CURRENT TRAUMA PROBLEMS IN GERONTOLOGICAL PATIENTS AFTER LOWER LIMB INJURY (literature review)

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CURRENT TRAUMA PROBLEMS IN GERONTOLOGICAL PATIENTS AFTER LOWER LIMB INJURY
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ABSTRACT

Older adults sustain frequent orthopedic injuries that may result in devastating consequences to their overall health, function, mobility, and independence, and even in death. Objective: Our aim in this article is to provide the readers with a review of current trauma problems in gerontological patients after lower limb injury.

Key words: elderly, lower limb fracture, comorbidity

Introduction

Older adults make up a growing proportion of trauma patients in emergency departments and remain a significant cause of increased morbidity and mortality and a serious public health problem.

Every year, approximately one-third of the population over the age of 65 has a fall experience, and this figure increases to 50% among people aged 80 and over [2]. In addition, the frequency of falls that lead to hospitalization in emergency clinics increases with the increasing number and rapid growth of the elderly and senile population [3]. The rate of drop-induced death, and the absolute number of such deaths, is growing rapidly [4]. As life expectancy has increased, hip fractures have become one of the leading causes of death in the elderly [5].

An elderly patient with fractures creates a number of problems compared to their younger colleagues. They are more likely to have multiple comorbidities and
significant polypharmacy [1]; thus, they are likely to require a change in their medication regimen at home when admitted to a hospital with a fracture. A representative survey of community-dwelling US adults (aged 57–85 years) has found that 81% use at least one prescription medication, and 29% use five or more prescription medications. Approximately 5% of older adults are on warfarin, a growing number are on novel oral anticoagulants, and more than 30% are on an antiplatelet agent, increasing the likelihood and severity of hemorrhage. Medications increase the likelihood of older adults experiencing a traumatic accident (e.g., sedative-hypnotics causing falls). Some, such as beta blockers, affect the physiologic response to trauma. [41]

Older adults are likely to have significant comorbidities at the time of injury. The percentage of older adults experiencing at least one of five chronic diseases—arthritis, stroke, chronic lower respiratory tract disease, coronary heart disease, and diabetes mellitus—varies from 15% to 47%, with only 33% of men and 25% of women having none of these comorbidities.[41]

Fractures in the elderly and senile not only have significant morbidity and mortality, but also have significant economic consequences. It is estimated that the cost of fractures due to fragility exceeds $17 billion annually in the US and 1.7 billion pounds in the United Kingdom. By 2040, it has been suggested that the annual incidence of hip fractures will exceed 500,000 in the United States alone, resulting in an annual cost of about $35 billion. [6]

Age-related balance disorders lead to more frequent falls, and the increased prevalence of osteoporosis increases the risk of fractures after a minor injury. [7] Multiple chronic diseases that develop in adulthood can lead to poor overall health. [8] for this reason, the mortality rate in patients with hip fractures is higher than in their peers in the first year after the fracture. [9]

Factors that may increase postoperative mortality were suggested as male gender, age over 85, multiple comorbidities, long waiting times before surgery, surgeon experience, and long hospitalization. [10,11]
One of the main causes, which is confirmed by the medical community, is age-related osteoporosis. This form of disease, with increased fragility and brittleness of the bones peculiar to people of old age. The negative impact of the disease can lead to serious injuries even when performing small mechanical efforts. Osteoporotic fractures, along with diseases such as myocardial infarction and malignant tumors, are the leading cause of morbidity and mortality in the elderly population. A continuous increase in the number of older people on the planet (projected by 2050 it will increase by 10 times) will inevitably lead to an increase in the growth of OP and its complications [12]

The occurrence of fractures on the background of osteoporosis is due to a violation of the strength of the bone. This indicator determines the risk of fractures. Bone mineral density (BMD), changes in microarchitectonics (thickness of the cortical layer and its porosity, structure of the trabecular layer — the number, shape and thickness of the trabeculae, the distance between them) and bone geometry (its shape and size) are considered as components of bone strength [13]

The most typical cases of osteoporosis are fractures of the thoracic and lumbar vertebrae, distal radius, and proximal femur (level of evidence A) [14]. According to the epidemiological analysis of the Moscow sample of people 50 years and older, the frequency of limb fractures is on average 39.8% in men and 36.7% in women [15]. According to foreign researchers, 85% of distal forearm fractures and about 75% of all hip fractures occur in women [16,17]

Fragile fractures are a problem for an ever-growing aging population. Current estimates show that 1 in 2 women and 1 in 5 men will suffer a fragility fracture during their lifetime. In addition, women have a 17.5% risk of hip fracture after age 50 [18]

The risk of fractures in elderly and senile people is associated with the development of complications such as congestive pneumonia, thrombophlebitis with subsequent development of pulmonary embolism, bedsores, and exacerbation of chronic diseases. Their development is directly related to the consequences of the trauma and a sharp restriction of the motor mode, which in 50% of cases leads
to fatal outcomes in the first year after the injury [19]. According to statistics, the mortality rate during the first year after a hip fracture is 20-24% [20]. According to epidemiological studies conducted in Russia, the mortality rate for femoral neck fractures reaches 55% [21]

According to the literature, the delay in the period of fixation of a fracture by more than 2 days, in comparison with patients who underwent surgical treatment in the first 72 hours, increases the mortality rate by 15% [22].

