the moment Lithuania does not have well defined schemes for the treatment of femoral neck fracture patients. Lack of prospective studies investigating the outcomes impedes introducing the effective models in the clinical practice. 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 standardized prospective comparison has been efficient, and the results might change the treatment policies and provide more knowledge on the subject (Cserhát et al. 2002).

The aim of our study was to compare femoral neck fracture patients treated in Kaunas Medical University Hospital and Lund University Hospital, concerning functional outcome and quality of life.

Patients and Methods

We evaluated patients with recent femoral neck fracture (FNF) admitted to Kaunas Clinics, Lithuania, and Lund University Hospital LUH), Sweden. Patients 55 years and older with non pathological FNF were included. We compared data on fracture type, American Society of Anesthesiologists (ASA) grade, demographic variables, mortality, and treatment method used. The patients treated with osteosynthesis were excluded from functional outcome comparison analysis, due to too few patients operated using this method in Kaunas. Functional outcome and quality of life at 4 months after the trauma in FNF patients treated with arthroplasty were compared in both institutions.

All patients included in to the study were investigated prospectively with the same study protocol in Kaunas and Lund. Patients were assessed according to the National Swedish Hip Fracture Register model and were followed for a period of 4 months after the injury. The Swedish National Hip Fracture Register consists of three forms for data collection. The first form (Form N. 1) used to collect information about the patient's admission to the institution, place of residence, mobility, fracture and surgery type and time, ASA grade, duration of hospital stay, and discharge location. The second form consisted of information collected during the follow up visit at 4 months following the injury. The patient's place of residence, mobility, complains for pain, and additional hospital stay was recorded. At the 4 month follow up the patients were contacted and further information about their health status was collected. The information was collected either via mail or some patients were assessed in the outpatient department. Euro Qol-5D (EQ-5D) (Brooks 1996), health related questionnaire for quality of life evaluation, was applied after four

months after the injury. Additional surgery (reoperations), if performed, was registered on Form N. 3.

Study was approved by Ethical committee of the institution.

Statistics

The t-test was used to calculate the differences between the numerical variables in the groups. Fisher's exact test was used to compare the proportions between the categorical variables in the groups. McNemar test was used to compare the proportions between the categorical variables for repeated measurements in the groups. Multiple linear regression analysis (backward method) was used to evaluate the relationship between the EQ-5D dimensions (mobility, self-care, usual activities, Pain/Discomfort, Anxiety/Depression) and other factors (country of residence, gender, age, mobility and walking aids usage before and after the trauma, ASA grade and implant type). p value of <0.05 was considered statistically significant. SPSS software was used for calculations.

Results

Between March 1, 2008 and September 1, 2010 there were 176 femoral neck fracture patients treated in Kaunas Clinic. The data was compared to 262 femoral neck fracture patients treated in Lund between March 1, 2009 and March 1, 2010. A flowchart of all patients treated in both institutions is shown in Figure 1.

For comparison analysis we used FNF patients, treated by artroplasty. The data of all patients treated in both institutions is presented in Table 2. We found that patients in Kaunas were younger, had lower ASA grade and all were treated with total hip arthroplasty, whereas in Lund 84% of patients were operated with Bipolar prosthesis.

Before the end of 4 months follow up out of remaining 147 patients treated with arthroplasty, 15 (10%) patients were deceased 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, lost to follow up or underwent additional surgery, were also excluded from functional outcome and quality of life analysis (Figure 1). Thus functional and quality of life outcome at 4 months was investigated in 99 femoral neck fracture patients treated with arthroplasty in Kaunas and 117 in Lund.

The comparison of patients' place of residence, mobility, and use of walking aids before and after the trauma is presented in Table 3. We found that 4 months 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 4 moths follow-up, patients in Kaunas were more mobile, $p<0.001$, and were using less walking aids, $p< 0.001$.

The comparison between institutions data at 4 months follow-up from EQ-5D questionnaire is presented in Table 4. Patients in Lund reported significantly better self care, felt less pain and discomfort, and had less anxiety and depression symptoms.

