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Original article

Surgical management of combined anterior or posterior cruciate ligament and posterolateral corner tears: For what functional results?

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ABSTRACT

Introduction: Management of combined anterior or posterior cruciate ligament and posterolateral corner tears is still poorly codified. The aim of this study was to evaluate functional outcome after complete surgical treatment.
Materials and methods: This retrospective multicenter study included 53 patients. Mean age was 29.8 yrs. (15–49). The anterior and posterior cruciate ligaments were involved in respectively 48 and 5 cases. Mean time to surgery was 25.6 months (0–184), and in 10 cases less than 21 days. Nine patients were sedentary workers and 29 non-sedentary (13 laborers). All ligament injuries were treated surgically. Mean follow-up was 49 months (12–146). Last follow-up assessment used IKDC, Lysholm and KOOS scores.
Results: At last follow-up, IKDC score graded 14 patients A, 25 B, 8 C and 6 D, versus 0 A, 4 B, 25 C, 22 D and 2 ungraded preoperatively. Mean subjective IKDC and Lysholm scores were respectively 72.8 (11.5–100) and 77.5 (37–100). Mean KOOS scores (pain, symptoms, daily life, sports, quality of life) were respectively 78 (3–100), 70 (25–100), 88 (47–100), 53 (0–100) and 50 (0–100). Posterolateral laxity was corrected in all but two cases. All sedentary workers and 86.7% of non-sedentary workers could return to work. The job had to be changed in 10% of cases overall, but in 25% of cases for laborers.
Discussion: The present results are comparable with those of the literature. The strategy of combined surgical treatment showed functional efficacy, usually associated with return to work except for some laborers. There was a non-significant trend in favor of acute-phase ligament reconstruction.
Level of evidence: IV (retrospective series).

1. Introduction

Lesions of the posterolateral corner (PLC) of the knee represent 16% of acute knee ligament lesions. Around 2.1% are isolated and 52% associated with multiligament lesions [1]. Combined lesions cause severe functional impairment [2,3]. If untreated or badly treated, they induce long-term alterations in intra-articular effort

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patterns that may lead to osteoarthritis [4,5]. In the short to medium term, if overlooked, they cause failure in central pivot reconstructions [6,7]. They are often difficult to discern in emergency contexts, and are diagnosed only in their chronic phase [8]. Treatment is as yet poorly codified, with no reference attitude. The literature resists analysis, as studies generally mix together medial and lateral multiligament lesions [9], chronic and acute lesions [10], and lesions of both or of only one cruciate ligament [11]. The current attitude favors acute-phase treatment and reconstruction rather than repair [12,13]. The present study sought to assess functional results after surgical management of combined lesions involving the PLC and the anterior (ACL) or posterior (PCL) cruciate ligament.

2. Material and method

A multicenter retrospective study was conducted in 7 French institutions. All patients operated on between 2001 and 2012 for PLC instability with associated ACL or PCL reconstruction were recruited. Inclusion criteria comprised: lesion of at least one PLC structure (lateral collateral ligament (LCL), popliteal tendon (PT), popliteal-fibular ligament (PFL), lateral posterior capsule (LPC)) associated with isolated lesion of one element of the central pivot (ACL or PCL) [14]; PLC lesion or lesions treated surgically (ligamentoplasty and/or suture and/or tibial valgization osteotomy); and minimum 12 months' follow-up. Surgery might be indicated in the acute-phase (< 21 days), or later in case of complaint of instability. Exclusion criteria comprised: bicruciate lesion, isolated PLC lesion and PLC lesion managed non-operatively.

The series comprised 53 patients (46 male, 7 female), with a mean age at surgery of 29.8 years (range, 15–49 years). The initial lesion mechanism was a sports accident in 64% of cases and a road accident in 26.4%. Mean trauma-to-surgery interval was 25.6 months (range 0–184 months). Ten patients (18.9%) were operated on earlier than day 21 (6 repairs and 4 first-line reconstructions). The central pivot lesion involved the ACL in 48 cases and the PCL in 5.

Thirty-eight of the 53 patients were in work at the time of the accident: 9 sedentary, 29 non-sedentary; 13 of the non-sedentary workers were laborers and 4 professional athletes.

