

MODERN ASPECTS OF THE PROBLEM OF FRACTURES OF THE PROXIMAL FEMUR

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Abstract

The purpose of the study is to study the current global clinical and epidemiological features of proximal hip fractures and the risks of their development and spread. The paper identifies the main aspects of the spread and treatment of fractures of the proximal femur; main world modern epidemiological characteristics of hip fractures and levels of risks of their development and spread. The relationship between comorbidities in patients with proximal hip fractures and the risk of various treatment complications is shown. The main types of treatment tactics are identified, the groups of the most common comorbidities in such patients are given. As a result of the work it was established: the percentage of fractures of the proximal thigh is 9.00–45.00 % among all skeletal fractures in the older age group and among all age categories – 17.00–24.00 %; global annual morbidity is 1.7 million people, and mortality – 11.00–23.00 % in 6 months and 22.00–29.00 % in a year; increase in the frequency of these fractures with age with doubling after 50 years every ten years; average age of patients – 75–79 years; predominance of women over men in 2–3 times; the lowest annual age-standardized cases among women are in Nigeria, South Africa, Tunisia and Ecuador, and the highest are in Denmark, Norway, Sweden and Austria, which is also typical for men; significant economic burden of treatment and high levels of fractures with osteoporosis, cardiovascular disease, diabetes, chronic obstructive pulmonary disease and more; the advantage of surgical treatment over conservative.

Keywords: comorbidities, proximal hip fractures, hip fractures, mortality, prevalence, risks of the development of fractures.

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1. Introduction

Recently, among the adult and child population of the entire world community, there has been a stable negative dynamics of high levels of injuries without any tendency to reduce them. In addition, there is a steady increase in the incidence of musculoskeletal system, which, along with high levels of injuries, causes their significant medical, social and economic consequences. Medico-social significance of high levels of injuries and diseases of the musculoskeletal system is determined by their high prevalence, negative trends in primary morbidity and disability, large direct and indirect economic losses, high rates of decline in quality of life, increase in the DALY index and other reasons which are considered one of the main structural components of the so-called «burden of disease». The medical and social significance of this pathology is also confirmed by the fact that injuries and diseases of the musculoskeletal system cause the greatest socio-economic losses, as people with high employment potential (young and middle age) have a leading level of disability due to trauma.

According to most world researchers, despite significant advances in modern science and practical health care, injuries and diseases of the musculoskeletal system still remain one of the main causes of high levels of both temporary and permanent disability and mortality throughout the world community. These diseases consistently occupy leading positions among the main causes of primary disability of the population, leaving only cardiovascular pathology and oncological nosology and annually account for about 7.00–8.00 % of the total number of persons first recognized as disabled.

Therefore, the aim of our study was to study the world's current clinical and epidemiological characteristics of fractures of the proximal femur and the risks of their development and spread.

2. Clinical and epidemiological characteristics of fractures of the proximal femur

Fractures of the proximal femur are currently one of the most common types of fractures [1, 2] and are in third place among the most common types of fractures [3]. According to epidemiological data, fractures of the femur have higher levels of prevalence in Northern Europe and the United States and lower – in Africa and South America, and Asian countries have average levels [4]. In recent decades, there has been a stabilization of the prevalence of femoral fractures in economically developed countries [5] and an increase in Asian countries [6].

According to various data, such fractures currently make from 9.00 to 45.00 % [7] in the structure of all skeletal fractures among patients of older age groups [8], and among all persons are 17.00–24.00 % of all fractures. The global annual incidence is about 1.7 million people, and by 2050 their number is projected to reach 6 million 260 thousand per year [6]. Given that the average age of the world's population is increasing significantly, the number of hip fractures is projected to triple over the next 50 years. Other projections suggest an increase in the burden of femoral fractures due to the steady increase in life expectancy [9] to 319 million global fractures by 2040 [10].

These fractures are reported to be associated with significant mortality and disability rates. Mortality due to them reaches 11.00–23.00 % in 6 months and up to 22.00–29.00 % in the first year, and disability is estimated at 5964 DALI per 1000 people [10]. Caring for such patients is a serious global economic burden [11].

Numerous epidemiological studies have confirmed that the incidence of proximal femoral fractures increases significantly with age [12] and doubles every ten years after the age of 50. It has been found that the average age of patients with hip fractures increases by one year every five years [13]. More than 50.00 % with damage to this localization are over 60 years old [14]. It is noted that among females of older age groups the frequency of these fractures is 2–3 times higher compared to men (about 60.00–70.00 %) [15]. According to other studies, at the age of 70–80 years, the frequency of these fractures reaches 1000–1200 cases per 100 thousand women and 300–400 per 100 thousand men. It is indicated that the majority of these patients are elderly and senile – the average age of treated patients with this type of fracture is 75–79 years. Fractures of the proximal thigh are three times more common at the age of 80–89 years compared with 65–69 years. Among people of this age group, fractures of the femoral neck are third after fractures of the radial and humerus. It is noted that the increase in age characteristics entails an increase in the frequency of these fractures: at the age of 50 the risk of fracture of the proximal thigh is 1.80 %; in 60 years – 4.00 %, in 70 – 18.00 %, and in 90 – already 24.00 %. At the same time, the risk of developing fractures of the proximal femur throughout life among men is about 6.00 %, and among women twice as high – 18.00 %; and from the age of 50 the risks for men are about 11.00 % and for women – 23.00 %.

