

Use of Arthroscopy in the Treatment of Early Fractures of the Greater Tibial Tuberosity

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Abstract The aim of the study was to improve the results and efficiency of treatment by using arthroscopy in the treatment of patients diagnosed with early fractures of large tibial masses. It was found that in the treatment of fractures of the big tibia, it was shown that performing an operation under the control of an arthroscope allows you to fully see the changes in bone fragments and soft tissues, the state of the joint, the accuracy of repositioning can be maximally controlled, and it can be performed in a minimally invasive way. When observing the results of arthroscopic treatment, a high result in 72.97% of cases, a good result in 21.62% of cases, and a satisfactory result in 5.41% of cases indicated the high efficiency of the long-term results of this method of treatment.

Keywords Early fractures of the greater tibial tuberosity, Arthroscopic treatment, Long-term results of treatment

1. Introduction

Last in years The frequency of intra-articular fractures of proximal metaepiphysis of the large tibia is not decreasing, these fractures make up to 10% of intra-articular fractures in the musculoskeletal system, from 2% to 5% of total fractures, and up to 30% of leg injuries [1].

In injuries of the bones forming the knee joint, these fractures make up 29.4%, femur fractures - 5.2%, and knee cap fractures - 65.4%. Also, fractures of the external condyle of the greater tibia occur in 55-70% of cases, and fractures of the internal and both condyles occur in 10-30% of cases. The peculiarity of these fractures is that the fracture surfaces are located inside the joint, and in most cases it is the joining of soft tissue elements of the joint [2].

Damage to the integrity of the surface of the knee joint is the reason for the severity of the injury and the long recovery process. It has been shown that fractures of the knee joint are overgrown with regenerating tissue, which in turn causes damage to the surface integrity of the patient's joint and changes in the shape of the joint, due to which it has been shown that patients often have limited movement in the injured joint and deforming arthrosis [3].

It should be noted that the accumulation of blood in the fractured joint causes the formation of scars and adhesions, and even permanent contractures of the joint are unlikely. The complexity of knee fractures is also based on the difficulty of repositioning bone fragments and their stable fixation. Incomplete diagnosis of these fractures leads to

incorrect selection of treatment tactics and, as a result, unsatisfactory results, today these cases are observed in 6-39%, and disability in them is observed in 6-15% [4].

It is known that the diagnosis of fractures of the greater tibial tubercle in older patients is difficult, and in the first days of the injury, a complete diagnosis is often not made. Initially, the patient's knee joint is x-rayed in standard projections, and multispiral computer tomography (MSCT) and magnetic resonance imaging (MRT) examinations clearly show the direction and displacement of intra-articular fractures, as well as the degree of injury to the intra-articular soft tissues (menisci, iliac ligaments) [5].

Currently, the use of high-tech minimally invasive methods is required in the treatment of large tibial tumors, and wide arthrotomy is still used in many clinics. It was found that in such practices, the crushing of the soft tissues of the joint increases, which, in turn, causes the increase of purulent complications, the appearance of contractures, the lengthening of the rehabilitation period, the inability to work, and the increase of disability [6]. Arthroscopic treatment of such fractures is still not widely practiced.

Based on the above, the aim of this research work was to improve the results and increase the effectiveness of treatment by using arthroscopy in the treatment of patients diagnosed with early fractures of the large tibia.

In the treatment with the help of the recommended method, restoring the surface integrity and shape of the knee joint in patients, preventing post-operative scars, preventing joint contractures and arthrosis, shortening the rehabilitation period, and returning patients to work by ensuring pain-free walking were among the priority tasks.

2. Materials and Methods of Research

In order to achieve the set goal, 37 patients who were treated in 2019-2023 in the Department of Sports Traumatology and Orthopedic Scientific Applied Medicine Center of the Republic of Uzbekistan and the Department of Traumatology, Orthopedics and Neurosurgery of the Multidisciplinary Medical Center of Navoi region were involved in the research.

All patients (n= 37) had a diagnosis of early fracture of the tibia, they were between 25 and 56 years old, 28 were men (75.68%) and 9 were women (24.32%). Table 1 shows the results of distribution of patients according to the causes of injuries.

Table 1. Distribution of patients with early tibial fractures by cause of injury

Body injury	Male		A woman		Total	
	Mut	%	Mut	%	Mut	%
Road transport incident	9	60.0	6	40.0	15	100.0
Sports injuries	6	66,67	3	33,33	9	100.0
Falling from a height	9	69.23	4	30.77	13	100.0

15 (40.54%) of them were injured in a road traffic accident, 9 (24.32%) were injured in sports, and 13 (35.14%) were injured in a fall from a height. Men have 3.11 times more injuries than women, which is related to their higher physical activity.

All patients (n= 37) underwent clinical and instrumental (x-ray, CT, MRI) examinations to verify the final diagnosis of the disease and were treated by arthroscopy. The statistical analysis of the obtained results was carried out using traditional variational statistics methods.

