

CLINICAL STUDY

High tibial osteotomy and debridement of the knee joint in treatment of varotic gonarthrosis

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Abstract

Background of the problem: We perform high tibial osteotomy with knee debridement and forage.

Goal: We evaluated the results of operations in 47 patients, who were operated from 1st January 1998 to 31st of December 2000.

Results: We examined the patients before operation and 2, 4, 6, 12, 24 and 30 months after it. The follow up was from 6 months to two and a half years after operation. The results after the operation were evaluated by both the patient (pain) and the doctor. The doctor evaluated the axial state of the extremity, the range of movement in the knee joint, present synovitis and the X-ray. The youngest woman was 52 years old, the oldest woman was 71 years old. The average age was 63.3 years. The youngest man was 25 years old, the oldest was 67 years old. The average age was 57.2 years. Patient's evaluation after the operation: 34 percent had no pain, 43 percent felt pain after excessive loading at the joint, 19 percent did not register any change and 4 reported increased pain. Doctor's evaluation: In 23 percent of patients, excellent results were achieved, 47 percent had good results, in 21 percent, they were satisfactory and in 9 percent, unsatisfactory results were recorded.

Conclusion: After the theoretic analysis and evaluation of the group of operated patients, the authors indicate the possibility to perform high tibial osteotomy with debridement and forage as a joint saving knee operation in varotic gonarthrosis. (Fig. 1, Ref. 6.)

Key words: gonarthrosis, debridement, high tibial osteotomy.

In the operative treatment of knee diseases, endoprothetics and arthroscopy became rather common. In younger patients, we achieve very good result with arthroscopy and debridement of the damaged and degenerated tissues. The final treatment of the knee pathology at higher age is knee arthroplasty. High tibial osteotomy is placed between these two methods when there is varotic gonarthrosis. In our Department we perform this operation in combination with the debridement of the knee joint in a open way in a single operation.

Material and methods

In our department decompensated varotic gonarthrosis with synovitis is an indication for high tibial osteotomy according to Coventry with debridement and forage. Before the operation we apply a tourniquet on the lower extremity. We make an S-shaped skin incision in a way to be able to achieve medial parapatellar approach to the knee joint and to make the proximal tibial meta-

physis accessible. After arthrotomy we revise the knee joint, we perform partial synovectomy, treat the damaged menisci and cut off osteophytes. We perform forage of the medial tibial condyle and patella. In cases of the 3rd degree of chondromalacia we perform forage of the cartilage according to Pridie with a Kirschner wire. In cases of chondromalacia of the 1st or 2nd degree, we perform forage according to Boeck. After synovectomy, we use an electrocauter to stop the bleeding from the vascular bed and we thoroughly rinse it. As a next step, we approach the proximal tibial metaphysis. We cut the proximal tibiofibular

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Fig. 1. X-ray of patient after high tibial osteotomy with debridement and forage in knee joint.

syndesmosis and with the Kirschner wire we mark the correct position of the wedge osteotomy with the basis on the lateral side according to the degree of the planned osteotomy. We control the correct position of Kirschner wires by means of X-ray. Then we perform high tibial wedge osteotomy of the metaphysis. The wedge we discard, and after partial fracture of the medial part of the cortical bone, we compress the fragments together. We use a T-shaped plate to fix the fragments and achieve good stability. We place 2 Redon drains into the wound, suture the wound in anatomic layers and wrap it in cotton and sterile bandage. Redon drains are left for 2 days, then the patient starts to train on a passive motion machine. Patients leave the hospital between the 10th and 14th day after operation. They use knee orthoses which are not locked. After six weeks, patients come back to our Department to train in order to strengthen their femoral muscles and to evaluate the healing of osteotomy. Further check-ups are scheduled after four, six and twelve months, then once each year.

Patient's evaluation of the pain

1. No pain at all
2. Pain when exposed to excessive loading of the joint
3. Pain identical with that before operation
4. Pain more severe than before operation

Doctor's evaluation of pain

1. Excellent result — the Mikulicz axis of the limb — ideal valgosity between 5 and 8 degrees, without synovitis, X-ray indicates no progression of varotic gonarthrosis, full range of movement.
2. Good result — the Mikulicz axis of the limb — without valgosity, synovitis, X-ray doesn't show progression of varotic gonarthrosis, full range of movement.
3. Satisfactory result — The Mikulicz axis of the limb — varosity between 5 to 8 degrees, intermittent synovitis, terminal limited flexion.
4. Unsatisfactory result — the Mikulicz axis of the limb — return to the stage before operation, permanent synovitis, on the X-ray — progression of the varotic gonarthrosis or pseudoarthrosis can be seen, limited range of movement.

