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Socio-medical Aspects of Femoral Neck Fractures

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SUMMARY

Fractured neck of femur (FNF) is very common in people older than 65 years, and sometimes requires a complicated procedure and expensive medical procedures so it also represents a significant socio-medical problem. Percentage of FNF in nursing homes rises to 40%. For those who have fall there is an increased risk of falling again. In the group of old people who have experienced falls, among them 70% of falls occurred due to tripping and stumbling on a flat surface, of which 60% occurred in a house in which they live. Of all these falls 1-2% had resulted in FNF. About 90% of all femoral fractures in the elderly population, the authors cited, happen when they fall. Since mortality is high among FNF international authors in the literature listed that the fracture is usually a result of suicide, 32% males and 22% in women. Next are injuries in traffic accidents–26% in men and 24% in women. The injury of hip occurred during ordinary fall the mortality was 15% in men and 32% in women. This difference in percentage of mortality in the favor of those with suicide attempts and traffic accidents is likely a result of additional injuries that have occurred on this occasion. This paper describes the most common and most important reasons that cause the fracture of the femoral neck, as well as measures for their prevention.

Key words: femoral neck fracture, osteoporosis, prevention measures.

1. THE ETIOLOGY AND ETIOPATHOGENESIS OF FEMORAL NECK FRACTURES

Etiologically femoral neck fractures (FNF) is usually categorized as "small" trauma as follows: in 52.2% of cases there is a fall in home, 35.5% on the street, and 12.4% other causes (1, 2, 3, 4, 5). Some authors consider that is sufficient minimal trauma, simply a „step into empty space", a sudden turn in place or the like. Primary endogenous disorders: cerebral stroke, myocardial infarction, visual disorders, diabetes, osteoporosis, hormonal insufficiency, etc., may be the primary cause, followed by a fall and subsequent to FNF (6, 7, 8, 9, 10).

There are two basic mechanisms of femoral neck fracture (11, 12, 13, 14, 15):

Fall with the impact of the foot or knee and a very powerful force that ascend along the limb axis, according to impact and cause break, so that the head of the femur being separated by body weight and the edge of femur, the fractures are closed and formed the so-called abduction fracture. This kind of fracture is more common in younger people (16, 17, 18);

FNF caused by a fall and struck a large area of the trochanter into the top cervico phisiar corner. The neck is fractured and a mention angle this time is opened and occurs the so-called adduction fracture (1).

Angle of the fracture often secondary closes due to the influence of strong painful muscle contractions or injured effort to step on the broken leg. The angle of the fracture is diametrically changed and formed the so-called secondary adduction fracture (1). This mechanism of injury is more common in older people. Thus, the Böhler mechanism of FNF in the elderly explains the forces of bending and torsion which occur when minor trauma, a simple fall, step in the "empty". With his views, and agrees Lippmann. Where are the biological changes of bone significantly distinct, fracture occurs without particular trauma, intensive rotation of the extremities. In this way, the head is closely fixed iliofemoral anterior capsule and ligaments, while the neck rotates backwards. The last part of the door hitting the acetabulum and the neck is broken. Such a mechanism of fracture corresponds to the last kominuci bone fracture is a rare and seen only on qualitative significantly altered bone.

Devas in 1965 and Blickenstaff and his associates 1996 published papers on FNF in younger patients. The fracture is most commonly seen in soldiers, and explains the origin by the overload and fatigue. Although rare, these fractures can occur in athletes and also due to fatigue. Since these fractures are not spared women with amenorrhea and, possibly, the beginning of osteoporosis. Smith in 1959 published his research papers and gave the conclusion that the locus minoris resistentiae in the neck of the femur Ward's triangle. External rotators in an upright position with feet supported, such as straining arch flex femoral neck, shooting at the place of least resistance. Farces and associates

are the reason FNF found in the weakening of trabecular structure and reducing its resistance (1).

Cummings and Nevitt are supposed that FNF is happening on cascade manner with the four conditions that must be met: navigation falling causes people to fall right on her hip, a protective hand position, local soft tissue does not absorb the impact energy on the surface and bone strength is reduced. We also emphasize that there is a difference in falling in the elderly and young adults, while older people are falling sideways, i.e. the hip, young fall forward and on the hands (1).

