

Revision Rates and Trends in Diagnosis and Management of Combined Anterior Cruciate Ligament and Medial Collateral Ligament Injuries

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INTRODUCTION:

Combined anterior cruciate ligament (ACL) and medial collateral ligament (MCL) injuries represent the most common variant of multiligament knee injuries, however, the management of these injuries remains controversial. Concomitant injuries are frequently treated with reconstruction of the ACL and nonsurgical management of the MCL. The purpose of this study was to determine if patients undergoing ACL reconstruction with a nonsurgically managed MCL tear are at increased risk of requiring revision ACL reconstruction or other reoperations in comparison to patients with isolated ACL injuries.

METHODS:

Patients were identified using a large insurance company all-payer claims database. This is a retrospective, nationwide insurance billing database that provides deidentified, patient-specific claims for up to 151 million patients. The data base was queried using CPT codes to identify adult patients who had undergone ACL reconstruction after 2016. ICD-10 codes were utilized to divide these patients into cohorts with and without concomitant MCL injury. Patients who underwent extra-articular ligament repair or reconstruction were excluded, allowing us identify a cohort who had undergone ACL reconstruction in addition to a nonsurgically managed MCL injury. This cohort was compared to patients undergoing isolated ACL reconstruction. Patients undergoing revision surgery, those with posterior cruciate ligament injury, posterior lateral corner injury, isolated lateral collateral ligament injury, or knee dislocation were also excluded. ICD-10 and CPT codes were used to identify return to the operating room over a 2-year period for revision ACL reconstruction, lysis of adhesions, synovectomy, manipulation under anesthesia (MUA), loose body removal, chondral debridement, and meniscus debridement/repair. The ACL revision rate and the rate of return to the operating room for each listed procedure was then calculated and compared between the two groups. In addition, the frequency of diagnosis of concomitant MCL injury in association with ACL rupture was tracked over the five-year study interval. Finally, CPT codes were used to evaluate trends in the treatment of the concomitant MCL injuries, including reconstruction, repair, and nonsurgical management.

RESULTS:

A total of 46,772 patients with isolated ACL reconstruction were identified and compared with the 5,140 identified patients who underwent ACL reconstruction with a nonsurgically managed MCL injury. Patients who underwent ACL reconstruction with a concomitant nonsurgically managed MCL injury were statistically more likely to require ACL revision over a two-year follow-up period (10.5% vs. 8.5%; $p < 0.001$). Patients with concomitant MCL injuries were also statistically more likely to require MUA (1.2% vs. 0.8%; $p = 0.005$), lysis of adhesions (1.8% vs. 1.3%; $p = 0.002$), synovectomy (0.8% vs. 0.5%; $p = 0.009$), and partial meniscectomy (7.0% vs. 6.1%; $p = 0.014$) (Table 1). The frequency of concomitant MCL diagnosis also increased over the 5-year study period (9.0% to 10.6%; $p < 0.001$) (Table 2). No significant difference was identified in treatment of the associated MCL injury over time, with greater than 95% of the MCL injuries being managed nonsurgically in each year of the study period (Table 3).

DISCUSSION AND CONCLUSION: While nonsurgical treatment of the MCL injury is appropriate for many patients with combined ACL and MCL injuries, these patients may be at increased risk of requiring revision ACL surgery. The rate of procedures to address postsurgical scar tissue and stiffness including MUA, lysis of adhesions, and synovectomy was also higher in patients with concomitant MCL injury.

Table 1. Reoperation Rates in Patients with Isolated ACL Injury vs. Concomitant MCL Injury

	N	ACL only 46772	ACL with MCL associated injury 5140	p-value
Gender				
	Female	24067 (51.5)	2802 (54.5)	
	Male	22705 (48.6)	2338 (45.5)	
2 year surgical interventions				
	ACL Revision	3979 (8.5)	538 (10.5)	<0.001
	Partial Synovectomy-120	227 (0.5)	39 (0.8)	0.009
	Full Synovectomy-120	341 (0.7)	48 (0.9)	0.106
	Lysis of Adhesions	589 (1.3)	91 (1.8)	0.002
	Loose Body	257 (0.6)	25 (0.5)	0.558
	MUA	379 (0.8)	61 (1.2)	0.005
	Debridement/Chondroplasty	752 (1.6)	106 (2.1)	0.015
	meniscectomy	2850 (6.1)	358 (7.0)	0.014
	meniscus repair	740 (1.6)	98 (1.9)	0.08

Table 2: Rates of Diagnosis of Concomitant MCL Injury

	N	ACL only 46772	ACL with MCL associated injury 5140	p-value
Gender				
	Female	24067 (51.5)	2802 (54.5)	
	Male	22705 (48.6)	2338 (45.5)	
Year				<0.001
	2016	9998 (91.0)	988 (9.0)	
	2017	9647 (90.3)	1044 (9.7)	
	2018	9395 (90.6)	978 (9.4)	
	2019	10101 (89.2)	1227 (10.8)	
	2020	7611 (89.4)	903 (10.6)	

Table 3. Trends in Management of MCL Injury in Patients with ACL Tears

	N	ACL with MCL reconstruction 26	ACL with MCL repair 72	ACL non-op for MCL 5045	p-value
Gender					
	Female	13 (50.0%)	36 (50.0%)	2755 (54.4)	
	Male	13 (50.0%)	36 (50.0%)	2290 (45.4)	
Year					0.800
	2016	2 (0.2)	16 (1.4)	970 (98.2)	
	2017	5 (0.5)	17 (1.6)	1022 (97.9)	
	2018	4 (0.4)	12 (1.2)	962 (98.4)	
	2019	8 (0.7)	18 (1.5)	1263 (97.8)	
	2020	4 (0.4)	9 (1.0)	896 (98.6)	