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Original article

Short-term complications in intra- and extra-articular anterior cruciate ligament reconstruction. Comparison with the literature on isolated intra-articular reconstruction. A multicenter study by the French Society of Arthroscopy

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ABSTRACT

Introduction: Lateral tenodesis (LT) is performed to limit the risk of iterative tear following anterior cruciate ligament (ACL) reconstruction in at-risk patients. By adding an extra procedure to isolated ACL graft, LT reconstruction increases operating time and may complicate postoperative course. The objective of the present study was to evaluate the rate of early complications. The study hypothesis was that associating ALL reconstruction to ACL reconstruction does not increase the complications rate found with isolated ACL reconstruction.

Material and methods: A prospective multicenter study included 392 patients: 70% male; mean age, 29.9 years; treated by associated ACL and LT reconstruction. All adverse events were inventoried.

Results: Mean hospital stay was 2 days, with 46% day-surgery. Walking was resumed at a mean 27 days, with an advantage for patients treated by the hamstring technique. The early postoperative complications rate was 12%, with 1.7% specifically implicating LT reconstruction: pain, hematoma, stiffness in flexion and extension, and infection. There was a 5% rate of surgical revision during the first year, predominantly comprising arthrolysis for extension deficit. The 1-year recurrence rate was 2.8%.

Discussion: The complications rate for combined intra- and extra-articular reconstruction was no higher than for isolated intra-articular ACL reconstruction, with no increase in infection or stiffness rates. The rate of complications specific to ALL reconstruction was low, at 1.7%, and mainly involved fixation error causing lateral soft-tissue impingement.

Level of evidence: IV, prospective multicenter study.

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1. Introduction

The “rediscovery” of the anterolateral ligament (ALL) of the knee [1] has provided anatomic evidence for the biomechanical principle of extra-articular reconstruction or lateral tenodesis (LT). This is systematically associated to intra-articular anterior cruciate ligament (ACL) reconstruction, in a combined technique (ACL-LT). There has been renewed interest for this approach, as results with isolated intra-articular ACL reconstruction were not always excellent, with residual rotational instability, leading to repeat tear [2,3] and onset of degenerative lesions [2].

There are, however, few studies of recent combined reconstruction techniques [4–8]. The scientific committee of the French Society of Arthroscopy (SFA) therefore decided that a dedicated symposium was needed.

The objective of the present study was to evaluate early complications rates in combined intra- and extra-articular reconstruction compared to the literature data on isolated intra-articular ACL reconstruction.

The hypothesis of this study, coming under the aegis of the symposium, was that combined reconstruction is not associated with specific complications.

2. Material and methods

Thirteen centers regularly performing combined ACL–LT reconstruction took part in a prospective study that included 592 cases with a minimum 1-year’s follow-up, inventorying short- and medium-term complications.

2.1. Series

Immediate postoperative course and early complications were analyzed in a prospective multicenter study between June 2014 and June 2015, involving 13 centers. Indications were at the surgeon’s discretion: degree of anterior laxity on preoperative laximetry, explosive rotational snap, duration of instability, high-risk sports activity, young age, or systematic indication for combined reconstruction.

Revision surgeries were excluded.

The series comprised 392 patients, 70% male. Mean age at surgery was 29 ± 11 years (range, 14–69 years) and mean trauma-to-surgery interval was 22 ± 39 months (range, 1 day to 51 months). Sports activity consisted in pivot sport in more than 90% of cases (Fig. 1). Forty-three percent of those with sports activity played professional or competition sport (Fig. 2).

Mean preoperative subjective International Knee Documentation Committee (IKDC) score was 55 ± 16 (range, 12–98), with 97% of patients graded C or D (Fig. 3). Mean Lysholm–Tegner score was 69 ± 17 (range, 7–95). Preoperative jerk test was clunk or gross in 80% of cases; the intraoperative rate under anesthesia was almost identical, at 84%.

Fifty-four percent of patients had a meniscal lesion; the medial meniscus was conserved in 54% of cases and the lateral meniscus in 50%. Thirty-six percent of medial and 32% of lateral meniscus lesions were repaired. Eighteen percent of medial and lateral meniscus lesions were left in situ without treatment, appearing stable on arthroscopy.

Most patients had normal X-rays, only 5% showing signs of incipient osteoarthritis.

2.2. Surgical techniques

ACL reconstruction was performed under arthroscopy, and LT reconstruction was open surgery. The two were continuous, with a single graft, in 184 cases, and separate, with 2 grafts, in 208

cases (Figs. 4 and 5). Several techniques were used, according to the surgeon’s habits.

2.3. Assessment

Systematic pre- and postoperative assessment comprised:

- range of motion: flexion deficit at 1, 3 and 6 months and 1 year postoperatively. From month 3, flexion deficit was graded as: 1, 0–5°; 2, 6–15°; 3, 16–25°; or 4, > 25°;
- extension was likewise graded as: 1, < 3°; 2, 3–5°; 3, 6–10°; or 4, > 10°;
- Lachman test, jerk test, differential laximetry on KT 1000™ arthrometry or Telos™ stress radiography, objective and subjective IKDC scores and Lysholm–Tegner score were assessed;
- time to recovery of gait and climbing up and down stairs;
- all adverse events, whether spontaneously resolving (pain, effusion, etc.) or requiring revision (joint lavage, material ablation, etc.);
- iterative tear was defined by instability, whether implicating a known accident or not, increased laxity, and MRI confirmation of diagnosis.

2.4. Statistical analysis

Normality of distribution was checked on Shapiro–Wilk test. Qualitative variables were compared between groups on Chi² or Fisher exact test, as appropriate. For quantitative variables, distributions were compared by non-matched Student *t*-test, or by non-parametric Mann–Whitney test in case of non-normal distribution. The significance threshold was set at 0.05.

Analyses used SAS 9.1.3 software (SAS Institute, Cary, NC, USA).

3. Results

3.1. Return to daily activity

Mean hospital stay was 2 days (range, 1–6 days), with 46% day-surgery. Twenty-one percent of patients required 2 days’ stay, and 19% 3 days.

Gait was recovered at a mean 26.8 days, and more rapidly (18 days) in case of hamstring graft ($P < 0.0001$). Among the patients, 42.4% normal gait at 21 days.

Climbing up stairs was resumed at a mean 29.2 days, and more quickly (22 days) following hamstring graft ($P < 0.0001$). Sixty-five percent of patients could climb up stairs normally at 1 month. Climbing down stairs took longer, at 36.5 days (or 26 days in case of hamstring graft; $P < 0.0001$). Among the patients, 68.5% could climb down stairs normally at 1.5 months. Thus, a large majority of patients recovered normal everyday life around the end of the first month.

Among the patients, 82.5% had returned to work within 3 months.

3.2. Range of motion

At 1 month, 9.3% of patients had flexion below the 1-month target of 120°; 2% had grade-2 deficit at 3 months, and 0.2% at 6 months. All knees were grade 1 by 1 year. Two patients underwent knee mobilization under anesthesia due to stiffness during the first year.

At 1 month, 5% of patients had grade-2 extension deficit, with less than 1% grade 3 or 4; at least 1.6% had extension deficit at 3 months, 1% at 6 months, and none at 1 year. There were 4 arthroscopic arthrolyses (1%) to restore extension.

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