

Problems of the Surgical Treatment of Patients with Fractures of the Proximal Femur on the Basis of Osteoporosis

Markov Alexander¹

¹ Tyumen State Medical University, Tyumen, Russian Federation

ABSTRACT

The research was conducted, dedicated to the analyses of surgical treatment's results of patients with fractures on the basis of osteoporosis, that showed the most frequency of unsatisfactory results that were gotten in cases of fractures of proximal femur. Such fractures have the distinctive mechanism of trauma and are called low-energetic, taking place during the influence of the minimal traumatic factor even after the fall from the highness of own height. It comes to the attention that in general people of old and senile age suffer from such problems. Such age groups often have such illness as osteoporosis in its anamnesis that manifests in the decrease of the mineral density and, as a result, leads to fractures that were described above. On the basis the conclusion was made that the heightened resorption of bone tissue around set implants or endoprosthesis is the main reason of unsatisfactory results that leads to the aseptic instability and migration of metallic constructions.

Keywords: fractures of the proximal femur, osteoporosis, fractures, endoprosthesis, aseptic instability, migration of metallic constructions

Correspondence:

Markov Alexander
Tyumen State Medical University,
Tyumen, Russian Federation,
Malaysia,
Email id : alexdokter@inbox.ru

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INTRODUCTION

Every year all around the world the growth of osteoporosis among patients takes its place. Significance of social and economic effects of osteoporosis is great, its manifestations are health life quality decline, and also it leads to big financial expenses on treatments, which multiply increase among patients after fractures of any localization [1, 5, 16, 23, 24]. It's the systematic metabolic skeleton's disease, which is characterized by the decrease of mineral density of bone tissue and violation of microarchitectonics of bones, and as a result strength of bone decreases and the risk of development of low energetic fractures rises [6, 7, 8, 10, 21].

The biggest significance of osteoporosis is evident during traumas and illnesses of musculoskeletal apparatus, associated with high prevalence and high percentage of disabilities and lethal outcomes [3, 4, 22].

Osteoporosis has its characteristic localization where low energetic fractures occur, for example in lumbar vertebra [19], distal metaepiphysis of radius – “typical fracture of radius at typical place”, but the most widespread and dangerous localization is medial femur's neck, that has the biggest percentage of lethal outcomes, often associated with the presence of accompanying pathology in the decompensated condition, which doesn't allow timely surgical treatment. Such fractures have the distinctive mechanism of trauma and are called low-energetic, taking place during the influence of the minimal traumatic factor even after the fall from the highness of person's own height. People of old and senile age suffer most often. The long bed rest also can become the reason of osteoporosis. At the moment when a man is situated in horizontal position without active movements and for a long time, the loading on the skeleton decreases, blood supply declines and the durability of bone tissue declines respectively. On the basis of data of domestic and international literature, fractures of proximal femur constitute from 3,9% to 18% of all fractures of tubular bones [3, 7]. The most widespread trauma of musculoskeletal system among patients of old and senile age is the fracture of femur's neck [18]. According to the literature's data up to 30% of beds in traumatological

hospitals are occupied by patients older than 50 year old and 70% of them are patients with fractures of femur's neck [12].

Nowadays cannulated screws are basic devices of osteosynthesis in fractures of the femur's neck. Osteosynthesis by screws is low traumatic and doesn't violate blood circulation in the cap of femur, the operation is not long and technically relatively simple. Method of closed osteosynthesis by cannulated screws is performed almost without surgical entrance through cutting-puncture up to 1,5 sm., that's why this method is optimal even for impaired patients of elder age.