Backman with his experiments where he used the force of bending, pressure and torsion and shear in creating different forms FNF. He thereby ignored the impact of muscle forces which were later taken into account by Hirche and Frankel. In their experiments, they were longitudinally and vertically burden neck of the femoral head caused by certain types of fractures of the neck. According to the papers that were published, the formation of these fractures at the femoral neck, the reason there are three weak points: the upper and lower transition in head and neck, small trochanter. They believe that a spontaneous fracture of the neck begins on the upper side, the crossing point of the head in the neck. In this initial cracks cause pain, which lead to muscle spasm and these fracture line extending downwards. In this way, incomplete fracture into a full, which causes instability and fall. Traumatic fractures occur in the fall of the great trochanter. Depending on the position of the upper leg at the time of the fall, there will be certain forms of FNF.

Scandinavia has the highest number of hip fractures worldwide, to 118 FNF to 10000 inhabitants in women older than 50 years, and in men 44 FNF to l0000 inhabitants, according to the Schwartz et al 1999. Many authors have predicted a significant increase in hip fractures, more than 1.3 million worldwide. It is assumed that by 2025 the number of fractures will double in the next 40 years the number of hip fractures will rise to 4.5 million (1). Thanks to research performed since 1924 until the 80-ies, we can observe an increase in incidence FNF, as mentioned by Gullberg and Rogmark (1). In many works published since 1992-1995 there are visible changes in the incidence of femoral neck fractures as seen from the works of some authors in North America and Scandinavia. In other parts of the world, especially in Asia, there is increase in the incidence of hip fractures (1).

Factors that influence the formation FNF are manifold. Kanis consider that the age, accompanying diseases and trauma contributes to the hip fracture.

2. DIAGNOSIS OF FEMORAL NECK FRACTURES

Evolution of state of a patient with FNF initially starts at the PHC level. It consists of fracture diagnosis, identifying risk factors and diseases that predispose to fracture and to prepare the patient for surgery. During the physical examination in diagnosis on the basis of three classic clinical signs:

- External rotation of the extremities, which usually does not exceed 45^0, because the joint capsule prevent more rotation.
- Shortening of the limb was clinically clear by classical measurement and inspection. Supplement it and move up the great trochanter and disorder Bryant triangle that is bounded by major trochanter, the firmament of the hip joint and upper spina pelvis.
- Lg adduction in relation to the horizontally laid pelvis (1).

Figure 1. Clinical signs

These are clear signs of a typical dislocated fracture. If FNF is pinned or without dislocation, symptoms are reduced to the impotence of pain and functioning. If this break is not recognized, may be secondary to a dislocation and fracture with a favorable prognosis becomes dislocated with all the accompanying clinical symptoms and prognostic unfavorable course.

Clinical findings complement the X-ray (Figures 2 and 3). It should do a clean x-ray image of the pelvis with both hips that shows part of the femur. This recording allows a comparison of which give accurate information on the degree of dislocation (1). Molded recordings give a good insight into the front–rear angulation and dislocation of the hip.

Figure 2. Not dislocated FNF

Figure 3. Dislocated FNF

Sometimes it is helpful make x-ray in the Lauenstein position with upper leg folded for 90^0 and hip abduction of 40^0. Typically, radiography completes diagnostics of FNF. Quite rarely, after radiography, there is a need for a CAT or MRI of the hip. Usually the diagnosis is requested by the impacted FNF, when clinical signs indicate break radiography does not confirm this.

3. AGE AND FRACTURED NECK OF FEMUR

The causes of hip fractures in younger people and children are normally associated with some powerful forces which have encountered in construction (fall from greater heights, hit by a heavy object), in mines, in traffic accidents and some sports (football, skiing) (3, 5).

Fractures of the hip in children have special etiopathogenesis and therapeutic characteristics and requirements. When we mention FNF in younger patients, it should be in the travertines of those that occur in war, as open, caused by firearms and explosives, also closed, resulting in crush and blast situation. These injuries are only marginally mentioned in the standard text books and unjustifiably classified in the manuals of war surgery. Experience from the last war in Bosnia and Herzegovina has shown that victims of these injuries of the hip were not only the soldiers, but also young and older civilian populations.

