

FEATURES OF THE APPLICATION OF EXTERNAL OSTEOSYNTHESIS IN GONARTHROSIS

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ABSTRACT. Knee arthrosis is one of the most common diseases in elderly patients with varus deformity. Corrective osteotomy is one of the methods of treatment. The aim of the study is to optimize the diagnosis of varus deformities of the lower extremities in patients with gonarthrosis; improvement of the technique of surgery and postoperative control of the main reference lines and angles; evaluation of correction results; analysis of complications. Methods. Retrospective clinical study. There were 39 patients under observation, each of whom underwent simultaneous operation on both legs (78 operations in total). Osteotomies of the tibia and osteosynthesis with the Ilizarov apparatus were used in all cases. All patients underwent full-length radiography of the legs with the determination of the main reference lines and angles. Results. In all cases, it was possible to achieve the normalization of the position of the mechanical axis and the angle of orientation of the knee joint. After the operation, the sutures were not applied to the wounds in order to prevent the compartment. Correction was performed in elderly patients at the same time, in young patients - gradually. The fixation period with Ilizarov devices was 16.6 ± 3.1 weeks. Conclusion. In our study, the Ilizarov method demonstrated the possibility of accurate correction of the varus deformity of the tibia, which leads to the normalization of the position of reference lines and angles on teleroentgenograms performed after treatment.

KEY WORDS: arthrosis of the knee joint, gonarthrosis, high osteotomy of the tibia, the Ilizarov method.

INTRODUCTION

Arthrosis of the knee joint is an extremely common disease typical for elderly people; in people over 50 years old, it occurs in 30–50% of cases [1–3]. Among the many different factors underlying the etiology of the disease, it is necessary to highlight the inadequate load on the internal parts of the knee joint in patients with periarticular, including varus, deformities [4]. In almost 77% of cases of isolated lesions of the knee joint, it is the medial parts that are affected [5]. Actually, the very term "deforming arthrosis" indicates deformity as an important component of the problem.

Corrective osteotomy is aimed at normalizing the angular relationship of the femur and tibia and ultimately restoring adequate loads on various parts of the knee joint. In the list of modern orthopedic surgical interventions, osteotomy is the only pathogenetically justified organ-preserving operation, since in the chain of pathogenesis of deforming arthrosis of the knee joint it affects the main link - deformation.

Today, the development of osteotomy technology is associated mainly with the use of extra-bone osteosynthesis [10, 11]. To a large extent, this trend is due to the

serious educational work of manufacturers of products and instruments for internal osteosynthesis. Against this background, there is practically no information on the possibilities of such an effective method of deformity correction as external osteosynthesis. The method proposed by G.A. Ilizarov in 1952, has received significant development and is widely used in the treatment of complex deformities of various parts of the skeleton [12]. However, it was only in 1994 that Italian orthopedists generalized the experience of using this technique in patients with gonarthrosis, describing it as fast, simple, safe and effective [13]. Nevertheless, the publication did not contribute to the popularization of the method, and until recently there are only a few works on this topic in the literature [14, 15]. Traditionally, the Ilizarov method is considered difficult to use, since it is associated with the development of numerous complications.

The aim of the study is to optimize the diagnosis of varus deformity of the lower extremities in patients with gonarthrosis; improvement of the technique of surgery and postoperative control of the main reference lines and angles; evaluation of correction results; analysis of complications.

MATERIAL AND METHODS

Surgical treatment, dynamic observation and X-ray examination of patients were carried out in the department of traumatology and orthopedics of the Bukhara regional multidisciplinary medical center. The possibility of observation and examination in this center ensured continuity in the stages of inpatient and outpatient treatment. The study was conducted between 2016 and 2019.

The method of treatment consisted of several main elements: the actual operation (proximal osteotomy of the tibia and osteosynthesis with the Ilizarov apparatus); postoperative axis correction, removal of external fixators. In all cases, preference was given to the so-called Ilizarov corticotomy [16]. Spokes with a diameter of 2 mm and rods-screws with a diameter of 4–5.5 mm were used as transosally conductive elements. An external fixator, consisting of 3 rings, was mounted before surgery so that the angle between the upper and middle rings was equal in magnitude to the angle of the proposed correction.

