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Commentary

Primary Repair of Intraoperative Medial Collateral Ligament Tear during Medial Pie-Crusting Technique in Total Knee Arthroplasty with Varus Deformity

Mohammadreza Piri Ardakani[1,*], Mehdi Motififard[1], Erfan Sheikhbahaei[2]

[1] Resident, Department of Orthopedic Surgery, Ayatollah Kashani Hospital, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran
[2] Student Research Committee, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran

[*]Corresponding author: Mohammadreza Piri Ardakani; Department of Orthopedic Surgery, Ayatollah Kashani Hospital, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran. Tel: +98-9132483702, Email: pirimd@yahoo.com

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Background

In total knee arthroplasty (TKA), the optimum kinematic and functional outcomes are achieved by restoring the balance between the medial and lateral compartment. In case of encountering varus alignment, the medial collateral ligament (MCL) and medial soft tissue release are often required to obtain the balance (1). Using the pie-crusting technique for MCL release for varus deformity correction during TKA has gained popularity among some surgeons recently (2-4). However, algorithmic medial pie-crusting technique has not become widespread achieving balanced medial and lateral soft tissue during TKA due to the risk of technique induced mid-substance superficial medial collateral ligament (sMCL) tear. Moreover, progressive mechanical weakening of the MCL can result in knee instability (5, 6). However, there is no clinical data available to validate the safety of this technique.

Motififard et al. have recently conducted a study on patients with varus deformity, undergoing medial pie-crusting technique during TKA to investigate the rate of the iatrogenic mid-substance sMCL tear. They have evaluated the Knee Society Clinical Rating System (KSS), range of motion (ROM), and instability rate between the sMCL repaired group and control group with intact sMCL. During the medial soft-tissue release, they have performed multiple needle puncturing technique on 653 knees (out of 1,768) and reported 35 (5%) cases of iatrogenic tear. Repairing the tears with nonabsorbable sutures yield good clinical consequences based on knee ROM and KSS (7).

Discussion

Ten years after the introduction of the medial pie-crusting technique by Verdonk et al. (4) for medial balancing in varus TKA, it is still not widely accepted among arthroplasty surgeons due to the fear of MCL failure and knee instability.

The study conducted by Motififard et al. (7) is the first large study assessing the rate of MCL mid-substance tear due to the medial pie-crusting. According to this article, 5% of the patients experienced excessive medial opening. Unfortunately, there is no agreement among authors on the best choice for managing intraoperative iatrogenic MCL mid-substance tear. Different options have been suggested previously, including conservative management, thicker polyethylene insert, repairing with sutures, augmentation with autograft tendons, and constrained condylar knee (CCK) prostheses. CCK prosthesis is included as one of the expensive orthopedic devices and is not at hand in all medical centers. Moreover, constrained prosthesis endangers the patient with increased risk of osteolysis, aseptic loosening, and increased wear (8, 9).

Evidence has suggested using tendon repair or reefing with sutures during the surgery instead of CCK prosthesis. Although there are some successful results reported, literature lacks sufficient evidences in this area (10, 11). No clinical outcomes of repairing mid-substance sMCL tear caused by the medial pie-crusting technique have been reported so far. They found no significant difference in postoperative ROM and KSS between the repaired joints and control. After 24 months of follow-up without losing any patient in the study group, there was no sagittal instability. However, coronal instability was detected in 5 (14.2%) knees. Revision surgery of the CCK prosthesis was performed for three patients after a mean of 5.3 months (range: 4.5-6.5 months) and two patients did not accept the revision surgery, preferring a life-long brace.

As stated above, this study faced two main limitations. First, there was no control group for patients undergoing TKA without medial pie-crusting. Second, no valgus stress radiographs were used in the postoperative evaluations to assess the medial joint.

In conclusion, throughout the medial pie-crusting technique in patients with varus deformity, mid-substance rupture of sMCL should be accounted as an important intraoperative complication. Although the outcome of repairing tear with a nonabsorbable suture was satisfactory, there is an eventuality of failure that should be noted.

Conflict of Interest

The authors declare no conflict of interest in this study.

Acknowledgments

None.

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