Incidence of FNF is closely associated with age and increases to about 90% of fractures occur after 70 years. In 14-18% of cases occurring in women over 50 years, while men in the 3-6% of cases, as Cooper states in his works (Cooper, 1998). It is estimated that it will happen in 30% of cases in people older than 80 years. Normal postural stability of the weak by weakening during aging vision, center of balance and musculoskeletal system, which contributes to increased risk of falling. Bone loss increases during aging, thereby reducing the strength of bone (1). Losing weight reduces the impact of local absorber especially the local muscles, which increases the risk of FNF after the fall.

Data from the American Academy of Orthopedic Surgeons, published in 2007, we see that in the U.S. during 1996, 323 000 patients were hospitalized due to hip injury, or more than 850 a day (1).

4. THE FRACTURE OF FEMORAL NECK IN RELATION TO GENDER

On cross-section of femur in men during aging occurs subperiosteal expansion more than in women; cortical area remains largely unchanged, whereas in women it decreased. Changes of geometric forms are related to aging. Men have fewer tendencies to fall than women, in whom the tendency to fall is two to four times more common (1).

In women, hip fractures occur 2-3 times more frequently than men. This is conditional on, among other things a longer lifespan and is more common in women with osteoporosis. The absence of the male equivalent of menopause with accelerated bone loss is important factors that explain the different risk in the occurrence of hip fractures in men and women. White women are twice as risk of fracture than white males, while black women and men have equal risk of fractures. Risk of fracture in Caucasian women than women of the black race is two times higher.

This is because the density of cancellous bone can be achieved in a relatively short period of time before the end of puberty in black women than for white person's skin color. Metabolism and hormones have an impact in the attainment of sexual maturity during adolescence and may be important determining factor for racial differences in bone mass of black and white women. Low body weight is designated as an independent predictor of the occurrence of hip fractures published McGrother. Undeniably it is known that there are genetic influences on the length and extent of bone, bone mass and their strength. Data on FNF in the elderly in the family history are also a risk factor. Such risk factors accentuated meet with people from the Caucasus.

5. THE CONDITIONS OF LIFE AND FEMORAL NECK FRACTURES

In developed countries, the analysis of etiological factors that lead to FNF in old people, concentrating on the conditions of their lives. In these countries have developed a variety of preventive services. These systems include various devices in their homes ranging from lighting, to preset the floors and stairs to the ones in the bathroom. In developed countries there are separate settlements, made life easier for the elderly, with a well organized system of supplying food and other needs, transportation, home care and assistance, to a specially developed system of nursing facilities with more intensive assistance to medical and other assistance.

Etiology and epidemiology of the emergence of hip fracture in such circumstances are different from those in developing countries, where the old people are at greater risk of injury. Average life expectancy in developing countries is shorter and physiological aging occurs earlier than in developed countries. In underdeveloped countries, people

live and move in houses, apartments and resorts which are not adapted to their age, and even have to do heavy agricultural work. Their work is often at odds with their physical and health capabilities. Therefore, in this series, most injuries are in May, July and December. In developing countries, nutrition and health care of older people is insufficient, they are hip injury and its treatment more difficult to tolerate, with more complications and greater disability and mortality.

Specific etiological moments in the emerging hip fracture and a special approach to their management create conditions of war. Along with the many troubles in the war are older people forced to move in their places of residence, fleeing into shelters and supply in the dark. After several days of physical passivity in the shelter still have (although weakened, malnourished, without treatment for their chronic diseases, no regular medical care) go in search of water, food and medicines. Put it in ruins, ravaged and icy streets and courtyards. In this way, are exposed to more opportunities to fall and be hurt. The only transportation remains a bicycle, which for the elderly have a great opportunity hip injury.

In war conditions, the elderly who sustain FNF usually had too late and inadequately provided first aid. Dehydrated, malnourished, in a state of neglect and late arriving to the hospital, where their priorities for treatment tend to provide admission to hospital and timely and appropriate treatment. Their difficulties are continuing in the course of rehabilitation and home care.

