

COMPLICATIONS IN THE TREATMENT OF SEGMENTAL TIBIAL FRACTURES

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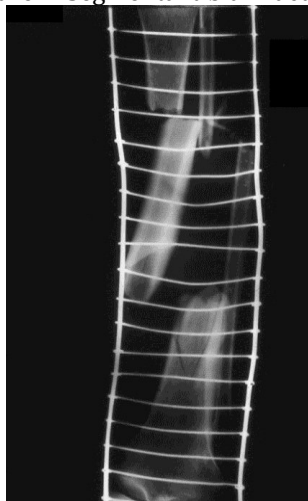
Summary: Segmental tibial fractures belong to the group of the most severe fractures of the locomotor system. They are most common in polytraumatized patients. Treatment of segmental tibial fractures can be conservative or operative. Treatment of segmental tibial fractures is accompanied by a number of complications, such as delayed healing, dislocation of fragments in one or the other fracture point, healing of fractures in poor position, non-healing of fractures, aseptic and septic pseudoarthrosis, infection around fixator wedges, wound infection of open segmental tibial fracture, iatrogenic infection, osteomyelitis, and limb amputation. The paper presents a female patient with a severe segmental tibial fracture on two levels, who was treated with external skeletal fixation. Without opening the fracture point, repositioning was performed in the proximal and distal part and the fractures were stabilized with an external skeletal fixator. After the operation, the patient was activated with underarm crutches with relief support on the injured leg. For the purpose of stimulating fracture healing, low molecular weight heparin, Fraxiparine (to prevent thrombosis and pulmonary thromboembolism) and Forticolinn were prescribed. After the fracture healed, the external skeletal fixator was removed and the patient returned to her working and living activities. At the follow-up examination five years after the segmental tibial fracture, the patient had a stable and firm support on the injured leg.

Key words: Segmental tibial fracture, external skeletal fixator, fracture stabilization, prevention of pulmonary thromboembolism, delayed fracture healing, five-year follow-up

INTRODUCTION

Segmental tibial fractures represent a break in the continuity of the bone tissue of the diaphysis of the tibia at two or more levels. In addition to comminuted fractures, they rank among the most severe fractures of the locomotor system. They most often occur under the influence of strong trauma in traffic and industrial trauma. Between the two levels of fracture on the tibia, there is an intermediate fragment, the part of the tibia that separates the two centres of fracture. The length of the intermediate fragment can vary from 3 to 20 centimetres (Figure 1).

Figure 1. Segmental tibial fracture.



Comminution can be present in both fracture points [1,2,3].

THE AIM OF THE PAPER

The aim of this paper is to present the treatment of a female patient with a segmental tibial fracture, by using the method of external skeletal fixation.

MATERIALS AND METHODS

The patient was treated at the Clinic for Orthopaedics and Traumatology of the Clinical Centre in Niš by using the method of external skeletal fixation, without opening the fracture point. After the operation, the patient was followed up for five years.

CASE REPORT

The forty-year-old female patient suffered a severe closed segmental tibial fracture after falling from a height (Figures 2 and 3).

Figures 2 and 3. Segmental tibial fracture, with two fracture points in the proximal and distal part of the tibia.



Right after admission, preoperative preparation was started and the patient was operated on; after repositioning under X-ray control, fracture stabilization was performed with two wedges in the proximal, two in the distal part of the tibia and two wedges in the intermediate fragment (Figures 4 and 5).

Figures 4 and 5. Segmental fracture stabilized by external skeletal fixator "Mitković", after fracture repositioning under X-ray control



During hospital treatment, the patient had the wounds regularly dressed around the wedges of the external skeletal fixator and activated with the help of underarm crutches. (figure 6).

Figure 6. Segmental tibial fracture stabilized by an external skeletal fixator.



After completing the hospital treatment, the patient was referred to physical therapy in Ribarska Spa. After completing the rehabilitation in the spa, the patient continued with the rehabilitation in the place of living. The support on the operated leg was gradually increased. Slowed fracture healing was registered in both the proximal and distal fracture points. After the fracture healed in both the proximal and distal part of the tibia, the external skeletal fixator was removed.

A control X-ray, five years after the fracture, shows a well-healed fracture (figures 7 and 8).

Figures 7 i 8. X-ray of the tibia five years after segmental fracture and external skeletal fixation.



Clinical examination revealed that there was no shortening of the injured leg, that there were no angular deformities and that the patient had a firm and stable support. (figures 9 and 10).

Figures 9 and 10. The legs are of equal length, without angular deformities, which enables stable and firm support on the injured leg.



DISCUSSION

According to the data from the literature, the frequency of segmental tibial fractures ranges from 1% do 6%.

In over 60% of cases, these are open tibial fractures. Segmental tibial fractures are rarely an isolated injury, and they are frequently found in polytraumatized patients [2,3].

Treatment of segmental tibial fractures can be conservative or operative. Conservative treatment is applied in non-dislocated segmental tibial fractures and in fractures that can be repositioned and kept in that position. Methods of conservative treatment are plaster immobilization, wedges incorporated in plaster and skeletal traction. Surgically, segmental tibial fractures can be treated with osteosynthesis with a plate and screws, intramedullary wedge and external skeletal fixation [4,5]. After repositioning of the segmental tibial fracture, without opening the fracture points, wedges are placed in the proximal, distal and the intermediate fragment under X-ray control.

Depending on the size, the intermediate fragment can be stabilized with two wedges, and if it is small, then with one wedge. The clamps and the fixator rod are installed and the segmental fracture is stabilized by an external skeletal fixator. The position of the fragments is checked once again in the operating room. The patient is prescribed low molecular weight heparin, Fraxiparine to prevent thrombosis and pulmonary thromboembolism and Forticolinn to stimulate fracture healing. In open segmental tibial fractures, in addition to the primary treatment of the open fracture wound, antibiotics covering both gram-negative and gram-positive flora are included (Longacef a 2g/24h and amp. Amicacin a 1g/24h, Metronidazole 500/8h). After the operation, the patient is activated with underarm crutches. Dressing of the wounds around the wedges of the external skeletal fixator is done for seven days. In case of infection around the wedges, dressing of the wounds is done more often [6, 7]. As the fracture heals, the support on the injured leg gradually increases. Physical therapy is performed in hospital or in an outpatient facility, with a gradual increase in support on the injured leg.

Treatment of segmental tibial fractures is accompanied by a number of complications, such as delayed healing of segmental fracture, dislocation of fragments in one or the other fracture point, healing of fractures in poor position, non-healing of fractures, aseptic and septic pseudoarthrosis, infection around the wedges of external skeletal fixator, wound infection of open segmental tibial fracture, iatrogenic infection, osteomyelitis, and limb amputation. [8,9,10].

CONCLUSION

Segmental tibial fractures belong to the group of the most severe fractures of the locomotor system. External skeletal fixation is one of the methods of treatment of both closed and open tibial

fractures. If possible, X-ray-controlled fracture repositioning should be performed, without opening the point of the segmental fracture. If it is an open segmental fracture, it is necessary to perform primary treatment of the open fracture wound, external skeletal fixation, prescribe anti-tetanus protection and antibiotic therapy (Longacef and Amicacin, Metronidazole 500m/8h). In both closed and open segmental fractures, low molecular weight heparin (Fraxiparine) is prescribed to prevent thrombosis and pulmonary thromboembolism, and Forticolinn in order to stimulate fracture healing.

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