Results

Total number of operations from 1st January 1998 to 31st December 2000 is 4647 (2969 women and 1951 man). 18 % of all operations were performed on knees (818 cases). Number of osteotomies with debridement in the knee joint is 47. The youngest female patient was 52, the oldest 71, average age was 63.3 years. The youngest male patient was 25, the oldest 67, average age was 57.2 years. The half year after operation 34 % of patients had no pain, 43 % of patients felt pain after excessive loading of the joint, 19 % of patients had unchanged pain and 4 % of the patients complained their pain has about increased. In doctor's evaluation of osteotomy from 6 months to two and half years after operation excellent results were achieved in 23 % of patients, good results were observed in 47 % of patients, satisfactory results were achieved in 21 % of patients, unsatisfactory results were in 9 % of patients. Figure 1 shows an X-ray of a patient after osteotomy according to Coventry with debridement.

Discussion

We characterise decompensated gonarthrosis as a complex of symptoms, which are present in gonarthrosis with synovitis and the feeling of pain. Gonarthrosis is a degenerative disease of the cartilage with a secondary effect on the synovial and fibrose parts of the joint capsule. When there is primary or secondary damage of the articular cartilage of biomechanical or biochemical etiology it successively results in chondromalacia, production of osteophytes, subchondral sclerosis and in the formation of geodes. We can even see venose hyperemia on MRI. The detritus from the cartilage and lysosomal enzymes irritate the synovial surface resulting in exudative and proliferative inflam-

mation. The joint capsule slowly loses its firmness. At the beginning, the contractures are due to pain, later they can be fixed. Very often, varotic gonarthrosis can be observed, which at the last stage can result in necrosis of the medial tibial condyle (1).

When the non-operative treatment of varotic gonarthrosis has failed, operative treatment is indicated. It consists of arthroscopy, partial synovectomy, cheilotomy and shaving of the cartilage, treatment of damaged ligaments and menisci, removal of free bodies, forage of the cartilage according to Pridie in case of 3rd degree chondromalacia, and forage according to Boeck in cases of 1st and 2nd degrees of chondromalacia (2). Denervation also participates in the relief of pain after operation.

One of the possibilities of the treatment of more progressive stages of varotic gonarthrosis is high tibial osteotomy in which the axis and the length of the extremity is corrected.

Aim of osteotomy is (3):

1. To increase of capability of the articular surface in order to bear the loading.
2. To change the loading of the joint by muscles.
3. To correct wrong axial position.
4. To prevention or remove venous hyperemia which probably causes more intensive pain. With this, we remove pain.
5. To stimulate the regenerative processes.
6. To prevent arthrosis when removing the uneven excessive loading caused by wrong statics.

The possibilities of high tibial osteotomy are:

1. Arch osteotomy and plaster fixation,
2. Arch osteotomy, osteosynthesis with staples, fixations with Kirschner wires and plaster fixation,
3. Wedge osteotomy, fixation with staples and plaster fixation,
4. Wedge osteotomy, fixation with a T-plate. This is stable osteosynthesis,
5. Osteotomy with ventralisation of the tibial tuberosity.

After evaluation of 106 high tibial osteotomies Naudie et al. (4) stated, that 5 years after osteotomy 73 % of the patients didn't need a total knee arthroplasty, after 10, 15 and 20 years no arthroplasty was needed in 51, 39 and 30 % of the patients, respectively.

Giagounidis and Sell (5) analysed 94 patients (112 knees), who were 9 years on the average (from 2 to 21 years) after the operation. The pain caused by walking was not recorded by 73 % of the patients.

Stutz et al. (5) combined high tibial osteotomy with anterior cruciate ligament plasty in 27 patients with good results.

Rinonapoli et al. (6) evaluated 102 high tibial osteotomies in 99 patients 15 years on the average after the operations. Excellent and good results were reported in 55 % of patients, satisfactory and unsatisfactory results in 45 % of patients.

Patients have to be precisely informed about advantages and risks of the operation. The doctor had to speak with the patients, because the indicated operation will affect the patient's private and professional life. The operation can be performed only after this explanation and when they compare together the results of both operative and non-operative treatments. In this way they can overcome dissatisfaction, especially when the patient expects too optimistic results from the operation.

With the use of high tibial osteotomy, we are very successful in the treatment of decompensated gonarthrosis with angulation. The best results in varotic gonarthrosis are achieved with high tibial valgotic wedge osteotomy of the metaphysis with a T plate used for fixation. We have achieved stable osteosynthesis and we do not need to use plaster. Before osteotomy we perform the revision of the knee joint with partial synovectomy, cheilotomy, debridement, removal of free bodies, meniscectomy with forage of patella and medial tibial condyle according to Boeck. 48 hours after the operation the patient starts with continual passive motion. He uses crutches without bearing the weight on the treated extremity.

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