Among all fractures of the proximal femur, spinal and cervical fractures account for almost 90.00 % [16]. The fracture of the femoral neck is much more common: 75.30–80.20 % against 19.80–24.70 % of spinal fractures.

It has been proven that the most common cause of hip fractures is osteoporotic bone changes [17]. The prevalence of osteoporotic femoral fractures worldwide is about 1.66 million cases each year [18]. Among European countries, their number reaches 400 thousand annually, and Asian countries account for about 30.00 % of fractures. World prevalence of osteoporotic hip fractures is recorded at 20.00 % of all osteoporotic fractures [19]. According to many WHO studies, osteoporotic fractures of the proximal femur are the leading causes of premature death in women, along with coronary heart disease, endometrial and breast cancer. Studies have shown a link between the share of health care spending in many countries around the world on osteoporosis (from 0.7 % in Luxembourg to 5.2 % in Cyprus) and the incidence of osteoporotic fractures [20]. It is stated that the levels of fractures of the femur are defined by many scientists as an international burden of osteoporosis, as they account for a significant amount of financial costs associated with fractures of most countries in the health sector due to high levels of disability and mortality among men and women aged 50 years and older [21].

2. 1. Risk levels of fractures of the proximal thigh

According to studies conducted using the Medline OVID study among 63 countries, there was a significant heterogeneity in the risk of femoral fracture [22]. For the purpose of mapping, the frequency of hip fractures was determined using color coding according to the risk categories marked as significant level of risk, medium level or low level (marked in red, orange or green, respectively) (Table 1) [22].

Among women, the lowest annual standardized age cases were found in Nigeria (only two cases per 100,000), South Africa (only 20 cases), Tunisia (58 in total) and Ecuador (73 cases). The highest levels were recorded in Denmark (574 cases per 100,000), Norway (563 cases), Sweden (539 cases)

and Austria (501) (Fig. 1) [22]. The low estimates obtained from Nigeria and South Africa were due to the poor quality and antiquity of the study.

Table 1

Color coding

Color category	Risk	Incidence per 100,000			FRAX risk of occurrence (%)	
		women	men	women and men	men	women
Red	high	more than 300	150 and more	more than 250	more than 15	more than 15
Orange	medium	from 200 to 300	from 100 to 150	from 150 to 250	from 10 to 15	from 10 to 15
Green	low	less than 200	less than 100	less than 150	less than 10	less than 10