6. THE INFLUENCE OF DIET ON THE FEMORAL NECK FRACTURE

Deficient diet with calcium and vitamin D leads to less resorption of minerals, not only during the growth of the skeleton, but during the whole life. Bone is living tissue, mainly composed of protein, calcium and other minerals. It is resistant only when there is enough calcium. As in life activities are constantly remodeling resorption and replacement of small amounts of calcium, disruption of this balance in terms of the gradual loss of calcium. Thus, the bone becomes weaker and thus increases the risk of a fracture. Severe eating disorders, such as starvation due to poverty, nervous anorexia and bulimia, can seriously damage the skeleton, due to lack of essential materials required for building bones (1).

7. INFLUENCE OF PHYSICAL AND MENTAL DISABILITY, CHRONIC DISEASE IN THE FRACTURED FEMORAL NECK

Physical damage such as severe bleeding, joint disease, a disorder of movement coordination, blindness, cancer and other diseases are very serious risk factors that may condition the FNF. Mental illness, especially in the elderly such as dementia and Alzheimer's disease, greatly increase the risks, especially in geriatric hospitals and homes for the elderly housing and care and mental disabled persons.

Many authors in their works reflect h hyperparathyroidism, type II diabetes, stroke, cardiovascular disease and Parkinson disease as a risk factor for developing FNF. Among chronic diseases, osteoporosis is a leading risk factor in women that can lead to FNF, even with minimal trauma. Since the decrease in bone mineral content did not spare even men.

Wejada et al. 1995 reports that the presence of hyperparathyroidism was 2.5 times higher in patients with hip fractures than the control group. Study by Solomon et al. published 1993 did not found an increased risk of fracture in women with hyperthyroidism and even in women who used thyroid hormone in the treatment of any form of hyperthyroidism. The risk of hip fractures in patients with Parkinson's disease is particularly high among older women, patients with low BMI, low BMD, low levels of isoniazid in serum calcium and 25 (OH) D with compensatory hyperparathyroidism. Increased risk of hip fracture is likely to be associated with a tendency for patients falling in a specific way. There are many other chronic diseases that can lead to reduced resistance of bone tissue. Among them are endocrine disorders: diabetes mellitus and hypogonodism. Weak illumination, slippery floors and carpets, stairs and bathrooms without hand rails, various cables, may be reason for the decline of older adults and their injuries.

That a stroke is risk factor for hip fracture, in its work has proved Lau. Fracture risk increases by more than seven times after hospitalization for stroke. Fractures can be caused due to the high incidence of accidental falls in stroke patients. Muscle weakness and increased risk of osteoporosis seized on the page is another important predisposing factor for the occurrence of fracture after stroke. New prospective studies communicated to the increased risk of fractures in patients with diabetes mellitus. According to these studies, the relative risk was 6.9 for Type I insulin-dependent diabetes and 1.8 for Type II non-insulin dependent diabetes. Increased fracture risk is possible, combined with the alteration of bone status and diabetic complications predisposing to trauma, such as retinopathy and peripheral neuropathy.

8. THE INFLUENCE OF DRUG USE ON FEMORAL NECK FRACTURES

Long-term use of some drugs can accelerate the reduction of bone mass and develop osteoporosis, and those are at increased risk for FNF. It is well known that prolonged use of corticosteroids leads to reduced bone mass. Uncontrolled and prolonged use of: hypertension drugs, diuretics, anticonvulsants, neuroleptics, and drugs for the thyroid gland, disrupt absorption of calcium and vitamin D, reduce bone mass, causing fainting, weakness, and these cause FNF. Some even call these iatrogenic fractures.

9. THE EFFECT OF PHYSICAL INACTIVITY ON THE FRACTURED FEMORAL NECK

The influence of lifestyle factors, as risk factors for hip fracture was investigated in many studies. Physical activity

in childhood and adolescent age improves bone strength and reduces bone loss reported in their research Frost in 1999.