RESULTS AND DISCUSSION

The operation began with the application of the Ilizarov apparatus to the lower leg. After that, the tibia was transected at a distance of 7–10 cm from the knee joint gap (between the upper and middle rings of the external apparatus). In the postoperative period, the external fixator was transformed so that the upper and middle rings were parallel to each other, which led to the straightening of the deformed segment. The final control of the shape of the lower extremities was carried out on the basis of the appearance and control lengthy radiography with the determination of the position of the reference lines and angles.

In patients, as a result of correction, the studied values of MAD and mMPPTA recovered to normal values: statistically significant ($p < 0.01$) differences were obtained for both indicators before and after treatment. In some patients, it was

possible to perform an X-ray of the legs along the entire length several times with an interval of 1–2 years, while there was no significant change in the parameters.

The fixation period with Ilizarov devices was 16.6 ± 3.1 weeks (min 12.9, max 20.4).

During the observation period, two types of complications were noted - deep vein thrombosis in 1 (2.6%) patient and inflammation at the exit sites of the wires and rods of the Ilizarov apparatus in 23 (29.5%) segments. It should be borne in mind that inflammation of soft tissues is the most frequent complication when using external osteosynthesis, belongs to the category of lungs and does not affect the outcome of treatment, but significantly reduces the quality of life, especially in elderly obese patients. Deep vein thrombosis in the patient developed at the final stage of treatment, 4.5 months after the operation, the devices were immediately dismantled, and specific therapy was carried out. A follow-up examination after 4 years showed no signs of venous insufficiency.

A gradual increase in interest in organ-preserving operations, in particular, in corrective osteotomies, determines the search for optimal options for their implementation. First of all, such criteria as the accuracy of correction, the safety of the operation, and the possibility of early rehabilitation are assessed. It is appropriate here to discuss and compare two techniques that are equally gradually gaining popularity - the Ilizarov method presented by us and various types of so-called high tibial osteotomies with plate fixation.

Having given an unconditional preference to the Ilizarov method, we had the opportunity to evaluate the alternative method according to the literature data, which reveal a number of problems. So, when performing internal osteosynthesis as the final stage of one-stage correction, an extremely important element is the intraoperative assessment of the position of bone fragments after osteotomy. Until now, a rather primitive method is used in practice in the form of projection onto the mechanical axis of the lower extremity of a metal rod or wire from electrocoagulation [10]. Modern computer navigation systems provide accurate control, however, for economic reasons, it is difficult to imagine their widespread introduction into clinical practice in the near future [10]. Internal osteosynthesis presupposes certain limitations (deformity value is not more than 20° , age up to 60 years) [20, 21], which does not allow using this method in patients with significant deformity and severe arthrosis, for many of whom adequate correction would be a solution to the problem. Serious problems arise when correcting multi-plane deformations, in particular in lateral projection and rotational. All of the above somewhat reduces interest in this technique.

It is necessary to note a significant number of complications directly related to the technology of osteotomy, adapted for osteosynthesis, namely: intra-articular fractures (up to 20%), neuritis of the peroneal nerve (up to 27%), suppuration (0.8-10.4%), false joints (1–5%), secondary displacement (4–8.5%) [22, 23]. When using the Ilizarov method, complications such as intra-articular fractures, false joints and

secondary displacement are practically excluded, and the likelihood of developing suppuration in the osteotomy area and peroneal nerve neuritis is minimal. The condition for an uncomplicated course is constant monitoring by the operating doctor throughout the entire period of treatment. In modern conditions, there are certain difficulties in organizing such a treatment process, which, unfortunately, significantly hinders the use of external osteosynthesis.

CONCLUSION

The Ilizarov method in the treatment of patients with varus deformity of the lower extremities in combination with gonarthrosis is a high-tech surgical intervention aimed at normalizing the relative position of the femur and tibia and, as a result, ensuring optimal loads on various parts of the knee joint. The advantages of the method are precise correction, stable fixation, which allows operating on both legs at once, and the absence of foreign bodies after the completion of treatment. The noted advantages make the method quite competitive in the market of medical services and justify its wider application in the treatment of this category of orthopedic patients.

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