# Tourniquet Use Does Not Impact Outcomes in Revision Total Knee Arthroplasty for Periprosthetic Joint Infection

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INTRODUCTION:
Traditionally, there has been recommendation to avoid the use of tourniquet in revision total knee arthroplasty (rTKA) for periprosthetic joint infection (PJI), however, evidence to support or refute such claims is lacking. This study aims to investigate whether the use of a tourniquet in rTKA for PJI influences patient outcomes compared to rTKAs for PJI performed without tourniquet use.
METHODS:
We retrospectively reviewed all patients who underwent rTKA for PJI at our institution from 2011-2020. Patients were stratified into two cohorts based on tourniquet inflation during the procedure. Outcomes of interest included estimated blood loss (EBL), change in hemoglobin (Hb), length-of-stay (LOS), surgical time, 90-day readmission rate, re-revision rate, and Knee Injury and Osteoarthritis Outcome Score for Joint Replacement (KOOS, JR) scores. Demographic differences were assessed with chi-square and independent sample t-tests. Outcomes were compared using multilinear and logistic regressions, controlling for demographic differences.
RESULTS:
Of the 247 patients included, 192 (78%) underwent rTKA for PJI with the use of a tourniquet and 55 (22%) did not. Mean tourniquet inflation time for these 192 cases was 97.45±32.35 minutes (median: 105.5 minutes; range: 19-218 minutes). EBL was significantly greater for patients who did not have a tourniquet used during their procedure (408.03vs.298.97mL;p=0.033). However, Hb from pre- to postoperatively (1.67±1.14vs.1.70 ±1.07 g/dL;p=0.857), LOS (p=0.440), 90-day readmissions (p=0.191), reoperation (p=0.113), surgical time (p=0.559), and KOOS, JR scores at 3-months (p=0.593) and 1-year postoperatively (p=0.830) did not significantly differ between the two groups.
DISCUSSION AND CONCLUSION:
Patients undergoing rTKA for PJI achieved similar outcomes irrespective of tourniquet utilization intraoperatively. Therefore, tourniquet use in rTKA for PJI should be evaluated on a case-by-case basis by the operating surgeon. Future studies should aim to elucidate the effects of tourniquet use on functional outcomes after rTKA for PJI at a longer follow-up.

**Table 1. Patient Demographics (n=247)**

| | Tourniquet (n=192) | No Tourniquet (n=55) | P-value |
|---|---|---|---|
| **Age (years; ± SD)** | 63.36 ± 10.63 | 65.98 ± 10.46 | 0.106 |
| **Gender** | | | 0.671 |
| Female | 95 (49.5%) | 29 (52.7%) | |
| Male | 97 (50.5%) | 26 (47.3%) | |
| **Race** | | | 0.977 |
| Caucasian | 122 (63.5%) | 35 (63.6%) | |
| African-American | 31 (16.1%) | 9 (16.4%) | |
| Asian | 5 (2.6%) | 2 (3.6%) | |
| Other | 34 (17.7%) | 9 (16.4%) | |
| **Smoking Status** | | | 0.252 |
| Never Smoker | 93 (48.4%) | 31 (56.4%) | |
| Former Smoker | 79 (41.1%) | 22 (40.0%) | |
| Current Smoker | 20 (10.4%) | 2 (3.6%) | |
| **BMI (kg/m$^2$; ± SD)** | 33.06 ± 7.48 | 30.09 ± 7.89 | 0.026 |
| **ASA Class** | | | 0.588 |
| I | 4 (2.5%) | 2 (4.9%) | |
| II | 54 (34.2%) | 15 (36.6%) | |
| III | 94 (59.5%) | 21 (51.2%) | |
| IV | 6 (3.8%) | 3 (7.3%) | |
| **CCI (± SD)** | 4.03 ± 2.15 | 4.42 ± 2.34 | 0.268 |
| Peripheral Vascular Disease | 9 (4.7%) | 5 (9.1%) | 0.213 |
| Diabetes Mellitus (Type II) | 40 (20.8%) | 9 (16.4%) | 0.464 |
| **Pre-op Hgb (g/dL)** | 12.52 ± 1.89 | 12.47 ± 1.68 | 0.872 |

*P-values are derived from two-sample t-tests for numerical values or $\chi 2$ tests for categorical values.
BMI: body mass index; ASA: American Society of Anesthesiologist classification; CCI: Charlson Comorbidity Index; SD: Standard Deviation

**Table 2. Outcomes**

| | Tourniquet | No Tourniquet | Effect of Tourniquet (95% CI) | P-value |
|---|---|---|---|---|
| **Post-op Hgb (g/dL)** | 10.85 ± 1.66 | 10.77 ± 1.72 | 0.01 g/dL decrease (-0.64 to 0.58) | 0.925 |
| **Estimated Blood Loss (mL; ± SD)** | 298.97 ± 254.74 | 408.03 ± 259.72 | 110.79 mL decrease (9.86 to 231.72) | 0.033 |
| **LOS (days; ± SD)** | 7.02 ± 5.18 | 7.50 ± 5.62 | 0.66 day decrease (1.03 to 2.35) | 0.440 |
| **Surgical Time (min; ± SD)** | 128.80 ± 50.99 | 121.23 ± 44.90 | 5.08 minute increase (-12.03 to 22.18) | 0.559 |
| **90-day all-cause Readmission** | 53 (27.6%) | 18 (32.7%) | OR: 1.60 (0.79 to 3.23) | 0.191 |
| **Re-Revision Rate** | 148 (77.1%) | 31 (56.4%) | OR: 0.56 (0.27 to 1.15) | 0.113 |

**Table 3. KOOS, JR Scores**

| | Tourniquet | No Tourniquet | Effect of Tourniquet (95% CI) | P-Value |
|---|---|---|---|---|
| **Pre-op (± SD)** | 51.04 ± 16.85 (n=22) | 41.07 ± 5.35 (n=7) | 9.89 point increase (-3.73 to 23.52) | 0.148 |
| **3 month (± SD)** | 57.76 ± 13.59 (n=24) | 56.68 ± 16.43 (n=9) | 2.86 point increase (-7.95 to 13.67) | 0.593 |
| **1 year (± SD)** | 54.72 ± 20.19 (n=24) | 55.16 ± 12.04 (n=6) | 1.92 point increase (-16.25 to 20.09) | 0.830 |

*P-values are derived from a multivariable linear regression. These regressions account for demographic differences between groups. CI: Confidence Interval, SD: Standard Deviation