Climbing the stairs and the accelerated pace of women in menopause increase BMD in the hip area and throughout the skeletal system. Studies have shown that women who can go out and can walk without an increased risk for fractures compared to women who are not able to go outside the house. It explains that women who are moving have stronger muscle strength, improved neuromuscular function, visual acuity and the stabilizer, which reduces their susceptibility to falling. Poor physical activity, also organize, was found as a risk factor for European women. Physical inactivity always leads to a weakening of the resistance of the locomotor system. This is reflected in the restricted movement in joints, weakening of the coordination of movement. In addition to general physical inactivity, which follows the old man's age, there are extreme cases and inactivity such as long hatching due to illness, injury or prolonged stays in inadequate shelters during the war.

Lifestyle, religious practices and physical activity support the joints and stretching exercises of concentration and coordination of movement. These religious rites are physically characterized by eastern nations (2, 4, 8).

Magnesium diet in postmenopausal women causes increased urinary calcium elimination, which may explain the increase in fracture risk. Increased iron intake is also associated with increased risk of hip fracture, but the mechanism is unknown. Increased intake of vitamin C can cause a negative calcium balance and may reduce the cancellous and cortical bone and the consumption of non-milk foods (meat, fish, eggs) that contains low levels of calcium and elevated protein level. Low level calcium is harmful for the skeleton and indirectly creates an increased risk of hip fracture was revealed in his work by Meyer and colleagues 1997.

10. EFFECT OF TOBACCO SMOKING AND ALCOHOL USE ON FRACTURED NECK OF FEMUR

Tobacco smoking, excessive use of coffee and alcohol are involved in metabolism in general, even in the normal process of construction and destruction of bone, disrupting the process and the gradual weakening of bone strength. Nicotine and alcohol adversely affect estrogen and testosterone, two important hormones that participate in the creation of bone mass. Inverse is the relationship between coffee intake and bone mass. It is associated with calcium elimination effect of caffeine, which creates conditions for increased risk of fracture as considered by Hasling. Introduction of calcium decreases with age. One reason is the decreased use of dairy products. Intestinal calcium absorption with age is reduced due intestinal inability to adapt to low levels of calcium entry. Vitamin D is insufficient. The reason is, inter alia, insufficient exposure to sunlight, which would enable compensation with vitamin D supplements, because aging decreases production of provitamine D3.

Tobacco smoking is a risk factor in postmenopausal women for FNF as stated in articles published by Law and Hackshaw. The risk is lower with the cessation of smoking and because smoking women to enter menopause earlier.

Possible mechanisms by which tobacco smoking has an impact on the increase in fracture risk are lower body weight of smokers, lower levels of parathyroid hormone and 25-hydroxivitamin, lower BMD, and BMI.

Excessive use of alcohol plays a significant role in the pathogenesis of osteoporosis and increased risk of FNF. Social alcohol use is associated with higher bone mineral density in men and postmenopausal women. Benefit effect on bone may be associated with increased serum levels of estradiol. Alcohol suppresses the function of osteoblasts, which indicates a lower level of osteocalcin in serum, and chronic moderate alcohol consumption increases serum levels of vitamin D metabolites with consequent malabsorption of calcium, hypocalcaemia and hypocalcuria.

Vitamin D metabolite, 25(OH)D, it is very important in the elderly population in Europe. The deficit this metabolite was found in the older population with FNF at the end of winter due to a lack of exposure to sunlight. Increased level of parathyroid hormone (PTH) is associated with increased bone resorption. The effect of PTH was observed in more cortical than trabecular bone. In terms of levels of PTH in patients with FNF in the literature there are different data. In some studies it was found elevated PTH levels in patients with FNF and patients in the control group who did not have FNF did not have elevated levels of PTH than patients with FNF. For the onset of fracture, besides already mentioned, play an important role trauma, food, body weight, general physical condition, defensive reflexes, etc.

