

# Prior Septic Arthritis Increases Risk for Revision due to Infection following Primary Total Knee Arthroplasty

Oliver Sax<sup>1</sup>, Sandeep Singh Bains, Zhongming Chen, Christopher George Salib, Daniel Hameed, Hytham Salem, Ronald Emilio Delanois<sup>2</sup>, James Nace

<sup>1</sup>Rubin Institute For Advanced Orthopedics, <sup>2</sup>Rubin Institute for Advanced Orthopedics

## INTRODUCTION:

Septic arthritis is responsible for over 16,000 emergency department visits annually and may predispose patients for a prosthetic joint infection (PJI) following total knee arthroplasty (TKA). However, the temporal relationship between a prior septic arthritis diagnosis and eventual TKA has yet to reach consensus. Recent studies suggest delaying TKA approximately 6 months, while others prefer to wait at least 1 year. We compared patients who were diagnosed with septic arthritis by three-month intervals prior to a primary TKA, with specific assessment of: 90 day to one-year (1) revisions due to PJI; as well as (2) independent risk factors for PJI.

## METHODS:

We queried a national, all-payer database to identify all patients who underwent a primary TKA between 2010 and 2021 (n=1.9 million). Using International Classification of Disease and Current Practice Terminology codes, we identified patients who had prior septic arthritis (ICD-10-M00.86) ipsilateral to the primary TKA characterized (n=4,251). These patients were then stratified into four specific cohorts based on the month interval between septic arthritis diagnosis and TKA: <3, 3 to 6, 6 to 9, and 9 to 12. A limited control cohort of patients without septic arthritis history was used for comparison (n=5,000). The incidence of PJI and revisions from 90-days to one year were then identified and compared using bivariate chi-square analysis. Multivariate regressions assessed independent risk factors for post-TKA PJIs adjusting for health metrics and comorbidities (age, sex, alcohol abuse, obesity, smoking, etc.) for post-TKA PJIs were then analyzed using multivariate regression models.

## RESULTS:

All septic arthritis cohorts were more likely to require revisions due to PJI, as compared to the control history of septic arthritis. This was especially true for patients who were diagnosed with septic arthritis within 3 and 6 months of TKA (90-day septic revisions, odds ratios (OR) range 70.0 to 87.9,  $p < 0.001$ ). In an adjusted analysis based on patient's health metrics and comorbidities (age, sex, alcohol abuse, obesity, smoking, etc.), history of septic arthritis within one year prior of TKA had a significantly higher rate of developing one-year revisions due to PJI (one-year septic revisions, OR range 90.0 to 113.0,  $p < 0.001$ ).

## DISCUSSION AND CONCLUSION:

Prior septic arthritis is associated with over 70 times increased risk for post-TKA revision due to PJI, as compared to patients without prior septic arthritis. These results underscore the potential complications following septic arthritis and should be integrated into shared decision-making models between patient and provider.

Table 1. Multivariate logistic regression for PJI			
90-day PJI	OR*	95% CI	p-value
Male sex	1.50	1.47-1.53	<0.001
Alcohol Abuse	1.96	1.91-2.02	<0.001
Diabetes Mellitus	1.26	1.23 - 1.28	<0.001
Obesity	1.71	1.68 - 1.74	<0.001
Rheumatoid Arthritis	1.59	1.55-1.64	<0.001
Tobacco Use	1.47	1.45-1.50	<0.001
Septic Knee within 0-3 Months	87.8	73.8-104.6	<0.001
Septic Knee within 3-6 months	70.0	58.4-84.01	<0.001
Septic Knee within 6-9 months	47.3	38.65-57.87	<0.001
Septic Knee within 9-12 Months	36.8	29.47-46.00	<0.001
<b>1-year PJI</b>			
Male sex	1.54	1.52-1.56	<0.001
Alcohol Abuse	1.90	1.85-1.95	<0.001
Diabetes Mellitus	1.27	1.25-1.29	<0.001
Obesity	1.67	1.64-1.70	<0.001
Rheumatoid Arthritis	1.62	1.59-1.66	<0.001
Tobacco Use	1.42	1.40-1.44	<0.001
Septic Knee within 0-3 Months	113.02	96.02-133.03	<0.001
Septic Knee within 3-6 months	89.96	75.76-106.83	<0.001
Septic Knee within 6-9 months	53.9	44.53-65.29	<0.001
Septic Knee within 9-12 Months	44.9	36.36-55.46	<0.001
<b>2-year PJI</b>			
Male sex	1.54	1.52-1.57	<0.001
Alcohol Abuse	1.88	1.84-1.92	<0.001
Diabetes Mellitus	1.28	1.26-1.30	<0.001
Obesity	1.64	1.62-1.67	<0.001
Rheumatoid Arthritis	1.66	1.62-1.70	<0.001
Tobacco Use	1.40	1.38-1.42	<0.001
Septic Knee within 0-3 Months	123.6	105.62-144.51	<0.001
Septic Knee within 3-6 months	98.15	83.11-115.90	<0.001
Septic Knee within 6-9 months	52.9	43.98-63.7	<0.001
Septic Knee within 9-12 Months	46.3	37.69-56.85	<0.001