Fundamentally important in treatment of patients with fractures on the basis of osteoporosis are prescriptions of drugs which have influence over the activity of resorption of bone tissue and processes of bone formation [9, 11, 13, 14, 15, 17]. Precisely in the course of violation of balance between these two processes accelerated destruction of bone tissue and its slow recovery take place. During surgeries on bone structures, in the moment of screwing or setting of implants local septic inflammation occur, which is supplemented by bone tissue resorption in the “implant-bone” area. Nowadays titanium alloys are material for production of metallic constructions that have relatively high biological and biomechanical compatibility and low velocity of biodegradation and the absence of allergic and immunological reactions wherein the risk of development of infectious complications is fairly low. Higher biocompatible features can be applied to titanium implants by the way of application of oxidized covering on their surface. Cyclical strains in bone structures during osteoporosis faster enlarge micro spaces between metallic construction and the bone because of rarefaction in trabecular structures in contrast with healthy bone. It can become the reason of instability in first weeks after osteosynthesis. On the other hand, the quantity and characteristics of biomechanical factors, that affect the area of fracture, can become the reason of insufficient results of osteosynthesis in these cases can be. As a result, the consolidation is slowing down and risk of non coalescence of fractures as well as the formation of false articulations is heightened.

Endoprosthetics has a special place in treatment of patients with pathology of articulation coxae, and that in spite of being highly technological method, also doesn't exclude unsatisfactory results [2]. All said above became the basis for our research of reasons of unsatisfactory results during surgical treatment of patients with fractures of the proximal femur on the basis of osteopenic syndrome.

GOAL

To analyze and determine reasons of unsatisfactory results of surgical treatment of patients with fractures of the proximal femur on the basis of osteoporosis.

OBJECTIVES

To explore literary data of domestic and international authors, that studied problems of treatments of patients with fractures of the proximal femur on the basis of osteoporosis.

To research ambulatory cards of patients of traumatology department №1 of Regional Clinical Hospital No. 2 for determination and analysis of reasons of unsatisfactory results during surgical treatment of patients with fractures of the proximal femur on the basis of osteoporosis.

To conduct the analysis and reveal possible reasons of development of insufficient results of operative treatment.

MATERIALS AND METHODS

Ambulatory cards of patients with fractures of the proximal femur on the basis of osteoporosis, taken into dispensary account treated in traumatological polyclinic of Tyumen. For the research time period was defined from January of 2013 to December of 2016, 61 patient with unsatisfactory results of surgical treatment was found. Gender distribution showed these results: 38 of women, 23 of men. Age of patients varied from 55 to 85.

The evaluation of functional condition of patients in remote period was conducted based on the scale of Harris. The unsatisfactory result of treatment corresponded to the interval from 0 to 69 points, satisfactory – evaluated from 70 to 79 points, good – from 80 to 89, excellent – 90-100 points.

Analysis of unsatisfactory surgical treatment's results of patients with fractures of the proximal femur on the basis of osteoporosis was conducted based on clinical and radiological researches, computed tomography and densitometry [20]. Publications of scientific and practical researches of international and domestic authors were researched.

RESULTS

The majority of unsatisfactory results in evaluation of functional activity on the scale of Harris in remote period was registered among 49 patients, which are 80,3% of all cases. Satisfactory results were got from 12 patients (19,7%). Unsatisfactory results among patients operated by the method of bipolar endoprosthesis of articulation coxae had the score on the scale of Harris in the range of 42-55 points, by the method of total endoprosthesis of articulation coxae – 46-62 points, after performed osteosynthesis of femoral neck by cannulated screws by the system of AO – 23-48 points, after surgical treatment of fractures of the spit area with DHS-system - 41-61 points.

During the analysis of clinical records and outpatient cards a series of connected diseases was revealed in different stages of compensation which not always allowed to timely conduct operative treatment and as a result also influenced the reciprocity