11. THE INFLUENCE OF AGE AT THE FEMORAL NECK FRACTURE

For people over 65 years of age is increasing rapidly FNF. In younger people, the upper heel of the femoral bone is one of the strongest bones in the human body. As you get older it weakens and becomes more susceptible to fractures. Aging reduces the coordination of movements, the ability to balance, nerve muscular reactions become slower and weaker eyesight. With reduced physical activity reduces muscle strength and joint mobility. These factors combine to age and increase the risk. Some gastrointestinal diseases causing decreased absorption of vitamin D and calcium. Severe forms of rheumatoid disease caused by the reduction of physical activity also indirectly lead to bone atrophy. Chronic diseases of the central and peripheral nervous systems, such as Parkinson's disease, multiple sclerosis and a variety of paralysis, increase the risk of falling, and FNF.

Cummings in 2004 with the associates published the study of risk factors in 9500 white women older than 65.5 years. Risk factors that were examined in their study were:

- Women aged more than 80 years,
- Fractures of the hip in family history,
- Actual weight is less than that in age of 25 years,
- Body height is less than 160 cm or less than the one in age of 25 years,
- Lack of concern about their health,
- Hyperthyroidism,
- Use of benzodiazepines,

- Drinking more coffee than two cups a day,
- Poor physical activity,
- Inability to get up from a chair,
- Stay on his feet less than four hours a day,
- Impaired hearing and vision,
- Heart rate alone if it is greater than 80 ppm and
- Incidence of bone fractures after 50 years.

They found that women with five or more risk factors had a greater risk of hip injuries than those who had none or up to two risk factors.

More than 90% FNF resulting from the fall, but only about 1% of all falls in the elderly leads to fractures, communicated Nevitt. Comparing the two forces, the power of stroke at the fall on the hip and in vitro measured the force required for the occurrence of hip fracture, Robinovich and associates 1991 came to the conclusion that any decrease in the standing position directly on the outer side of the hip (trochanter maioris) can break a hip. Influence the direction of falling, as a risk factor, demonstrated in a series of clinical trials. Older people have a high tendency to drop, and the reason for the decline were slower response time of hands, reduced grip strength of the grip, falls while using stairs, or an attempt at turning, reaching for items and the like. The reason for this behavior in older people is to reduce cognitive function, reduced function of the lower extremities, the problem with strength, sensation and orientation in space, use of sedatives, static disorder, neuromuscular weakness, decreased visual acuity.

For recurring fails, whose cause is not syncope, increasing the risk of falling increases with the proportion of people who have difficulty getting up from a chair, difficulty walking in tandem (heel-toes), arthritis, Parkinson's disease, three or more falls during the previous year, use of alcohol, physical environment factors such as stairs, street lights, hallway lights.

12. SIGNIFICANCE OF OSTEOPOROSIS IN FEMORAL NECK FRACTURE

Osteoporosis is defined as a skeletal disorder characterized by reduced firmness as a predisposition to increased risk of fractures. Bone strength is determined by the density and bone quality. Density is expressed in a gram of minerals in the volume and quality of bone architectonics, volume decrease, damage accumulation and mineralization.

Osteoporotic fracture (fragility fracture) is usually the first sign that a patient suffering from osteoporosis. Orthopedic surgeon is therefore the first and often the only physician who sees this patient. Therefore, an orthopedic surgeon may have a key role in the optimal treatment, not only of the fracture, but the disease which is the basis of a fracture–osteoporosis.

- 3422 survey of orthopedic surgeons from 6 countries found that:
- 90% of orthopedists do not routinely determine bone density after the first fracture.
- 75% have insufficient knowledge about osteoporosis.

The average density–bone density of the female population reaches a maximum around the 35 years of life, after which there is a gradual decline (1). Loss of bone density