Clinical diagnosis of PLC lesion was founded on differential lateral laxity exceeding 10° in forced varus in extension and 20° in flexion and/or > 15° differential external hyper-rotation on dial-test at 30° and 90° flexion in prone position [14]. ACL assessment comprised Lachman test at 20°, and jerk test. PCL assessment comprised screening for anterior tibial tuberosity posterior sag sign and posterior drawer in 70° flexion. MRI was performed systematically to determine whether the ACL or PCL lesion was isolated and to explore for any associated meniscal lesion. The complete examination was recorded on an International Knee Documentation Committee (IKDC) form [15]. Knee function was assessed on subjective IKDC score (0–100).

All central pivot lesions were managed by autograft reconstruction using conventional techniques (bone-tendon-bone graft, hamstring, quadriceps tendon). All PLC lesions were managed surgically. In 15% of cases (8/53), PLC lesions were managed by repair and in 85% by reconstruction. Repair used direct suture or bone reinsertion with bone anchors. Reconstruction used "anatomic" plasty to reconstruct the affected structure or structures. Grafts were autologous (hamstring (gracilis and/or semitendinosus) tendon, or fascia-lata); no allografts were used.

Postoperative care included 6 weeks' complete non-weight-bearing in 73.5% of cases and 3 weeks' in 26.5%. Rehabilitation sessions in 0–90° flexion were allowed immediately in 86.8% of cases; otherwise, rehabilitation was initiated only after 3 weeks' immobilization. After this initial phase, rehabilitation was continued with the patient using an articulated brace, worn for a mean 16 weeks (range, 12–24 weeks).

All patients were followed up clinically in their original institution by an observer independent with regard to the surgeon. Mean follow-up was 49 months (range, 12–146 months). Assessment at last follow-up comprised subjective and objective IKDC, Lysholm and KOOS scores. PLC clinical examination comprised assessment of laxity in varus (in extension and in flexion) and in external rotation on dial-test at 30° and 90°. Return to work or occupational change and any postoperative complications were recorded.

Statistical analysis used Excel™ software (Microsoft, Redmond, WA, USA). Matched pairs analysis used Student *t*-test or Wilcoxon test as applicable. The significance threshold was set at 5%. The impact of time to surgery and of surgical technique (reconstruction versus isolated direct suture) was studied for the PLC.

The study hypothesis was that functional results after treatment of combined PLC and ACL or PCL lesion systematically allow resumption of daily life and occupational activity under pre-trauma conditions.

The principal assessment criterion was the patient's subjective IKDC score. Secondary criteria were clinical correction of posterolateral instability, and return to work.

3. Results

3.1. Complications

Complications comprised: 4 cases of postoperative stiffness, treated by 2 arthroscopic arthrolyses and 2 mobilizations under anesthesia; 2 infections (1 superficial); and 1 compressive hematoma inducing peroneal nerve palsy, resolved by surgical evacuation and neurolysis.

There were 4 secondary meniscal lesions: 3 medial and 1 lateral. Three occurred in reconstruction-group patients and 1 in the repair group. Management was medial meniscectomy in 2 cases and abstention in 2 cases.

Functional results at last follow-up are shown in Table 1.

3.2. Subjective assessment

Only 4 patients had complete preoperative subjective IKDC scores: 30, 30, 28 and 61.

At last follow-up, mean corrected subjective IKDC score was 72.8 (range, 11.5–100). The poorest result (11.5) was in a patient with advanced osteoarthritis related to schuss skiing accidents. Mean corrected subjective IKDC score was 72.3 (range, 11.5–100) in the PLC + ACL group and 82.1 (64.4–97.7) in the PLC + PCL group.

Table 1
Global functional results.

	Whole series				PLC/ACL lesion ($n = 48$)				PLC/PCL lesion ($n = 5$)			
Objective IKDC score	A	B	C	D	A	B	C	D	A	B	C	D
	14	25	8	6	13	23	7	5	1	2	1	1
Subjective IKDC score	72.8 (range, 11.5–100)				72.3 (range, 11.5–100)				82.1 (range, 64.4–97.7)			
Lysholm score	77.5 (range, 37–100)				76.83 (range, 37–100)				89 (range, 86–96)			

PLC: posterolateral corner; ACL: anterior cruciate ligament; PCL: posterior cruciate ligament.