of unsatisfactory results. Consequently tactics of treatment of patients in majority of cases depended on accompanying diseases of systems of organism present at the moment of trauma and also on the stage of their compensation. Accompanying diseases were observed among 57 of patients (93,4%). Diseases of cardiovascular system which were diagnose among 46 patients (75,4%) make up the biggest percentage. Hypertensive disease was determined from 39 patients (63,9%): I stage from 23 patients (37,7%), II stage from 16 patients (25,8%). Chronics ischemic heart disease is diagnosed among 26 patients (42,6%) 16 of which are men (25,8%), and 10 are women (16,4%). Post-infarction cardiosclerosis was found among 4 patients (6,6%): 3 men (4,9%) and 1 woman (1,6%). Diabetes was found among 13 (21,3%) of patients, of which 7 were men (11,5%), 6 were woman (9,8%). Pathology of thyroid gland was determined among 12 women (19,6%): 7 with hypothyroidism (11,5%), 5 (8,2%) patients with thyroid nontoxic nodule. Diseases of respiratory system organs were determined among 16 patients (25,8%). Diseases of organs of digestive system were diagnosed among 41 patients (67,2%). Pathology of urinary system was diagnosed among 29 patients (47,5%). On the moment of surgery accompanying somatic diseases were compensated.

The execution of standard x-ray research in two projections allows getting of reliable, authentic and accurate information about type and localization of fracture on the stage of diagnostics of proximal area of femur's injury. Together with features of fracture the picture of fan-shaped trabecules in metaepiphyseal area of femur was determined with the help of x-ray research. X-ray research allows determination of presence and severity of osteoporosis in the type of evaluation of mineral density of bone tissue. Evaluation of decreasing of mineral density of bone tissue was conducted by half-quantitative method of the index of Singh and morphological cortical index. (MCI). Singh Index was registered in the interval of 2-6 stage in both groups, and the meaning of MCI was not more than 27%. Signs of expressed osteoporosis were detected among overwhelming number of 57 patients (93%).

During the research the biggest percent of unsatisfactory results was determined after surgical treatment among 20 patients with fractures of proximal femur, of whom 16 cases (26,4%) were detected with medial fractures of neck's femur and 4 patients (6,7%) with fractures of spit area. All patients with medial fractures of femur's neck were operated on with three cannulated screws by AO system, and patients with fractures of spit are with DHS system. During the analysis of unsatisfactory results in 8 cases an underpressure of bone tissue around fixed implants was determined, during the analysis of staged radiological control, with following development of metallic construction's migration and instability of performed osteosynthesis, leading to the formation of false articulation.

During the analysis of unsatisfactory treating of 12 patients (20%) with vertebra damage after stabilizing surgery with using of submersible transpedicle construction, results of radiological examination and computed tomography were analyzed and migration and fatigue fractures of metallic constructions during the first year were discovered, and also unsatisfactory result and repeated operation as a result. Aseptic instability of total endoprosthetics of articulation coxae and articulation genus was discovered among 8 patients (13,4%) and 4 patients (6,7%) respectively, also being directly connected with heightened resorption of bone tissue on areas that surround components of endoprosthetics. On this basis aseptic instability

of endoprosthetics, which often leads to inevitability of repeated surgery, develops. This problem can become the menace for patient's health and by the way leads to bigger financial expenses. Instability and migration of metallic constructions after performed osteosynthesis of femur's neck with plates and screws also had high percentage in studied group among 8 patients (13,4%), which had been provoked by heightened resorption of bone tissue around fixed cortical and spongy screws.

The timely medical examination of old and senile patients with the purpose of diagnosing of osteopenic syndrome in early stages and the possibility of detection and elimination of risk factors of osteoporosis is very important and strategically necessary variant of the prophylactics of low-energetic fractures development nowadays, being the only right decision. It will allow the correction of lifestyle of the patient, the selection of necessary drugs, that positively influence the reparative regeneration of the bone tissue, and the competent scheduling of schemes of conservative therapy for patients of the osteoporosis risk group. In the case of detection of the decreased mineral density of the bone tissue among patients with fractures after surgical treatment it is necessary to direct them to the center of osteoporosis for the further observation.

CONCLUSION

Analysis of literary data and results of researches lead to a conclusion that the basic reason of determined unsatisfactory results after surgical treatment of patients with fractures of the proximal femur on the basis of osteopenic syndrome is heightened resorption of bone tissue around fixed implants or endoprosthetics that leads to the instability and migration of metallic constructions which is evaluated as unsatisfactory result.

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