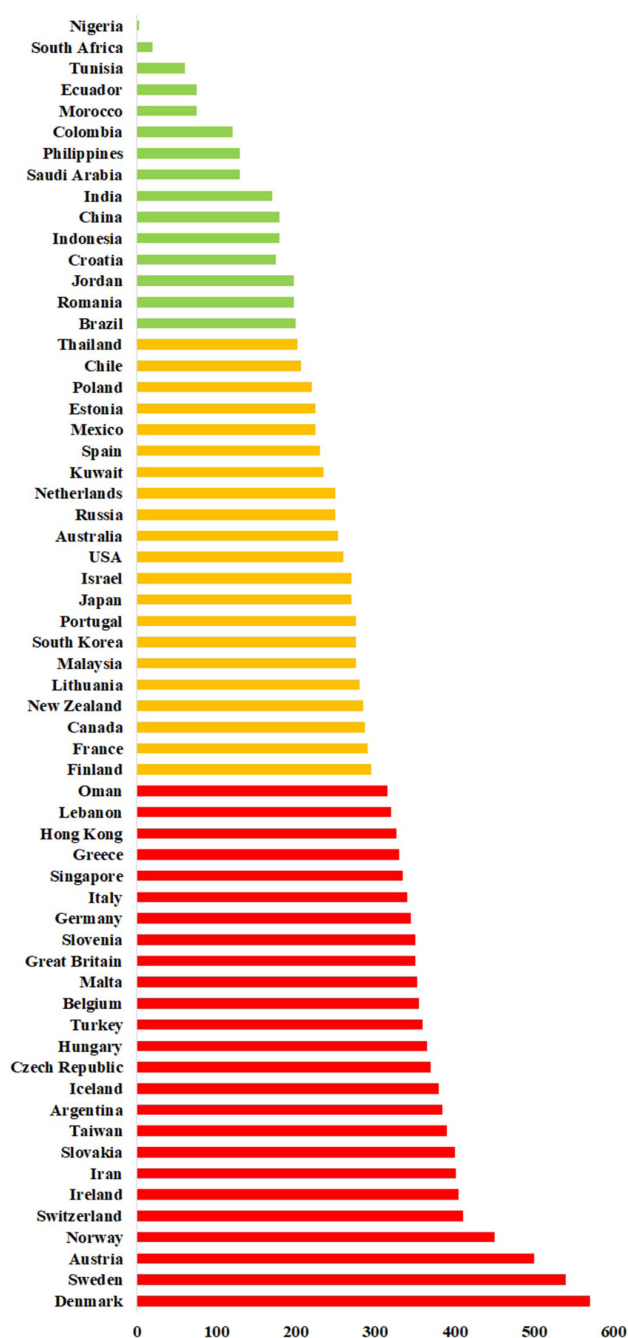


Fig. 1. Age-standardized annual level of hip fractures in women (per 100,000) depending on color coding

For men the standardized age of hip fractures in world countries was about twice lower than for women (**Fig. 2**) [22]. It is noted that in countries where higher values were noted among the female population, higher rates were observed among the male population and vice versa. Not taking into account the results obtained from Africa, the highest annual levels of this disease among the male population were found in Denmark (290 cases per 100,000 population) and the lowest in Ecuador (only 35 cases per 100,000 population).

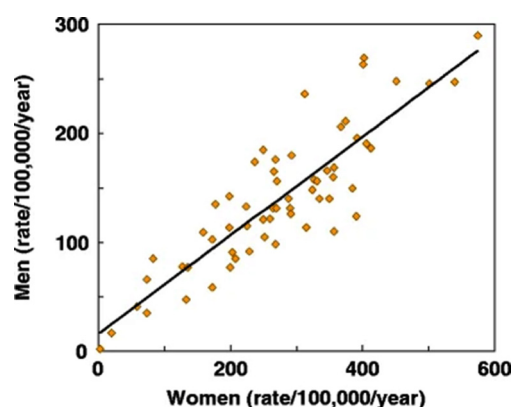


Fig. 2. World standardized rates of hip fractures (per 100,000/year) in men compared to women

As for the risk of fracture of the femur, these studies have identified many high-risk regions mapped from North-Western Europe (Finland, Denmark, Sweden, Ireland, Iceland and Norway) east to Russia and down to borders of Central Europe (Austria, Germany, Belgium and Switzerland) and then in the southwest (Czech Republic, Hungary, Greece and Slovakia) and further to Kuwait, Oman, Iran. Other countries with high levels of risk for men were Japan, Singapore, Korea, Malta and Taiwan. Regions with moderate levels of risk for the male population included India and China, Oceania and Argentina, and North America. Countries with a low risk of hip fractures in men included Latin America (with the exception of Saudi Arabia, Argentina, the Iberian Peninsula and Africa, and two Southeast Asian countries (Thailand and Indonesia)) (**Table 2**) [22].

For the female cohort, a similar men picture of the distribution of the risk of fractures of the femur was recorded. A significant difference was observed only for the Russian Federation, where the risk for women was moderate. In addition, a number of countries with high levels of risk of developing the disease among European countries were more cohesive and ranged from North-Western Europe (UK, Denmark, Iceland, Ireland, Norway and Sweden) to Central Europe (Austria, Belgium, Switzerland, Germany and Italy) and later to the south-west (Slovenia, the Czech Republic, Slovakia, Hungary and Greece) and extended to Iran, Oman and Lebanon. Other countries with high levels of risk for women included Taiwan, Singapore, Malta and Hong Kong. Regions with a moderate risk of developing the disease included the Russian Federation, Oceania, North America and southern Latin America. Low-risk regions included northern Africa and Saudi Arabia, Jordan and Latin America, China, Indonesia, India and the Philippines. It is noteworthy that among European countries, most were classified as high-risk or moderate. Low levels of risk were noted only in Romania and Croatia (**Table 2**) [22].

Table 2

World standardized by age indicators of hip fracture (per 100,000) and its risk categories

Country	Level	Women	Risk	Men	Risk	Women+Men	Risk
1	2	3	4	5	6	7	8
Australia	N	252	M	105	M	183	M
Austria	N	501	H	246	H	380	H
Argentina	R	390	H	124	M	264	H
Belgium	N	356	H	169	H	268	H