However, a systematic review of 25 studies with more than 275,000 patients found that during early surgery (they were unable to conclude that this was associated with a reduction in complications [23]. However, there were no adverse outcomes associated with early surgery; thus, with the exception of medical complications, early stabilization of hip fractures in old age is likely to be beneficial.

Early operations on hip fractures (within 24-48 hours) are reported to reduce mortality by avoiding complications associated with prolonged bed rest, such as venous thromboembolism, skin ulceration, nosocomial infections, and pulmonary complications [24, 25].

Anesthesiologists play a very important role in the perioperative treatment of these patients. Proximal femoral fractures are particularly problematic for anesthetists, as geriatric patients may have significant comorbidities. [26]

H. Bombaci and co-authors studied 107 patients (70 women, 37 men) aged 65 years and older who underwent surgery for a hip fracture. In the first year after surgery, 28 patients died. The mortality rate in the first year was significantly higher than in the General population (p <0.05). Of these 28 patients, 16 died within the first 3 months; most due to respiratory failure. The mortality rate was significantly higher in patients with abnormal creatinine values (p= 0.001) in preoperative laboratory results and was classified as ASA 4 (p <0.0001). Postoperative mobilization was slower and mortality was higher in patients with cognitive dysfunction, such as senile dementia. [27]
Kalchenko A.V. and co-authors analyzed 744 medical records of elderly and senile patients with low-energy fractures of the proximal femur. All patients were found to have concomitant pathology with a predominance of diseases of the cardiovascular system. All the patients underwent osteosynthesis of the proximal femur by a plate with angle stability. Long-term results were studied in a survey of 91.6% of patients subjectively noted a deterioration in the quality of life after surgical treatment of the trauma. After the osteosynthesis plate a good result (12.5%) were found only in one patient, satisfactory results have questioned patients revealed unsatisfactory results (87.5%).[28]

V.N. Borovkov and the authors recommend that for the treatment of fractures of the proximal femur type A1, A2, A3 in patients of low and old age, the use of Proximal Femur Nailing reduces the time of inpatient treatment, the period of rehabilitation and temporary work capacity, improves the quality of their active life. [29]

Proximal femoral fractures have the greatest economic impact among fractures associated with osteoporosis [30]. Muhr and Tscherne already pointed out the importance of adequate treatment of trochanteric femoral fractures in geriatric patients 30 years ago. The authors identified instability, osteoporosis, and the need for early mobilization as key factors and major problems in the treatment of these fractures [31]. However, other factors, such as chronic Pro-inflammatory status, also affect the patient's outcome, called "inflammation" [32]. In elderly patients, the immune system is significantly impaired even in the absence of injuries. Despite the growing interest in these topics, the immunological significance of individual surgical strategies has not been resolved. Articles by Thaeter et al. it deals with the perioperative inflammatory response in a major fracture and its dependence on age [33].

Malnutrition, sarcopenia and weakness lead to functional disorders and are part of a vicious circle. Despite the high level of malnutrition among elderly patients with injuries and its impact on the outcome, there is no standardized preoperative assessment of nutrition in most centers [34]. Eschbach et al.,
contributing to this question, developed a web questionnaire that requested information regarding the use of nutrition assessments and the use of certain laboratory parameters to detect malnutrition [35].

Osteoporosis, in addition to age-related gait disorders, is a major risk factor for femoral fractures in the elderly. Due to the osteopenic structure of the bone, even minimal trauma leads to sometimes complex fractures of a type rarely seen in young patients [36]. Implant fixation in an osteoporotic bone is a dilemma for an orthopedic surgeon and leads to the development of new methods of fixation [37]. Currently, there is no established comprehensive guidelines for the treatment of osteoporosis.

Various types of collaborative treatment have been developed in many places to help older patients regain their independence. Working closely with geriatricians creates synergy to address issues such as post-operative delirium, nutrition, pain management, wound care, and fall prevention. Although there is a tendency for better overall results in patients receiving multi-specialty inpatient rehabilitation, the literature is contradictory [38]. There is also no consensus on the effectiveness of various orthogeriatric models [39]. However, due to the improvement of short-term mobility, it was proposed to treat elderly patients with hip fractures as orthogeriatric care [40]. Today, there are 30 certified geriatric trauma centers in the world, and their number is growing exponentially. We would like to thank all the authors for their excellent work and their appreciation of their efforts, and we wish interested colleagues an interesting time to read articles in this area.

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