Additional analysis of patients rating for their current health-related quality of life state (EQ VAS) at 4 moths follow up in Kaunas was 55 (SD 22) as compared to 69 (SD18) in Lund, $p<0.001$.

Regression analysis data and factors, significantly affecting 5 dimensions of EQ-5D questionnaire is presented in Table 5. Analyzing mobility dimension in EQ-5D we excluded from regression analysis the evaluation of mobility from register at 4 months follow due to its direct correlation between each other. 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 patients 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 country of residence 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.

Discussion

Comparing the whole group of patients admitted during the inclusion period in both institutions we found that patients in Lund were older, and had higher ASA grades. There were greater amount of un-displaced fractures and more patients were treated with osteosynthesis in Lund. Older age in Lund might be associated with the longer life expectancy in Sweden (79.4 for men and 83.5 for women in 2009), as compared to Lithuania (67.5 for men and 78.7 for women in 2009) (European commission Demography report 2010). Older patients' age and possibly due to this related bigger number of leading co-morbidities may explain our finding of higher ASA scores in Lund. We have no clear explanation of the differences observed in distribution of fracture displacement between institutions. However, lower number of undisplaced fractures in Kaunas is in concordance with our previous report and might be associated with either late arrival of the patients to the hospital or some of the fractures being misdiagnosed (Valaviciene et al. 2010). Thus, lower number of patients treated with osteosynthesis in Kaunas was mainly related to lower numbers of undisplaced fracture admitted to the institution.

Analyzing the distribution of implant' types, we found that all patients in Kaunas were treated with THA, but in Lund there were only 16% of THA, whereas the remaining patients were operated on with bipolar prosthesis. Explanation is that use of bipolar prosthesis is not a common practice in Lithuania due the police of State Patients Fund. One may suspect that the significant differences in prosthesis type distribution might influence the comparison of functional and quality of life outcome between the institutions. However, recent studies have shown that there is no significant difference in function and quality of life in short term follow up when bipolar or

THA was implanted in patients with femoral neck fractures (Blomfeld et al. 2007, Hedbeck et al. 2011).

The majority of the patients in Kaunas before and after the traumas were living in own home, whereas in Lund significantly greater number of patients were living in social facilities. These differences related to higher amount of well organized service houses with wider spectrum in Sweden (Cserháti et al. 2002) whereas in Lithuania there is 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 institutionalization. The relatively high number of femoral neck fractures which occurred in health care institutions in Kaunas suggests, that creating a safe environment and fall prevention for elderly people during their hospitalization are important topics to be addressed in Lithuania.

The patients in Kaunas were more mobile and used less walking aids before trauma and at 4 months follow-up as compared to patients in Lund. This is possibly related to younger age and lower ASA grade of Kaunas' patients. The occurrence of femoral neck fracture in Sweden in older age and in the less mobile population suggests that the older population in Sweden has either more efficient osteoporosis and management or better fall prevention for the elderly as compared to patients in Lithuania. Patients did not regain their pre-fracture functional status in both institutions. This is in concordance with reports, that 50-75% of hip fracture patients never reaching their former functional capacity level (Sernbo and Johnell 1993, Stromberg et al. 1998, Magaziner et al. 2000, Pasco et al. 2005).

Data revealed that at 4 months the follow-up patients in Lund rated their self care significantly better for pain/discomfort, anxiety/depression and current health-related quality of life state from EQ-5D questionnaire. Despite the fact, that the patients in Kaunas were younger, had lower ASA grade, and were more mobile at 4 months follow up, their self rated quality of life was worse as compared to patients from Lund. This might be associated with the difference in self reporting

between the countries or background contributors in the population. This is accordance with Molzahg et al. (2001), who investigated the importance of health related quality of life in elderly in 22 countries and found that Lithuanian people rated lowest score of their quality of life out of all participating countries. However, in Sweden population quality of life ratings were among the highest. This is in concordance to 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 from EQ-5D questionnaire.