Continuation of Table 2

1	2	3	4	5	6	7	8
Brazil	R	199	L	77	L	141	L
The UK	R	349	H	140	M	250	M
Venezuela	R	150	L	45	L	100	L
Hong Kong	N	324	H	148	M	240	M
Greece	R	326	H	158	H	247	M
Denmark	N	574	H	290	H	439	H
Ecuador	N	73	L	35	L	55	L
Estonia	R	225	M	-		-	-
Israel	R	265	M	131	M	201	M
India	R	159	L	109	M	135	L
Indonesia	R	173	L	59	L	119	L
Iran	R	402	H	269	H	339	H
Ireland	N	406	H	191	H	304	H
Iceland	N	385	H	150	H	273	H
Spain	R	228	M	92	L	164	M
Italy	N	334	H	140	M	242	M
Jordan	N	198	L	114	M	158	M
Canada	N	290	M	131	M	215	H
China	R	173	L	103	M	140	L
Columbia	R	127	L	78	L	104	L
Kuwait	R	226	M	174	H	207	M
Lithuania	N	270	M	156	H	216	M
Lebanon	N	210	H	114	M	196	M
Malaysia	R	269	M	114	M	205	M
Malta	N	355	H	160	H	263	H
Morocco	R	73	L	66	L	69	L
Mexico	N	225	M	115	M	173	M
Nigeria	R	2	L	2	L	2	L
the Netherlands	N	249	M	121	M	188	M
Germany	N	346	H	166	H	261	H
New Zealand	N	288	M	140	M	218	M
Norway	R	563	H	262	H	420	H
Oman	R	312	H	236	H	276	H
South Africa	R	20	L	17	L	19	L
South Korea	N	268	M	176	H	224	M
Poland	R	224	M	133	M	181	M
Portugal	N	268	M	98	L	188	M
Russia	R	249	M	185	H	219	M
Romania	N	198	L	142	M	172	M
Saudi Arabia	R	135	L	77	L	107	L
Serbia	R	184	L	88	L	139	L
Singapore	N	331	H	156	H	248	M

Continuation of Table 2

1	2	3	4	5	6	7	8
Slovakia	N	401	H	263	H	335	H
Slovenia	N	349	H	-	-	-	-
The USA	N	260	M	122	M	195	M
Thailand	R	203	M	91	L	150	M
Taiwan	N	392	H	196	H	299	H
Tunisia	N	58	L	41	L	50	L
Turkey	N	357	H	110	M	240	M
Hungary	N	367	H	206	H	291	H
The Philippines	N	133	L	48	L	93	L
Finland	N	293	M	180	H	239	M
France	N	291	M	126	M	212	M
Croatia	R	177	L	135	M	157	M
Czech Republic	N	374	H	211	H	297	H
Chile	N	207	M	85	L	149	L
Switzerland	N	413	H	186	H	306	H
Sweden	R	539	H	247	H	401	H
Japan	N	266	M	165	H	218	M

Note: risks – H – high; M – medium; L – low; levels – N – national; R – regional

Mapping the risks of hip fractures is given in Fig. 3–5 [22].

