

Possibilities of arthroplasty in bilateral knee OA

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Abstract:

Aims and Objectives: Joint replacement is one of the most frequently performed methods of surgical treatment for degenerative processes and the consequences of injuries. The technologies of medical support of the perioperative period, as well as the rehabilitation component are important. However, due to the increase in the number of operations performed the number of complications is also growing. Currently, surgical approaches in the treatment of bilateral knee OA remain poorly understood. In the literature, there are data on the intervals between knee arthroplasty from 3 months to 5 years. The epidemiological and pathogenetic aspects of the restoration of functional activity in bilateral knee OA also need further study.

Goal is the study of functional activity in patients in the perioperative period after arthroplasty with bilateral knee OA.

Methodology: The results of treatment of 124 patients with knee OA using arthroplasty technology were analyzed. 32 patients underwent arthroplasty of the contralateral joint. The results were evaluated using the KSS scale, as well as using radiography in the intervals 1, 3 and 6 months after surgery.

Results: During the first month after the operation, a restoration of functional activity was noted due to relief of pain, restoration of muscle function and regional hemodynamics in the area of the knee joint. It was also noted that the restoration of functional activity in the period from the first to the third month in patients with bilateral knee OA occurs less intensely due to decompensation of the contralateral joint.

Conclusion: patients activity analysis during postoperative period shown increasing of operated limb function and significant decreasing of another joint condition.

Date of Submission: 17-10-2019

Date of Acceptance: 02-11-2019

I. Introduction

Demographic processes taking place in modern society lead to a sharp increase in the population of the elderly. According to the WHO, degenerative diseases of the musculoskeletal system are significantly ahead of infectious and malignant lesions. Degenerative diseases of large joints of the lower extremities in the contingent of patients under study are of particular importance, since they have not only medical, but also social significance. Knee replacement is an increasingly common method of treating a wide range of diseases and the consequences of a knee injury.¹ Knee OA is widespread, and it accounts for almost a quarter of all articular pathology.^{2,3} Deforming osteoarthritis as a terminological archaism includes a biomechanical component of the pathogenesis of this nosology.⁴ Statistically valgus deformity at the level of the knee joint is much less common than varus, and its frequency is about 10-15% in the general population of patients undergoing total arthroplasty.⁵

Thus, OA of the knee is attributed to diseases associated not only with age, but also with a high level of comorbidity. The conclusion suggests itself: to help patients of old age improve the quality of life with knee arthroplasty, an assessment of all their comorbid conditions is needed, and intraoperative risk and postoperative complications must be minimized. Total knee arthroplasty is a high-tech and effective method for the treatment of knee OA in its final stage.⁶

High-tech surgery for knee arthroplasty should save the patient from pain, increase its activity and ensure social adaptation, regardless of age.⁷

Primary arthroplasty of the knee joint can effectively reduce the intensity of the pain syndrome, restore range of motion and improve the functional state of the operated joint; the use of modern rehabilitation technologies in a hospital demonstrates better functional results compared with outpatient conditions.⁸

With an increase in the number of primary arthroplasty surgeries, the number of revision interventions is steadily increasing, and now their share reaches 6–8% of the total number of arthroplasty performed.⁹

Currently, orthopedists more often choose endoprostheses with safeguarding of the posterior cruciate ligament, focusing on the results of better survival of the tibial component compared to those using posterior stabilized endoprostheses.^{14,15,16,17}

However, the complex of factors on which the effectiveness of primary arthroplasty depends, also includes the rehabilitation of the patient, which in the postoperative period, especially the late, has not been fully studied in the context of arthroplasty of the contralateral joint.^{10,11,12,13}

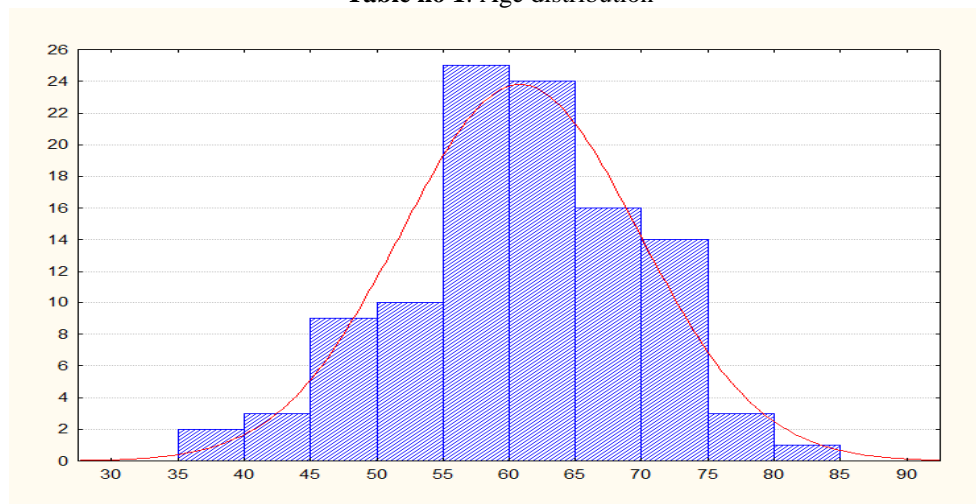
It is known that radiation monitoring data in the group over 50 years reflect the demineralization of bone matrix during perimenopause varying severity.¹⁸