We conclude that femoral neck fracture patients in Kaunas were younger and more mobile before and at the follow up as compared to Lund, however patients in Lund were rating their quality of life higher after the treatment. This might be related local cultures of the countries and should be considered when comparing the data.

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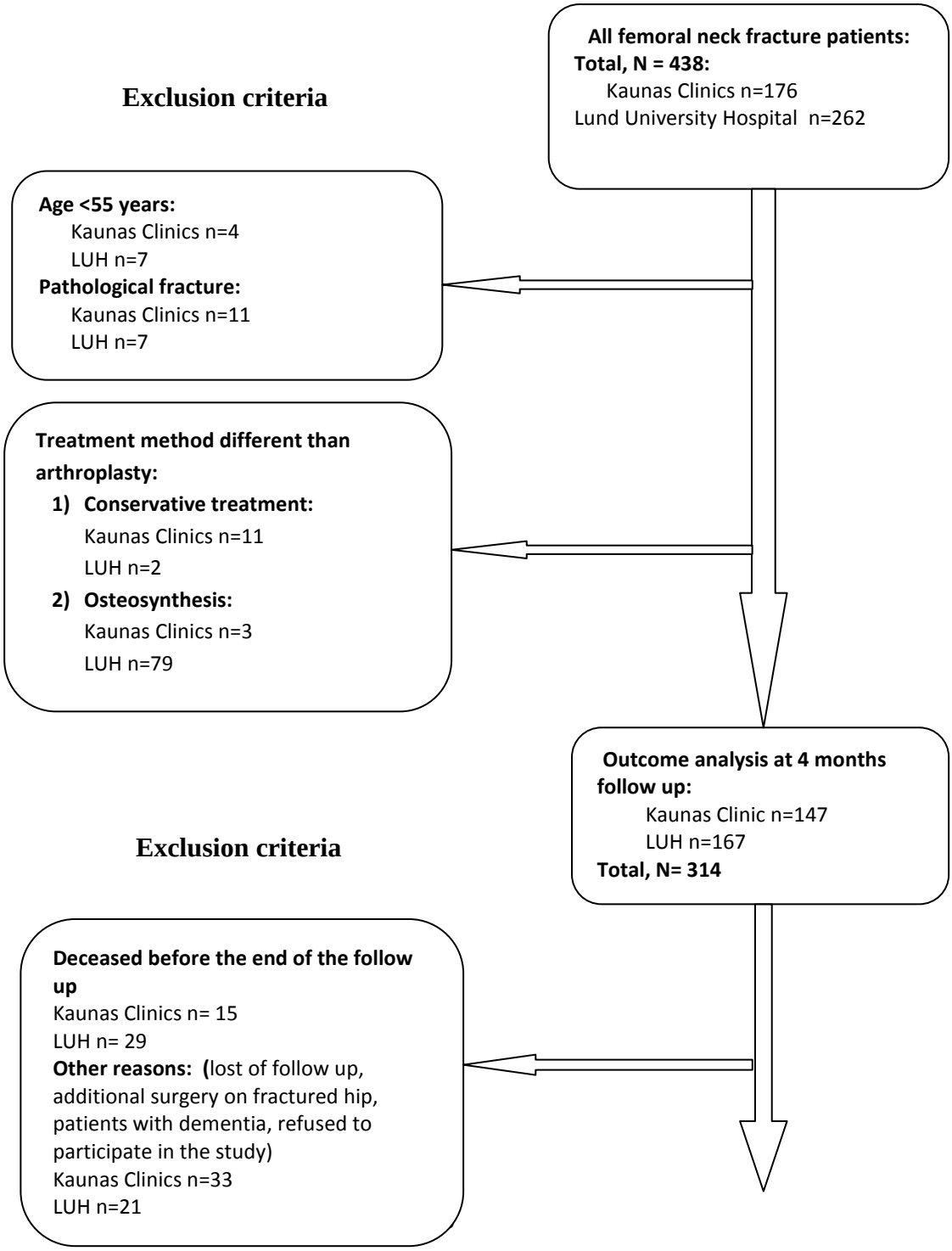
Author's contributions

RV: data collection, compilation and analysis, writing manuscript, JM: editing manuscript, AS: data collection, editing manuscript, PD: statistical analysis, editing manuscript, AH: organizing study, editing manuscript.