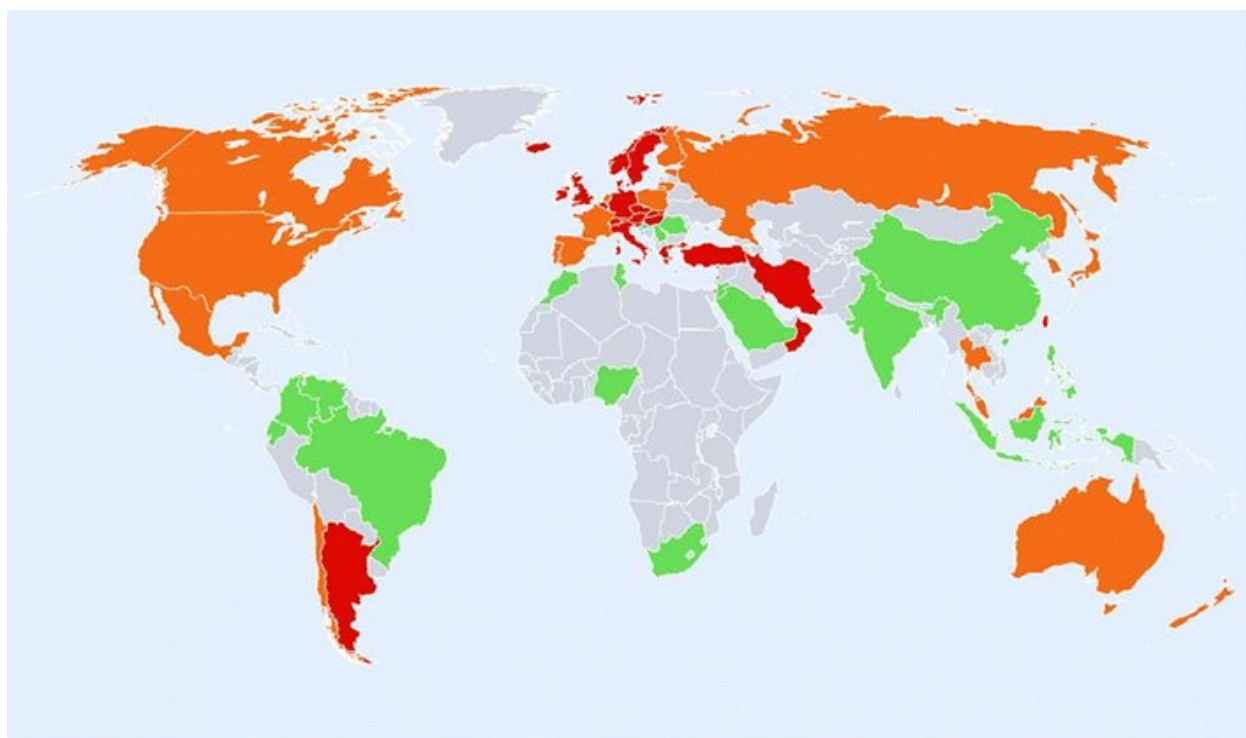


Fig. 3. Frequency of fractures of the femur in women in different countries of the world with a breakdown by risk (red – annual incidence >300/100000, orange – 200–300/100000, green – <200/100000).

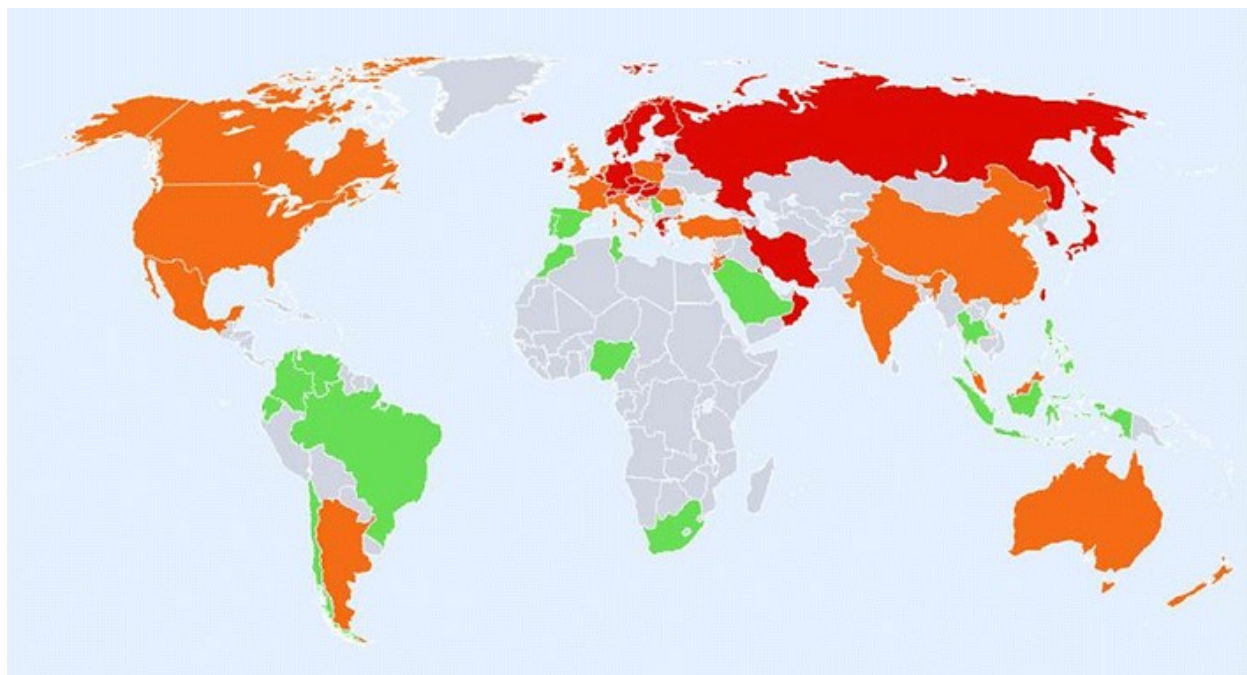


Fig. 4. Frequency of fractures of the femur in men in different countries of the world with a breakdown by risk (red – annual incidence $>150/100000$, orange – $100-150/100000$, green – $<100/100000$)