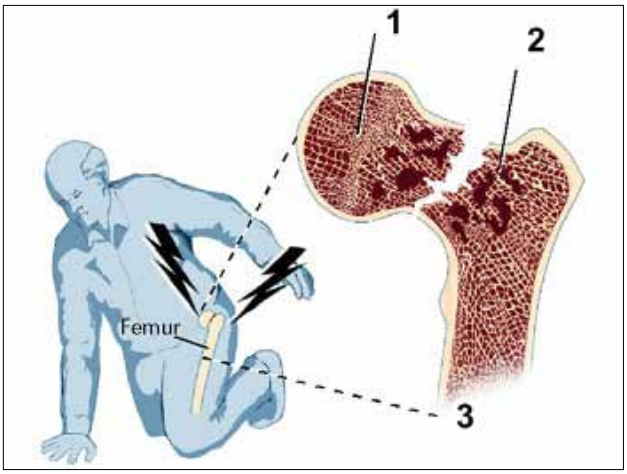

Figure 4. FNF due to osteoporosis

is accelerated in the postmenopausal period. With people living 90 years 1/3 of women and 1/6 men had osteoporotic fractures. Mortality in hip fracture reaches 25% one year after the injury. World Health Organization with the International Foundation for Osteoporosis (WHO/IOF), osteoporosis is defined based on the findings of measuring bone mineral density:

- Normal density of -1.0 SD
- Osteopenia -1.0 to -2.5 SD
- Osteoporosis -2.5 SD
- Severe osteoporosis–2.5 SD (with low-energy fractures).

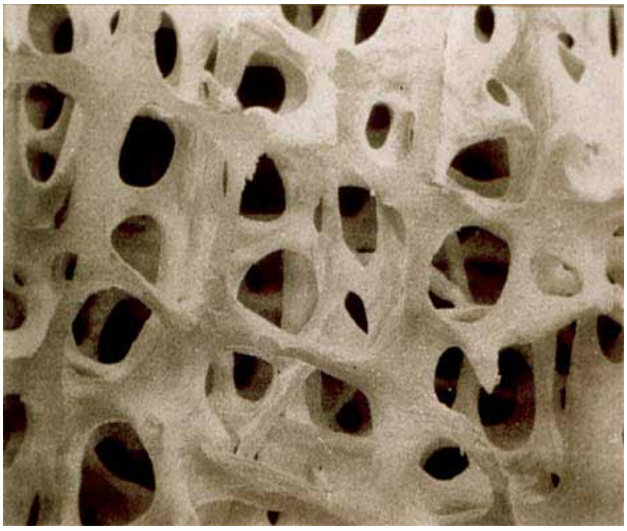

Figure 5. Bone tissue of norma density

Normal findings: bone mineral density (BMD) deviates less than 1 standard deviation (SD) in relation to BMD of the femur of young adult women (Figure 5).

Osteopenia (decreased BMD): BMD deviates more than one but less than 2.5 SD compared with young adult women.

Osteoporosis: BMD deviates more than 2.5 SD.

Severe osteoporosis: BMD loss to the level of osteoporosis associated with one or more low-energy fractures of the bones.

BMD decreased by 1 SD increases the risk of vertebral fractures in 2 to 2.4 times. Risk of fracture in the course of life is increased if the osteoporosis previously occurred.

According to the American Medical Association risk

Femoral Neck Bone Mineral Density T Score								
Age y	-3,5	-3,0	-2,5	-2,0	-1,5	-1,0	-0,5	0
50	49	41	33	27	21	16	13	10
60	47	40	33	27	21	17	13	10
70	46	39	33	27	21	17	13	10
80	41	35	30	24	20	16	12	10

Table 1. Risk of FNF by age (in percent) for white women

of pathological fractures in the remaining period of life in relation to age and bone density in percentages is as follows:

These estimates are based on a static model using a logistic model of the relationship between bone mineral density and risk of hip fracture withdrawn from the study of osteoporotic fractures (relative risk = 2.6 SD). These results are based on the results of bone mineral density of the Hologic QDR 1000 densitometer, with T results obtained from the base of the national survey of health and nutritional studies 1995. (Black et al.) JAMA, Oct.16, 2002-Vol 288, No15, p.1892.

In the U.S., about half of vertebral fractures, ¼ of FNF and ¼ of Colosov fractures are in persons with osteoporosis. These fractures are present in different age: fracture of the forearm (Colos's) about 50 years, vertebral fractures over 60 years and FNF about 70 years. Cost of treating these fractures is $14 billion. (National Institutes of Health USA 1999 MG.) Low body weight is a strong predictor for a very low bone mineral density (BMD–T_score ≤ -3.5), which can be explained as a high risk for FNF. Low body mass index (BMI) (body mass index–BMI) was established as a risk factor for hip fracture, because a low BMI in relation to low bone mass are considered by Edelstein and Barrett.