No competing interest declared.

Legends to figures and tables

Figure 1. Flowchart of all femoral neck fracture patients treated in both institutions.



Remaining patients included to the outcome analysis:

Kaunas Clinics n= 99

LUH n=117

Total, N= 216

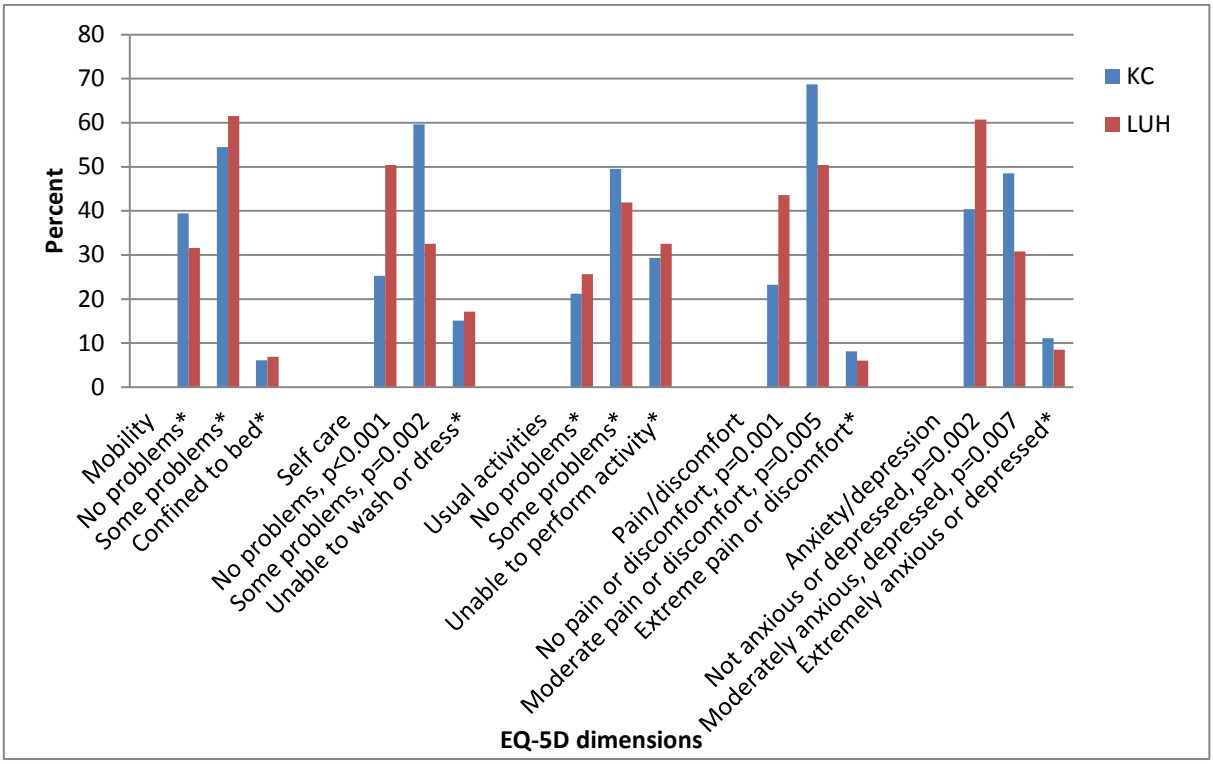
Table 2. The comparison of baseline data of femoral neck fracture patients treated with arthroplasty in Kaunas and Lund.

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

Table 3. *The comparison data according 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

Table 4. The comparison results of patient self reporting health status, according EQ-5D questionnaire between countries.



*no significant difference

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

EQ dimensions	Variables	Regression coefficient (B)	95% Confidence interval		p value
			From	To	
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

EQ-5D – Euro-QoL 5 Dimensions Scale Questionnaire; ASA – American Society of Anaesthesiologists grade