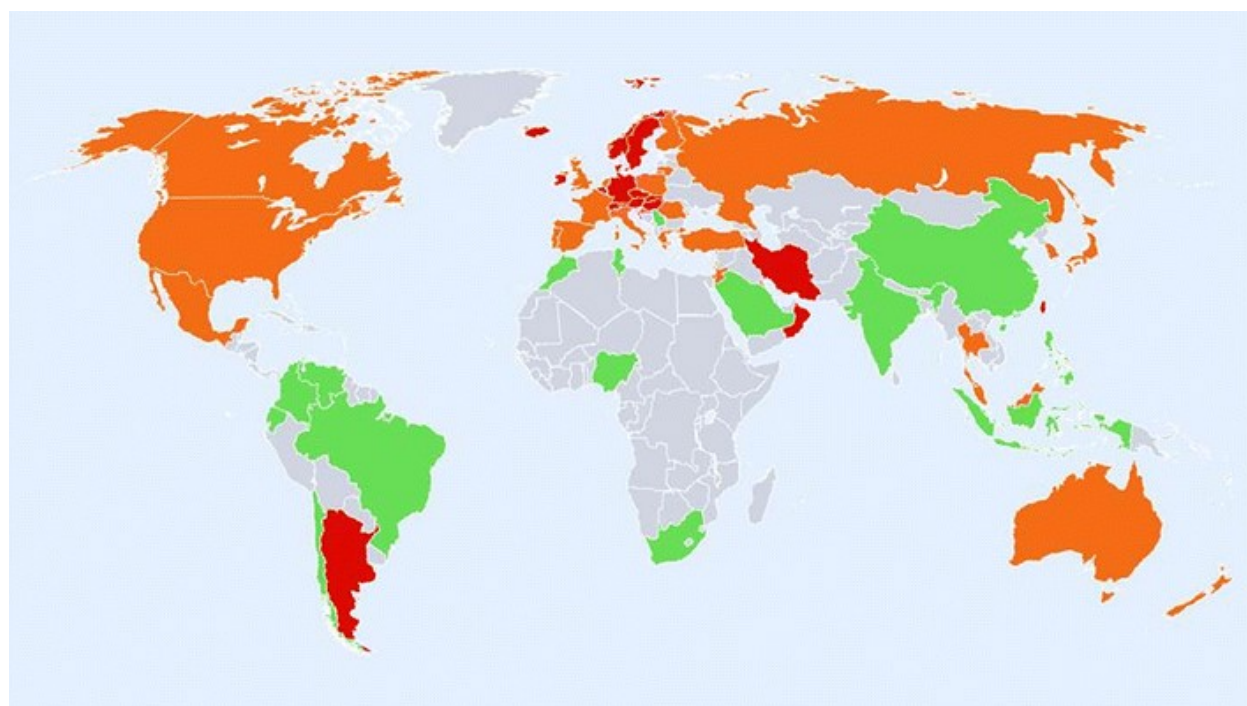


Fig. 5. Frequency of fractures of the femur in women and men in different countries of the world with a breakdown by risk (red – annual incidence $>250/100000$, orange – $150-250/100000$, green – $<150/100000$)

2. 2. The economic burden of treating fractures of the proximal thigh

In addition, many studies indicate a significant financial cost for the treatment of fractures of the proximal femur [23] due to the predominance of patients with reduced functional status and the presence of a significant number of comorbidities [12], so the treatment of such patients in most

cases require a long stay in hospital, a significant rehabilitation period and a complex individual comprehensive treatment program [24]. The presence of concomitant pathology significantly increases the risk of adverse treatment outcomes [25]. Because of this, many world clinics involve an interdisciplinary team in the treatment of such patients [26], which includes specialists in several medical fields (orthopedics, surgery, therapy, anesthesiology, rehabilitation, geriatrics, psychiatry and psychotherapy, neurology, social medicine, etc.). [27].

Thus, according to studies in the UK, about 70.00 % of such patients are admitted to the hospital with indicators of physical condition ASA 3–4; 35.00 % of them have one concomitant pathology, 17.00 % – two, and 7.00 % three or more [28]. Among the most common comorbidities were cardiovascular (35.00 %), respiratory (14.00 %), cerebrovascular (13.00 %), diabetes (9.00 %), malignant neoplasms (8.00 %) and renal insufficiency (3.00 %). Indicators of existing concomitant pathology of varying severity of most patients with such fractures in Ukraine reach 60.00–100.00 % and include in most cases cardiovascular (90.00 %) and bronchopulmonary (20.00–26.00 %) diseases. The vast majority of patients have two or more comorbidities.

The treatment of such patients according to research is quite high: in the UK from 9429 pounds (about 10896 euros) to 14435 (16681 euros) [29]; and in the United States, about \$ 40,000 in the first year after the fracture (direct medical expenses) and almost \$ 5,000 in subsequent years (rehabilitation, etc.) [30]. In total, the United Kingdom spends about £ 2 billion annually on proximal hip fractures (including medical and social care) at a stationary cost of £ 0.785 billion [26], and the United States spends more than \$ 10 billion [31].

2. 3. Relationship between functional status and treatment results of proximal hip fractures

The choice of the necessary tactics of surgical intervention in the treatment of fractures of the proximal femur is made taking into account the age of the patient and the presence of concomitant pathology, which is exacerbated by injury and long-term treatment and rehabilitation. Many authors point to a significant risk of developing a wide range of postoperative complications in patients with concomitant severe somatic diseases. At the same time practicing traumatologists state that the necessary correction of concomitant pathology during surgery in patients with fractures of the proximal femur is associated with a forced significant period of immobilization (prolonged bed rest, skeletal traction, derotation immobilization may be another), even more dangerous complications (especially against the background of existing comorbidities) in the form of circulatory disorders in the femoral head with the development of aseptic necrosis, bedsores, hypostatic pneumonia, various thromboembolic complications and other disorders. In this regard, the set of existing comorbidities in general determines the choice of a mechanism of surgery (osteosynthesis and endoprosthesis).

