

Usage Trends, Reoperation Rates, and Complication Rates in Meniscus Allograft Transplantation from 2010 to 2020

Kevin Tang¹, Wesley Day¹, Peter Y Joo², Christopher Wilhelm, Sercan Yalcin, Christina R Allen, Jonathan N Grauer, Michael Medvecky³

¹Albert Einstein College of Medicine, ²Yale New Haven Health, ³Yale Univ School of Med

INTRODUCTION:

Meniscus allograft transplantation (MAT) may be considered for the meniscal deficient knee in younger patients with symptomatic pain. Due to the infrequency of this procedure, prior studies have been limited to small cohorts or database studies with other limitations. To address these limitations, the present study leveraged a large national database to determine the (1) usage trend, (2) 90-day adverse event profile, and (3) 2-year and 5-year reoperation rates of this procedure.

METHODS:

The PearlDiver Mariner91 database from 2010 to Q3 2020 was used to query patients undergoing MAT (Current Procedural Terminology code 29868). Patients with concomitant ligamentous, bony, or cartilaginous reconstructive procedures were excluded. Annual incidence of MAT was determined (number of cases per 100,000 in the database per year).

Postoperative 90-day complications were assessed using International Classification of Diseases, 9th and 10th Revision, Clinical Modification codes. Reoperations out to five years were defined.

RESULTS:

Of 90,772,632 patients in the dataset, 593 MAT patients were identified (mean age \pm SD = 29.71 \pm 11.51 years old; females = 53.12%; BMI > 35 kg/m² = 10.5%), for an average incidence of 0.084 MAT procedures/year/100,000 patients (Table 1 and Table 2).

Overall 90-day complication rate following MAT was 5.6%. Emergency department visits and hospital readmission up to 90 days was 13.49% and 1.18%, respectively (Table 4).

Reoperation rate following MAT was 26.1% and 32.2% at 2-years and 5-years points, respectively. At both 2-years and 5-years points, the most commonly reported reoperations were revision meniscus transplantation (14.33% and 19.22%, respectively) and meniscus repair (4.89% and 5.73%, respectively) (Table 3).

DISCUSSION AND CONCLUSION:

In a large insurance database sample, we found MAT to be a rare procedure. In a sample of 593 patients who underwent MAT, overall 90-day complication rate was low (5.6%) and 2-year and 5-year reoperation rate was 26.1% and 32.2%, respectively, with the most common reoperation being revision meniscus transplantation.

Table 1. Patient Demographics

Patients	n = 593	SD or %
Mean Age (years)	29.71	SD: 11.51
Sex		
Female	315	53.12%
Male	278	44.88%
BMI		
< 30	483	81.45%
30 - 34	48	8.09%
35 - 39	37	6.24%
> 40	25	4.22%
Mean ECI Score	1.48	1.84

BMI, Body Mass Index; ECI, Elixhauser Comorbidity Index

Table 2. Annual Trends in Number of Meniscus Allograft Transplantation Procedures Performed from 2010 to 2020 in PearlDiver US Private Insurance Database

Year	No. of MAT Procedures	No. of Patients in Database	Incidence per 100,000 patients
2010	57	57,208,148	0.09
2011	56	60,820,654	0.09
2012	55	62,383,649	0.09
2013	58	65,589,629	0.09
2014	56	63,528,658	0.09
2015	67	66,062,486	0.10
2016	55	66,126,742	0.08
2017	56	66,066,596	0.08
2018	48	61,241,280	0.07
2019	84	68,646,482	0.12
2020	21	39,911,132	0.05
Total	593	60,772,632	Average: 0.084

MAT, Meniscus Allograft Transplant

Table 3. 2-Year and 5-Year Reoperation Rate Following Meniscus Allograft Transplant

Reoperations	2-Year		5-Year	
	n	%	n	%
Total	155	26.14%	191	32.21%
Meniscus Transplant	85	14.33%	114	19.22%
Meniscus Repair	29	4.89%	34	5.73%
Synovectomy	27	4.55%	33	5.50%
Chondroplasty	21	3.54%	32	5.40%
Manipulation under anesthesia	11	1.85%	14	2.36%
Lysis of adhesions	24	4.05%	31	5.23%
Loose body removal	< 10	< 1.69%	< 10	< 1.69%
Redebridement for infection	< 10	< 1.69%	< 10	< 1.69%
Osteotomy	< 10	< 1.69%	< 10	< 1.69%
Partial knee replacement	< 10	< 1.69%	12	2.02%
Total knee replacement	11	1.85%	17	2.87%

Table 4. 90-Day Complication Rate Following Meniscus Allograft Transplant

Variable	Meniscus Allograft Transplantation n = 593	%
Any Complication	33	5.56%
Septic		
Aseptic		
Septic Infection		
Deep Infection		
Nerve Injury		
Neurological Complication		
Cardiac Complication		
Pulmonary Complication		
Wound Complication		
Deep Vein Thrombosis		
Pulmonary Embolism		
Hematuria		
Urinary Tract Infection		
Delirium		
Dizziness		
Knee Instability		
Knee Instability		
Emergency Department Visits	80	13.49%
Readmission	7	1.18%