



Preoperative Planning in Patella Fractures

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14.1 Conservative Versus Surgical Treatment

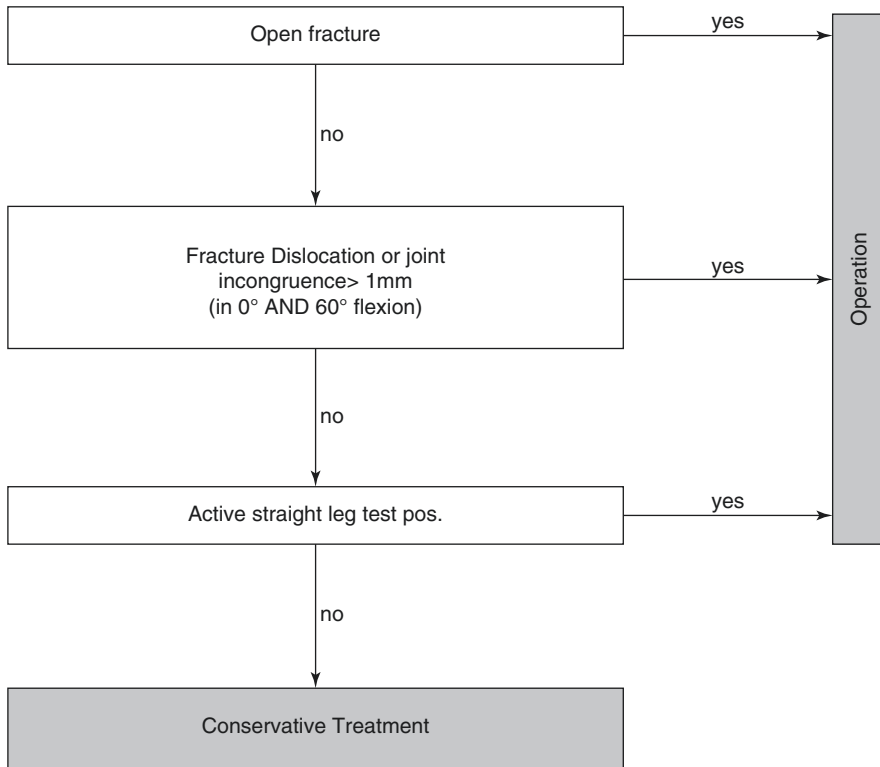
Undisplaced fractures of the patella are very rare. The reason wherefore is the tension on the extensor mechanism of the knee. Standing on one leg in a 90° bent knee position, the tension on the patellar ligament is about 2.9x of the bodyweight. This is why the majority of all patella fractures are getting secondary displaced [1].

Conservative treatment is only indicated in fractures that are undisplaced and stable. Braun et al. described three different fracture types that are suitable for conservative approach: (A) longitudinal fractures without incongruence of the articular surface with a lateral dislocation of less than 1 mm, (B) transverse fractures without involvement of the joint and (C) transverse fractures involving the joint but with fragment dislocation of less than 1 mm and incongruence in the articular surface of less than 1 mm [2]. These criteria should be met up to a 60° flexion of the knee, so that every patient should receive a dynamic testing of the fracture stability. A conservative treatment may only be indi-

cated if the extensor mechanism of the knee is intact. The superficial fibres of the quadriceps tendon as well as the retinacula must not be ruptured or insufficient. Contraindications for conservative treatment include open fractures as well as a disrupted extensor mechanism with the disability of active knee extension. Every patient undergoing conservative treatment should perform a negative active straight leg raise test [3].

If conservative treatment is indicated, patients should receive an immobilisation in a long leg splint for a few days until the initial pain is relieved. In cases of massive intra-articular effusions or tensed soft tissue above the joint, a therapeutic aspiration can be performed [2]. After that an early functional treatment is necessary. Passive movement up to 40° flexion can be performed under physiotherapeutic assistance. Boström et al. allowed their patients with conservative treatment full weight-bearing as tolerated in an extended knee position which showed satisfying results. 98% of all patients showed good or excellent results [4]. A hinged knee brace can be used to limit the maximum flexion of the knee to avoid a secondary dislocation of the fragments. Frequent radiological controls have to be performed to control the success of the conservative treatment. In case of secondary dislocation, a conversion to an operative strategy is necessary. If the 6-week radiological controls show an undisplaced fracture, the patient can start going back to normal activities with a full range of motion in the knee.

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Decision algorithm: conservative vs. surgical treatment

14.2 Timing of Surgical Treatment

The timing of the operation is mostly dependent on the soft tissue damage and the swelling of the injured knee. 25% of all patella fractures are associated with skin abrasions. In this case the operation should be postponed until the wound gets dry and shows no signs of infection. Open fractures occur in 6–13% of all cases [5]. As any other open fracture, it is a surgical emergency and needs immediate treatment including wound excision, debridement and primary wound closure with or without osteosynthesis. In cases of severe contamination of the wound, a two-stage treatment is recommended. Open patella fractures usually result from high-energy trauma. They are more often combined with other injuries, and patients with open patella fractures had

a significantly higher ISS [6]. Life-threatening injuries have to be treated first. Patella fractures can be treated after the patient has been stabilised.



Case: 34-year-old patient with an open patella fracture and superficial skin abrasion after primary surgical treatment with debridement and wound closure without osteosynthesis

14.3 Preoperative Planning

Prior to the surgical treatment, a precise planning of the strategy is useful. A variety of types of osteosynthesis is available. See Chap. 15 therefore. In case of multifragmentary fractures, a preoperative CT should be performed to get a better understanding of the fracture pattern. In case of an open fracture, we recommend a two-stage approach. If operated with open reduction and internal fixation in the first stage, deep infection rates are up to 10.7% [3]. In the acute situation, the wound should be excised and closed after taking microbiological smears. Postoperative antibiotics should be adjusted depending on the results of the microbiological tests. After consolidation of the soft tissue and in the absence of signs of infection, the osteosynthesis can be performed.

Operation is performed in a supine position. General or epidural anaesthesia can be used. Prophylactic perioperative antibiotics should be administered 30 min before the skin incision [7]. A tourniquet placed to the patient's thigh should

be used carefully due to the risk of fracture dislocation by compressing the quadriceps muscle.

References

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