At the moment, clear data have already been collected on the impact of comorbidities on the development of fractures and the risks of adverse treatment outcomes. Thus, high correlations between the general mechanisms of osteoporosis (which is a factor in the increased risk of fracture) and cardiovascular disease have been identified. Other studies have found an increased risk of femoral fractures in patients with diabetes mellitus and its complications that contribute to bone damage; as the interaction of bone tissue and insulin are key factors in the development of osteoporotic bone lesions. A high incidence of osteopenia and osteoporosis in patients with chronic obstructive pulmonary disease has been established. Comorbidity of osteoporosis and Alzheimer's disease, scleroderma and other diseases has also been established.

Studies of the structure of comorbidity in patients with fractures of the femoral neck on the background of osteoporosis indicate the predominance of cardiovascular diseases: coronary heart disease, hypertension, arrhythmias (which lead to chronic heart failure), and vascular diseases of the central nervous system. It is noted that comorbidities can be significantly exacerbated by traumatic injuries and stress, thereby significantly increasing the risk of surgical treatment. Congestive heart failure, chronic obstructive pulmonary disease, diabetes, malignancies and other comorbidities significantly increase the risk of death after fracture of the femoral neck.

According to many systematic reviews and meta-analyzes, the presence of comorbidities along with age, type of injury, sex, preoperative activity, physical status, cognitive impairment is a predictor associated with high rates of postoperative mortality in the treatment of proximal fractures. In this regard, a significant (and in most cases the main) influence on the choice of treatment tactics for this type of fracture has the presence of concomitant injuries and somatic pathology, the general somatic and mental status of the patient (as fractures of the femoral neck are most common in elderly patients and old age, and most people (65.00 % to 100.00 %) 60 years and older suffer from at least one (or more) concomitant chronic diseases, ie almost all elderly and senile patients with fractures of the femoral neck have a significant burdened somatic status).

Many authors indicate that the presence of concomitant somatic pathology plays a significant role in determining the timing of surgery and the period of rehabilitation postoperative recovery of such patients. Yes, Michel J. P. et al. (2002) identified the possibility of predicting the development of fatalities after surgery in the treatment of fractures of the femoral neck on the basis of the ASA classification. It was found that in operated patients of elderly and senile age (mean age 82.4 years) with trauma of the proximal femur with significant concomitant somatic disorders (ASA III and ASA IV) mortality rates in the first year were 9 times higher in compared with operated patients with less severe comorbidities (ASA I and ASA II). A retrospective analysis of other studies of surgical treatment of femoral neck fractures (Sexson SR and Lehner J. (1987)) revealed that in more physically «healthy» (had 1 or 2 concomitant somatic diseases) patients annual survival rates were significantly higher when fixing the fracture within 24 hours after injury in comparison with those patients in whom surgery was performed without the necessary stabilization of concomitant 3 or more somatic diseases. Moran C. G. et al. (2005) in the treatment of patients 60 years and older with fractures of the femoral neck established the following levels of overall postoperative mortality: 9.00 % – within 30 days, 19.00 % – 90 days and 30.00 % – 1 year and indicated that patients in the presence of significant concomitant somatic disorders (due to which surgery was postponed) stated an increase in the risk of death by 2.5 times within 30 days.

2. 4. Treatment of patients with fractures of the proximal thigh

The selection of tactics for the treatment of patients with fractures of the proximal thigh in recent years is a very serious issue [3]. Previously, the main method of treatment was conservative, which was determined by the use of skeletal traction. The results of such treatment were not considered satisfactory due to significantly high levels of burden. Most patients became significantly weaker due to prolonged skeletal traction, their condition was aggravated by muscular malnutrition and joint contracture and the intensification of comorbidities. The majority of authors at conservative treatment note development at 65.00 % of bedsores, at 23.00 % – hypostatic pneumonia, and at 18.00 % – a thrombosis of deep veins with statement of mortality rates during the first year from 33.70 % to 71.00 %.

Therefore, world practice has long recognized the advantage and significant effectiveness of the surgical method of treatment of such fractures over conservative. The use of conservative treatment is possible only in unplaced fractures or in the presence of severe comorbidities (acute myocardial infarction, acute cerebrovascular accident, acute pneumonia, acute surgical disease, severe mental disorders, etc.).