3. The Obtained Results and Their Discussion

All studied patients (n= 37) complained of knee swelling, pain, deformation, limitation of movement, difficulty in walking (100.0%) within 14 days after the injury.

In 17 patients (45.95%) meniscal injuries were detected between bone fragments, in 2 cases (5.41%) lateral meniscus anterior horn tear was detected and "P" sutures were placed, and in the remaining cases (48.65%, n=18) underwent a partial meniscectomy.

All cases were repositioned and osteosynthesized with cancellous screws under arthroscopic control. The patients were put in a plaster cast with a tutor for 14 days, after which the patients began to perform flexion-writing exercises in the knee joint.

Below, as a clinical example, we found it necessary to present the medical history of one of the adult patients involved in the treatment.

Patient D. 37 years old, (medical history No. 8514) 8 days before the winter of applying to the clinic, he received an injury to his left leg as a result of a fall from a height. placed However, the patient referred to the clinic because of persistent pain, and additionally underwent MSCT (Fig. 1) and MRI (Fig. 2).

According to the results of the examination, a diagnosis of "fracture and displacement of the outer tubercle of the left tibia and partial tear of the anterior horn of the lateral meniscus" was made.

After that, the patient underwent arthroscopy, partial meniscectomy of the anterior horn of the lateral meniscus and reposition of the external tubercle under the control of the arthroscope, osteosynthesis with cancellous screws (Fig. 3).

The method of surgical treatment of intra-articular fractures of large tibial tubercles that we offer includes revision of the knee without opening the knee joint using videoarthroscopic technology, trepanation of the large tibial bone, restoration of the articular surface of the damaged tubercle, filling the bone defect with a graft, and fixing the fragments with spikes.



Figure 1. MSCT view of a patient with a diagnosis of fracture and displacement of the outer condyle of the left tibia (patient D. 37 years old, case history No. 8514)

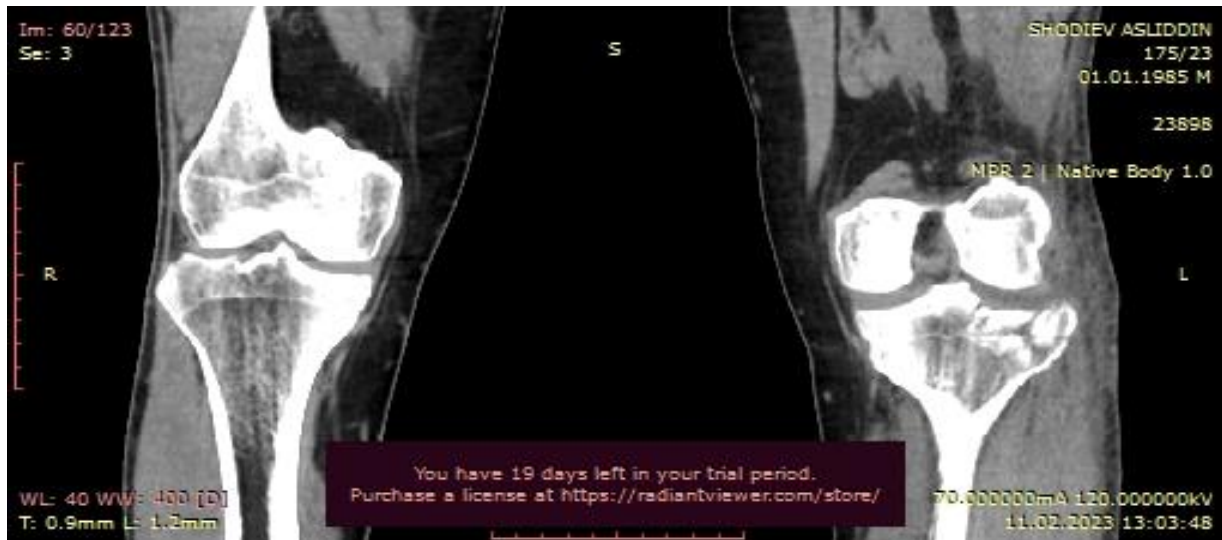


Figure 2. MRI image of a patient with a diagnosis of fracture and displacement of the outer tubercle of the left tibia, partial tear of the anterior horn of the lateral meniscus (patient D. 37 years old, (case history #8514)