However, a study conducted on a population of patients undergoing arthroplasty in the background of subcompensated bone metabolism, shows that the implementation of surgery, as well as the related forced immobilization of the limb leads to decompensation of mineral homeostasis, which adversely affects the efficiency of motor rehabilitation in early and the late postoperative period.¹⁹

II. Material And Methods

The analysis of the results of the examination and treatment of 124 patients with degenerative-dystrophic diseases of the knee joint of Department of trauma at the clinic of the BSMU was carried out from January 2019 to September 2019. A total 124 adult subjects (both male and females) of aged ≥ 18 , years were observed in this study. Patients were divided into 2 groups: 32 patients underwent arthroplasty of both knee joints; 92 patients with bilateral gonarthrosis underwent arthroplasty of one of the most decompensated joints. The level of functional activity was evaluated using the KSS scale, the position of the components of the endoprosthesis was evaluated using x-ray. In the group of 32 patients with bilateral arthroplasty, women made 21 observations (65.62%). The average age of the patients was 61,78 years (Table no 1).

Table no 1: Age distribution



Study Design: Perioperative open label observational study.

Study Location: Department of trauma at the clinic of the BSMU

Study Duration: January 2019 to September 2019.

Sample size: 124 patients.

Statistical analysis: For statistical processing of the obtained results were used packages application programs Microsoft Excel and STATISTICA 10.0 (StatSoft, USA). Used nonparametric methods of statistical analysis. Research results presented in the form of a median and interquartile range with an indication of 25 and 75 percentiles or mean and standard deviation. Rating differences between groups were performed using the Mann-Whitney test. The differences were considered statistically significant at $p < 0.05$.

III. Result and discussion

As a result of the analysis, it was found that in the end, patients have 52.4 points \pm 4.8 SD on the KSS scale (Table no 2). By the end of 4 weeks of observation, functional activity increased to an average level of 69.1 \pm 5.2 SD, with a significance level of differences $p < 0.05$.

It was revealed that the studied parameter decreased to 62.2 \pm 6.7 SD by 3 months of observations, in the absence of significant changes compared to the previous time range.

Sufficient differences compared with the preoperative period ($p < 0.01$) and compared with a period of 3 months ($p < 0.05$) were noted 6 months after surgical treatment.

Analysis of a similar indicator on the opposite knee joint shows negative dynamics throughout the observation period. A significant decrease in the contralateral joint function ($p < 0.05$) was detected 3 months after arthroplasty, with a decrease from the initial values from 78.6 to 70.2 ± 4.3 SD, followed by a decrease by 6 months to 60.7 ± 4.9 SD.

Clinical example 1. Patient B., 65 years old, knee OA of the right knee joint 3 stages according to K.-L., condition after arthroplasty of the right knee joint. There is a restoration of limb support ability in the postoperative period and decompensation of the function of the contralateral joint (Table no 3)

Clinical example 2. Patient F., 68 years old, bilateral knee OA 3-4 stages according to K.-L., JD 2-3 stage, coxarthrosis 2 stages on the left, 3 stages on the right. Condition after arthroplasty of both knee joints. (Table no 4)

In the time interval from 3 to 6 months, an equalization of the functional activity indices of the operated and intact limbs was noted, which was reflected from the data of stabilometry, while the shift of the pressure center under the feet to the healthy side was minimal.

Table no 2: Parameters of functional activity according to the KSS-F scale of operated and intact lower limb