The choice of one or another surgical tactic for the treatment of femoral neck fractures has also caused considerable controversy among the medical community in recent decades [32]. Thus, osteosynthesis with internal fixation of a screw or pin is used for fractures without displacement or with minimal displacement [32], while primary arthroplasty is proposed for displaced fractures [18]. Meta-analyzes of existing world studies indicate that arthroplasty shows slightly better results compared to internal screw fixation [18]. Different methods of fixation also show different results: for example, the dynamic hip screw (DHS) has found slightly better treatment rates over many years; although the use of intramedullary osteosynthesis with blocked nails (IMN) [12] (including the mini-invasive technique of osteosynthesis with the PFN nail) also

noted quite good treatment results [3]. The choice of one or another tactic of surgical treatment has been developed by scientists for many years [33] and noted the advantages of slanted metal osteosynthesis by dynamic femoral system DHS or intramedullary fixation of PFN in different types of fractures, although research in this area is still conducted today.

It should be noted that despite the significant list of surgical techniques used and available modern implants [34], the frequency of complications and unsatisfactory results of surgical treatment is still quite high [35] and according to various data up to 30.00 %. Mortality after surgical treatment during the first year after fracture in different regions ranges from 30.80% to 35.10% [36], and among those patients who survived 78.00 % after a year and 65.00 % through two need outside care. Other studies indicate that only 40.00 % of patients fully recover their preoperative functional level, and 20.00 % of operated patients require long-term care [37]. Studies also confirm the presence of negative long-term consequences (mortality 10 years after fracture) [38], although other studies have shown a moderate increase in mortality over the long term [39]. Of particular importance is the inpatient mortality of victims, which according to various estimates ranges from 0.00 to 14.00 %, due to different diagnostic and therapeutic approaches [28].

Thus, it should be noted that fractures of the proximal femur is a very common disease (especially among the elderly and senile), which has high levels of adverse effects and is characterized by the need for significant costs for treatment and rehabilitation, which leads to significant medical and social significance. A significant proportion of patients with these types of fractures are characterized by the presence of many comorbidities and low functional levels. The presence of significant comorbidities in patients with fractures of the proximal femur is a major factor in the choice of surgical treatment and a significant predictor of increased risk of adverse events. Surgical treatment of this type of fracture must be performed with the necessary correction of the patient's somatic status and taking into account a multidisciplinary approach and the involvement of additional specialists (general practitioners – family medicine, therapists, cardiologists, pool monologues, urologists, psychiatrists and others).

Study limitations. Excessive identification of such fractures (double counting), inaccurate reporting or other coding of fractures, and population-level errors are possible, especially in regional rather than national studies. These constraints at the population level have little effect in explaining global heterogeneity. Another limitation is the possible differences in different countries due to ethnic differences and the fact that in some regions of the world not all cases of hip fractures fall under medical attention.

Prospects for further research. Subsequent clinical studies will be conducted to establish the possibility of predicting the consequences of treatment of hip fractures depending on the medical-epidemiological and anamnestic characteristics of patients. The results of this trial will inform clinical practice.

3. Conclusions

1. According to the results of many studies, it was determined that the percentage of fractures of the proximal thigh is 9.00–45.00 % in the structure of all skeletal fractures in patients of older age groups and among all age groups – 17.00–24.00 % of all fractures. It is stated that the global annual incidence is 1.7 million people, and mortality due to them reaches 11.00–23.00 % in 6 months and 22.00–29.00 % in the first year.

2. According to the literature, the incidence of fractures of the proximal femur increases significantly with age and after the age of 50 doubles every ten years with an increase in the average age of patients by one year every five years. It was determined that the average age of treated patients with this type of fractures is 75–79 years. The predominance of women of older age groups with such fractures over men in 2–3 times was established.

3. Research has shown that among women, the lowest annual standardized age cases are recorded in Nigeria (two cases per 100,000), South Africa (20 cases), Tunisia (58) and Ecuador (73 cases); and the highest – in Denmark (574 cases per 100,000), Norway (563 cases), Sweden (539 cases) and Austria (501). For men, the age-standardized level of hip fractures was twice

lower than for women, and the global prevalence levels in the countries almost corresponded to the female population.

4. According to the literature, a significant economic burden of treatment of fractures of the proximal thigh has been revealed: Great Britain – from 9429 pounds to 14435; US \$ 40,000 (direct medical expenses) and \$ 5,000 (rehabilitation, etc.). It is estimated that the United Kingdom spends about £ 2 billion a year at a stationary cost of \$ 0.785 billion and the United States more than \$ 10 billion a year.

5. High levels of the relationship between proximal hip fracture and osteoporosis, cardiovascular disease, diabetes, chronic obstructive pulmonary disease, Alzheimer's disease, scleroderma and other diseases have been identified.

6. The advantage and significant efficiency of the operative method of treatment of fractures of the proximal thigh over the conservative one was stated. It is determined that the use of conservative treatment is possible only in unplaced fractures or in the presence of severe comorbidities.

Conflicts of interest

The authors declare that they have no conflicts of interest.

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