

# Paper #12

## Closed Incision Negative Pressure Therapy in Revision Knee Arthroplasty: A Randomized Clinical Trial

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**Introduction:** Surgical site complications (SSC) are pervasive among high-risk revision total knee arthroplasty (rTKA). This multicenter, randomized, clinical trial compared the 90-day 1) incidence of SSCs, 2) health care utilization (number of dressing changes, readmission, and reoperation), and 3) patient-reported outcomes (PRO) in high-risk rTKA patients with postoperative closed incision negative pressure wound therapy (ciNPT) versus a standard of care (SOC) silver-impregnated occlusive dressing.

**Methods:** 294 rTKA patients (15 centers) at high-risk for wound complications were prospectively randomized to SOC or ciNPT (n=147 each) and stratified by revision type (aseptic vs. septic). The ciNPT system was adjusted at 125 mmHg of suction. Treatment duration was ≥5 days and outcomes were assessed until 90 days after surgery. SSC rates were assessed using intention to treat (ITT) and modified intention to treat analyses. Healthcare utilization and PRO were assessed solely on an ITT basis.

**Results:** A total of 242 patients completed the follow-up (ciNPT: n=124 [84.4%]; SOC: n=118 [80.3%]). Demographics, baseline comorbidities, causes of revision, and duration of treatment were similar between cohorts ( $p>0.05$ ). ITT analysis demonstrated lower SSC rates with ciNPT vs. SOC (3.4% [5/147] vs. 14.3% [21/147]; OR: 0.22; 95%CI [0.08, 0.59];  $p=0.0013$ ). Similar outcomes were obtained with the modified ITT analysis (ciNPT: 4% (5/125) vs. SOC: 16.4% (21/128); OR: 0.22, 95%CI [0.08, 0.59];  $p=0.0013$ ). The ciNPT cohort exhibited lower readmission rates (3.4% [5/147] vs. 10.2% [15/147];  $p=0.0208$ ), and number of dressing changes ( $1.1\pm0.29$  vs.  $1.3\pm0.96$ ;  $p=0.0003$ ). There were no significant differences in postoperative improvement of Knee Injury and Osteoarthritis Outcome Score subtypes nor the PROMIS global-10 mental and physical health scores ( $p>0.05$  for all).

**Conclusions:** ciNPT mitigates 90-day SSC and readmission rates among high-risk rTKA patients. The lower frequency of dressing changes within the ciNPT cohort may provide added value for healthcare utilization without compromising pain and function.

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