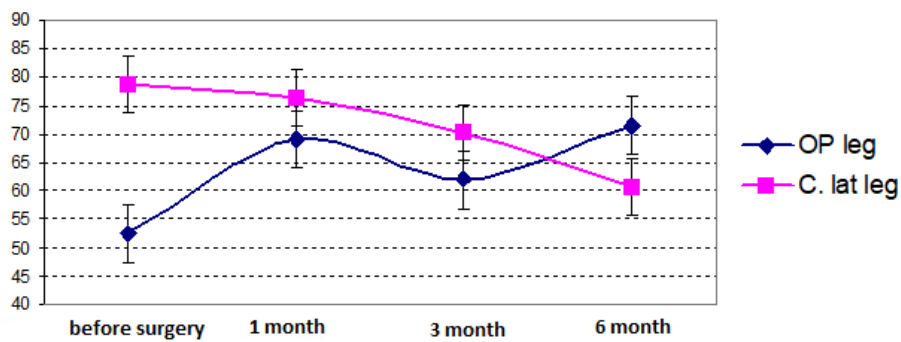
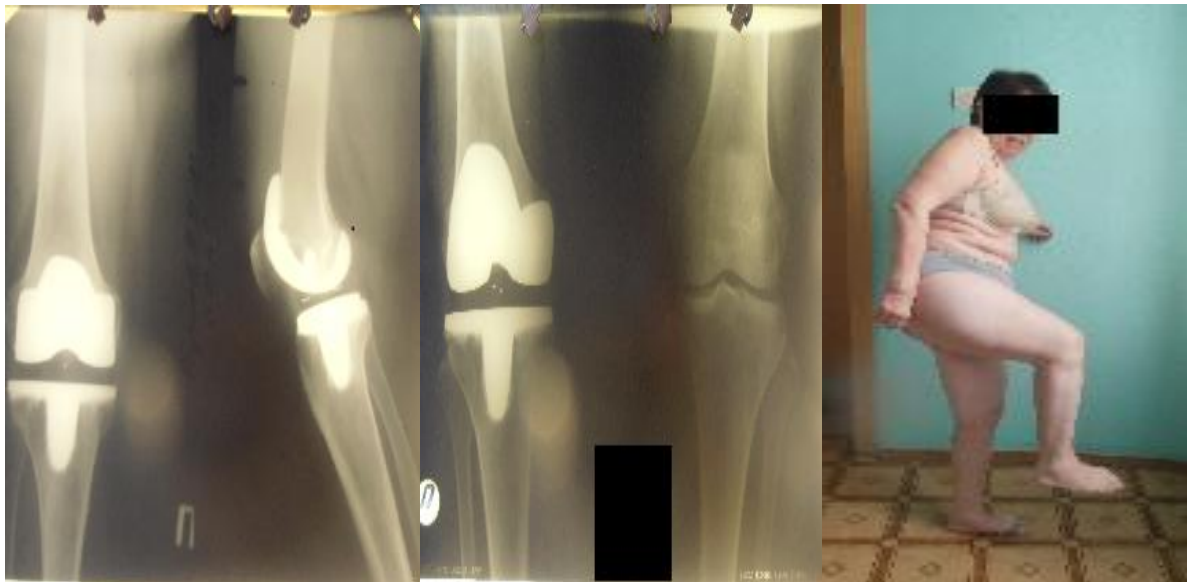


Table no 3: Case 1



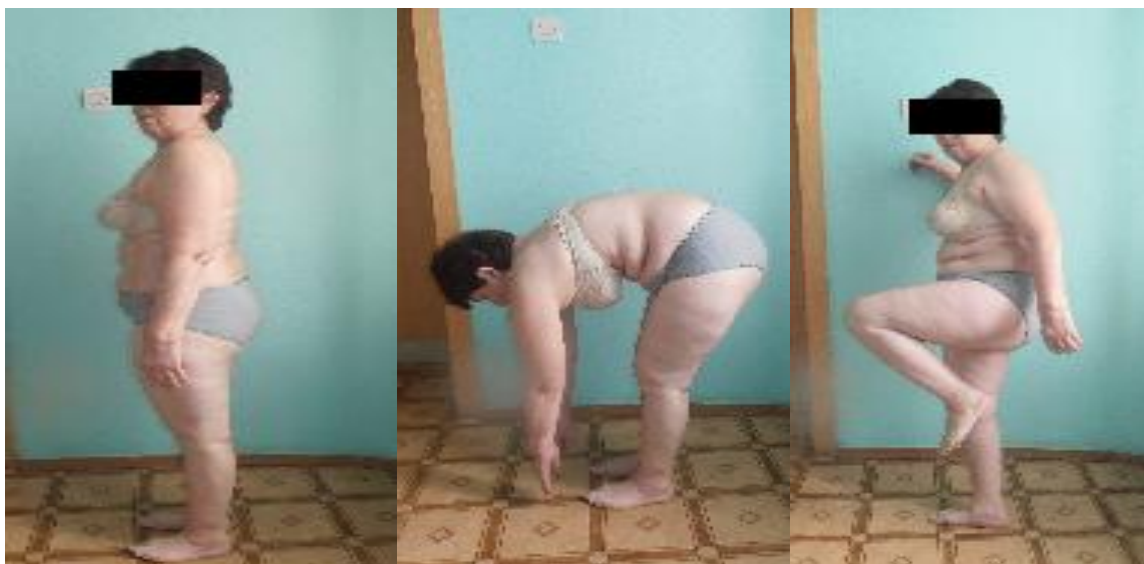


Table no 4: Case 2



The precision of the surgical technique, including ligament balance, limb axis correction, and normalization of limb length in order to restore biomechanical relationships, is important.

Of particular importance in the perioperative period, in our opinion, are the parameters of bone metabolism. The perioperative period is inevitably associated with physical inactivity, tissue hypoperfusion, as well as the inefficiency of enzyme systems, which leads to the redistribution of mineral and organic substrates both within the limb and the body as a whole. Therefore, the rehabilitation component, which ensures the permanent restoration of the muscle tone of the limb, is important. The pathogenesis of osteoarthritis still needs to be studied, which is reflected in the work of more and more large groups of researchers.

Arthroplasty of both knee joints is also being studied in the context of possible negative effects on the cardiovascular system. Another point of view is associated with the implementation of sequential surgical procedures after a rehabilitation course and restoration of limb support ability after arthroplasty.

IV. Conclusion

Thus, the analysis reflects the restoration of functional activity in patients in the postoperative period; nevertheless decreasing of the opposite limb function was revealed, which in turn reduces the effectiveness of both rehabilitation and therefore, necessitates second joint replacement.

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