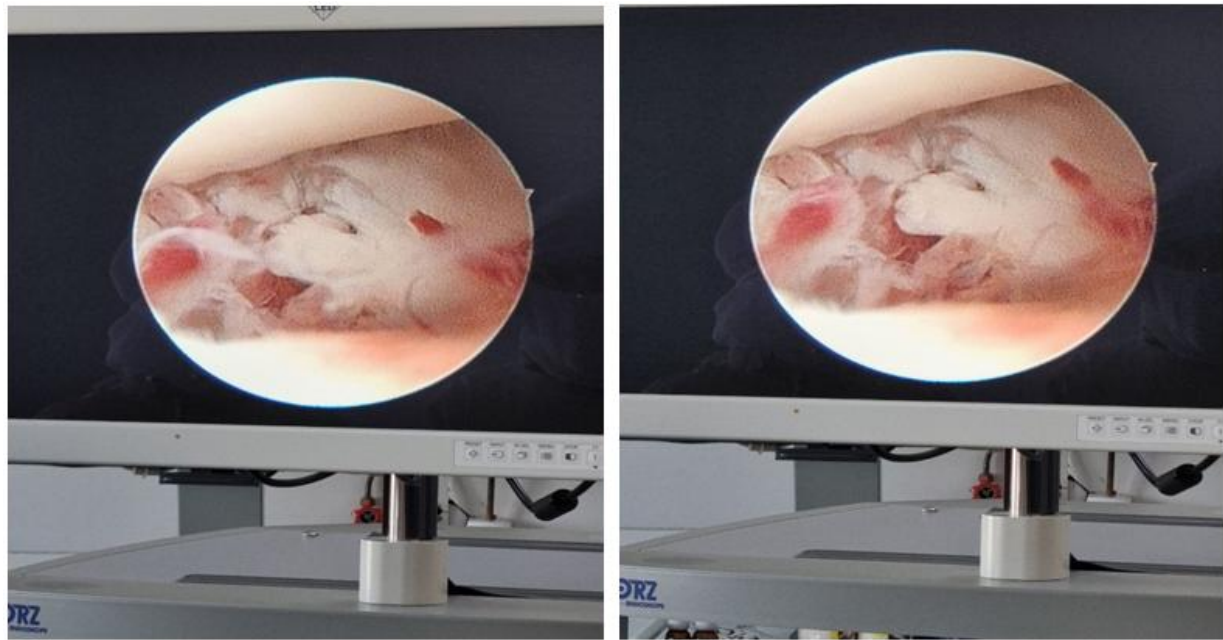


Figure 3. Arthroscopic view of a patient diagnosed with a fracture and displacement of the outer condyle of the left tibia, a partial tear of the anterior horn of the lateral meniscus (patient D. 37 years old, case history No. 8514)

Revision of the knee joint was performed using an arthroscope inserted into the joint through anterior-lateral and posterior-medial inferior mini skin incisions, when a clean paracapsular tear of the meniscus was detected, it was sutured with a P-shaped suture, when other tears or a degeneratively changed meniscus were detected, a partial or complete meniscectomy was performed. after that, the edges of the meniscus were cleaned with a shaver, trepanation of the area of the greater tibia was performed when the impression of the hyaline bone was detected, for this, through a 0.5 cm long skin incision and through the trepanation window in the area of the subscapula, pointing needles and a cannulated blunt trocar were inserted into the impression area by the injury, the bone fragments were repopulated and fixed with

Kirschner pins, the bone defect was filled with autograft through the trepanation window, fragments fixed with comparative and cannulated cannulated screws were monitored under an electronic-optical transducer (EOP control).

A plaster cast with a tutor was placed on the patient's left leg for 14 days. On the 14th day, the wound sutures and a plaster bandage were removed, and bending and typing exercises were started in the knee joint in a non-stressful state.

In order to determine the long-term effect of the treatment, the patient was invited to the clinic after 3 months for repeated clinical examination. The result of radiography performed on the patient (Fig. 5) showed that the treatment was carried out correctly, without complications.

When the treatment results were observed, 27 of 37 patients (72.97%) had a good result, 8 (21.62%) had a good result, and 2 patients (5.41%) had a satisfactory result (Table 2).

Table 2. Analysis of the long-term results of treatment of patients with early fractures of the greater tibial condyle

Distant result period	Excellent		Good		Satisfactory	
	Mut	%	Mut	%	Mut	%
After 3 months	27	72.97	8	21.62	2	5.41

The condition of the patients was assessed by criteria such as bending-writing of the knee joint, stability at the frontal level, absence of pain when walking.

4. Conclusions

1. It has been shown that in the treatment of fractures of the large tibial bone, performing an operation under the control of an arthroscope allows you to fully see the changes in bone fragments and soft tissues, the state of the joint, the accuracy of repositioning can be maximally controlled, and it can be performed in a minimally invasive way.
2. The advantages of arthroscopy include the absence of scars on the skin after the procedure, the reduction of the risk of purulent complications, the absence of long-term use of plaster bandages, and the absence of contractures limiting movement in the knee joint.

3. When observing the results of arthroscopic treatment, a high result in 72.97% of cases, a good result in 21.62% of cases, and a satisfactory result in 5.41% of cases indicated the high efficiency of the long-term results of this method of treatment. This made it possible for early rehabilitation of patients and their return to work in a short period of time.



Figure 4. Radiographic view after arthroscopic surgery of a patient diagnosed with a fracture and displacement of the outer condyle of the left tibia, a partial tear of the anterior horn of the lateral meniscus (patient D. 37 years old, (case history # 8514)



Figure 5. Radiographic view of a patient diagnosed with a fracture and displacement of the outer condyle of the left tibia, a partial tear of the anterior horn of the lateral meniscus, 3 months after arthroscopic treatment (patient D. 37 years old, (case history No. 8514)

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