Many studies have shown that low mineral density and low bone mass in the hip region are closely associated with FNF in women and may be a predictor risk factor for hip fracture in the future. The decreased BMD in the femoral neck for each standard deviation of density increases, according to age, the risk of fractures by 2.6 times in the lower quarter by 8.5 times. Peak BMD is achieved in early adolescence after linear growth of the skeleton, which is influenced by genetic, hormonal, nutritional factors and physical activity. However, there is a period of bone loss that is associated with age, menopause and other factors such as low body weight, alcoholism, smoking, lack of physical activity. To review the clinical etiology of postmenopausal osteoporosis is important, as a general process that affects all the bones and is manifested in the bones that were exposed to the highest loads: spine and hip. Postmenopausal osteoporosis caused by estrogen deficiency or diminished ovarian function. Lack of estrogen and bone loss accompanies dying osteocytes. In the early years of menopause, bone loss is dramatically increased.

Cells that remodulate the bone also getting old, dominated by regressive processes, which in the body leads to a reduction of substrate material. Develops osteoporosis, which contains not only a simple loss of calcium, but also a loss of bone resorption and significantly reducing the number of bone beds. Osteoporosis of upper femur was divided into 6 grades known as Singh index. Assessment of Singh index on plain radiographs of the hip is a cheap and simple method to allow an approximate assessment of the femur mechanical quality. Due to the subjective character, its predictive value for mechanical quality of bone in some patients remains uncertain.

Conventional radiography of the pelvis is widely available and inexpensive, provides sufficient spatial resolution and contrast for the assessment of the macroscopic structure of the upper femur (1). Using this method, several studies have found no association in geometry of the pelvis and upper femur with the risk of occurrence of hip fractures in postmenopausal women. The geometry of the hip can be a significant predictor of occurrence of the fracture strength as a result of building the functionality of its geometry. This is the sequence of construction engineering principles. Another important principle of the mechanical properties of the material it was built in the structure and location and direction of the stress that these structures are subjected. Torsion strain on the congested femoral fractures can lead to its lowest point, which is positioned horizontally over the neck of femur. It is claimed the first time in Sir Astley Coouper more than 150 years. Since then, the skeletal geometry of the upper femur is presented as a contributing risk factor for FNF in studies performed by DXA (dual-energy X-ray absorptiometry) and by conventional radiography, but the results were partly conflicting.

Predisposing medical conditions of osteoporosis are: a) estrogen deficiency, b) inflammatory bowel disease, c) type 2 diabetes; d) cystic fibrosis lung; e) hyperthyroidism; f) hyperparathyroidism; g) hypogonadism; h) liver disease; i) use of corticosteroids; j) use of heparin, and cyclosporine.

Leichter's have the opinion that osteoporosis is a pathological fracture, or the stress fracture. He tried to prove the claim by histopathological analysis of this region of the bone, as well as monitoring the shape of the fracture plane. He argues that first occurs the break and then fall. Straining external rotators during upright standing and relying on her foot, acts as a strained arch in the femoral neck, then bend at the site of the strongest and weakest points (Ward triangle) FNF follows, and then drop Bingold considered. Bray believes that in some cases the torsion force is sufficient to lead to fracture of the neck in the presence of other factors and mechanical embrittlement of bone tissue.

13. CONCLUSION

In addition to the above listed risk factors, there are other metabolic disorders that may be risk factors for fracture neck of femur. So are found bones with osteomalacia in 24% and the histological changes in hyperparathyroidism in 3% of cases with FNF proved by Arna associates in 1997. All the enumerated risks to a greater or lesser extent, can affect the type and severity of femoral neck fractures. The

role of physicians in family medicine education, especially, high-risk population groups, is essential. Unfortunately this and other health problems, which needs intensive prevention (health promotion) activities can be well prevented, and which are the most economical, most efficient and most rational form of dealing with this health problem in our health care system are not given enough attention. This is the organizers of Health must address more.

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