Surgical technique for treatment of concomitant grade II MCL lesion in patients with ACL rupture

Fabian Blanke, Lutz Vonwehren, Geert Pagenstert, Victor Valderrabano, Martin Majewski

INTRODUCTION

The medial collateral ligament (MCL) and the anterior cruciate ligament (ACL) are the most commonly injured ligaments of the knee (20). Combined ACL and MCL lesions are frequent (4,6). While surgical treatment of ACL injury is well established to allow individuals to return to demanding activities treatment of concomitant MCL lesions is discussed controversial in literature (7,25,29). Conservative treatment of concomitant grade I MCL lesions and surgical treatment of concomitant grade III MCL lesions are generally accepted (6,7). Treatment regime of concomitant grade II MCL lesions remains unclear with tendency to surgical intervention (7,19,32). However, a standard surgical technique for grade II MCL lesions does not exist. This study wants to suggest a surgical technique for grade II concomitant MCL lesions and present short term outcome results.
SUBJECTS AND METHODS

Subjects

5 patients who sustained acute ACL rupture and grade II MCL-tear were included. All patients gave informed consent to participate in the study. This clinical study had been approved by the institutional review board of our hospital before commencement. All patients underwent beside single bundle ACL-reconstruction surgical treatment of MCL in below described technique. The indication for surgical treatment of MCL were determined 6 weeks posttraumatic when patients showed persisting grade II lesion of MCL according to Fetto and Marshall (6). All surgeries were performed by 1 senior surgeon and the same protocol was used for postoperative rehabilitation. All patients were followed up after 6, 16 weeks and 9 months postoperative. Patients with concomitant meniscal or chondral lesions, history of other knee injuries or of surgical treatment of lower extremity as well as patients with general diseases were excluded. The 5 patients included 2 men and 3 women with a mean age of 39.6 years (range, 28-49 years) at the time of surgery. All causes of injury were sports-related injuries.

Surgical Procedure

After the knee was examined under general anesthesia, a routine diagnostic arthroscopic procedure was done through anterolateral portal with the tourniquet inflated. Longitudinal Incision was made over pes anserinus with cranial extension to prepare semitendinosus tendon graft harvesting as well as distal and medially part of MCL. (Fig. 1) Single-bundle ACL reconstruction was performed in outside-in technique by transtibial drilling for tibial socket and anteromedial drilling for femoral socket. Femoral and tibial fixation was done by Flip-Tack technique. After ACL reconstruction subtle preparation of MCL was continued and independent of location of the MCL-lesion the medially part of the MCL was doubled and loaded with two fiber wire sutures in circumferential cross stitch technique (Fig. 2). Then MCL was detached distally and tibial head was debrided with cortical microfracturing. Subsequently MCL was tensioned and pulled distally while continuous varus stress was applied to ipsilateral knee joint. After that MCL was reattached with one or two blocking screws in foot print area and surplus ligamentous material was distally removed (Fig. 3). Finally above layers were reconstructed to allow regular healing and prevent tissue adhesion.

Clinical Evaluation

Preoperative and in follow-up visits all patients underwent examination with the Valgus-Stress-Test, Lachman-Test, Pivot-Shift-Test and Range-Of-Motion (ROM) assessment; additionally International Knee Documentation Committee (IKDC) scores were evaluated. Valgus-Stress testing and classification of grade of MCL lesion was done according to Fetto and Marshall (6). Concerning the overall evaluation of the knee, the International Knee Documentation Committee (IKDC) evaluation form and Lysholm-Knee-Scoring-Scale were used to evaluate postoperative knee function such as symptoms, stability and daily activities (12,30). Complications, including allograft failure and infection were documented.
Postoperative Care and Rehabilitation

A compressive ice wrap was applied first 24 to 48 hours after surgery, to eliminate swelling. All Patients were allowed to have active-assisted or passive mobilization allowing F/E 0-10°-70° of range of motion 24 hours after surgery. During the first 4 weeks weight bearing with 20 kg was permitted and the knee was protected with a knee brace allowing above mentioned range of motion. From 4 to 6 weeks the patients were allowed to perform active ROM exercises and weight bearing was permitted within the patients’ tolerance. After 6 weeks mobilization with full range of motion was allowed. After 3 months the patients started progressive activities and were weaned off brace use gradually.

RESULTS

Valgus Instability

Preoperative stress valgus testing of the injured knee showed grade II medial instability respectively no firm endpoint in 30° flexion in all cases. The medial stability had distinctly improved at recent follow-up with valgus instability grade A in all patients according to IKDC (Tables I and II). Regarding IKDC medial instability scores all patients (5 patients) had grade A postoperatively, whereas 1 patient (20%) showed grade C and 4 patients (80%) grade B preoperatively.

IKDC ROM Score and Lysholm Score

Before our surgical treatment all patients had full extension and flexion, which were graded as normal. At final follow-up all patients had no problems in activities of daily living with normal ROM (Table I). All Patients (n = 5) reached full range of motion in flexion and extension equivalent to grade A according to IKDC-Score. The overall Lysholm-Score averaged 94.6 ± 3.57 points (range, 90-100 points) postoperatively.

Anteroposterior Instability and Pivot Shift Test

The results of clinical examination regarding the Lachman- and Pivot-Shift-Tests were clearly improved when compared to preoperative status. At final follow-up 5 of 5 patients (100%) had a negative Lachman-Test or grade A IKDC result and all patients had a negative Pivot-Shift-Test and were graded as A according to IKDC-Scores.

Other complications

No infections, wound complications or other complications were found at our recent follow-up. No revision surgery needed to be done.

DISCUSSION

Presented surgical technique improved both, valgus and anterior stability and led to excellent short term results in patients with concomitant grade II MCL lesion. Insufficient treatment of concomitant MCL lesion can lead to persistent instability or failure of reconstructed ACL (1,15,26,31). Therefore invasive treatment of concomitant MCL lesions has to be considered especially in sports-active patients. In ACL-rupture and concomitant grade I MCL tear most authors are agreed that conservative treatment for MCL is recommended (7,17,19). Equally in concomitant grade III lesion there is a consensus for reconstructive treatment because of complete damage to superficial und deeper layers of MCL and good results after surgical treatment (2,3,14,22,27). Treatment regime of concomitant grade II MCL lesions remains unclear with tendency to surgical
because of thickness and rigidity of collagenous structures. Location of MCL injury is not important with this surgical technique. All Patients who were treated with presented surgical technique showed excellent clinical results at the follow-up examinations. All patients showed valgus instability grade A according to IKDC. Most patients had normal range of motion and in all 5 patients (100%) the findings were graded as normal or nearly normal according to IKDC knee examination form.

Present study has some limitations. Sample size is small and only short term results are provided. However a concomitant grade II MCL lesion is a particular injury pattern and available data is rare. Moreover this article focus on presentation of surgical technique and short term results are of special interest in this kind of lesion because especially athletes are affected. Nonetheless further investigations with controlled trials are preferable to validate significance of this surgical technique.

**CONCLUSION**

Presented surgical technique improved both, valgus and anterior stability and led to excellent short term results in patients with concomitant grade II MCL lesion.

**REFERENCES**


