Closed Incision Negative Pressure-Therapy Does Not Decrease Wound Complications following Revision Total Hip Arthroplasty: A Randomized Controlled Trial

Jaewon (Freddy) Yang¹, Alexander Acuna, Anne Debenedetti², Craig J Della Valle³, Vasili Karas⁴, Brett Russell Levine², COL. (ret) Tad L Gerlinger, Denis Nam²

¹University of Washington, ²Rush University Medical Center, ³Rush University Med Ctr, ⁴Midwest Orthopaedics at Rush INTRODUCTION:

Wound complications following revision total hip arthroplasty (rTHA) are associated with an increased risk of superficial and deep infections. Closed incision negative-pressure therapy (ciNPT) has been reported to decrease wound complications. The purpose of this study was to assess if ciNPT decreases the rate of wound complications following rTHA versus a conventional, silver-impregnated dressing.

METHODS:

This was a single center, randomized controlled trial of patients undergoing both aseptic and septic rTHA. Patients received either ciNPT or a silver-impregnated dressing (control) for 7 days. Minimum follow-up was 90 days. Wound complications during these 90 days were recorded, including: surgical site infection (SSI), periprosthetic joint infection (PJI), prolonged drainage > 5 days, superficial wound healing delay treated with antibiotics, and hematoma formation. RESULTS:

Between 2017 and 2024, 200 patients were enrolled: 105 (52.5%) ciNPT and 95 (47.5%) control. Four (2.0%) patients were excluded as they were lost to follow-up. There were no differences in patient demographics, operative approach, wound closure method, intraoperative estimated blood loss, or post-operative anticoagulation (p=0.10-1.0). Two (1.0%) revisions were performed via a lateral approach; all others were performed via a posterior approach. Twelve patients in both the ciNPT (11.7%) and control (12.9%) cohorts sustained a wound complication (p=0.95). There was no difference in the type of wound complications observed (p=1.0). Four (3.9%) patients in the ciNPT cohort underwent re-operation for wound-related complications (2 PJI, 1 SSI, 1 prolonged drainage) versus 1 (1.1%) in the control cohort (1 PJI) (p=0.37). DISCUSSION AND CONCLUSION:

Prior smaller, non-randomized studies have shown ciNPT to be effective in decreasing the rate of wound complications. This randomized controlled study found no differences in wound complications or reoperations performed for wound-related etiologies in rTHA patients. Further research is required to evaluate the potential clinical advantages of ciNPT to justify their increased cost compared to conventional dressings.

	Negative Pressure Wound Therapy (n=103)	Conventional Wound Dressing (n=93)	P-Value
Age (years), mean ± standard deviation	64.9 ± 10.2	65.6 ± 11.2	0.62
Body Mass Index (kg/m2), mean ± standard deviation	30.7 ± 6.8	30.4 ± 6.2	0.71
American Society of Anesthesiologists Score, n (%)			0.17
1	2 (1.9%)	0 (0.0%)	
2	40 (38,8%)	47 (50.5%)	
3	60 (58,3%)	44 (47,3%)	
4	1 (1.0%)	2 (2.2%)	
Approach, n (%)			1.0
Posterior	102 (99.0%)	92 (98.9%)	
Direct Lateral	1 (1.0%)	1 (1.1%)	
Procedure, n (%)			0.60
Isolated Head and Liner Exchange	26 (25.2%)	22 (23.7%)	
Acetabular Revision Only	25 (24.3%)	23 (24.7%)	
Explantation of Prosthesis and Placement of Spacer	14 (13.6%)	7 (7.5%)	
Femoral Revision Only	9 (8.7%)	11 (11.8%)	
Conversion Prior ORIF ¹ to THA ²	10 (9.7%)	9 (9.7%)	
Acetabular and Femoral Revision	12 (11.7%)	6 (6.5%)	
Conversion Prior Hemiarthroplasty to THA	3 (2.9%)	4 (4.3%)	
Removal of Antibiotic Spacer and Reimplantation	2 (1.9%)	3 (3.2%)	
One Stage Exchange	1 (1.0%)	4 (4.3%)	
Conversion Prior Resurfacing to THA	1 (1.0%)	3 (3.2%)	
Conversion Prior ORIF to Articulating Spacer	0 (0.0%)	1 (1.1%)	
Wound Complication, n (%)	12 (11.7%)	12 (12.9%)	1.0
Type of Would Complication, n (%)			1
Excessive or Prolonged Drainage	6 (50.0%)	7 (63.6%)	
Periprosthetic Joint Infection (met 2018 MSIS3 Criteria)	2 (16.7%)	1 (9.1%)	
Superficial Wound Healing Delay Treated with Antibiotics	2 (16.7%)	2 (18.2%)	
Surgical Site Infection	1 (8.3%)	0 (0.0%)	
Hematoma Formation	1 (8.3%)	1 (9.1%)	
Desidelan for Wound Complication of (0/)	4 (2.09/)	1 (1 10/)	0.27

 Revision for Wound Complication, n (%)
 4 (3.9%)

 ¹Open reduction internal fixation, ²Total Hip Arthroplasty, ³MSIS: Musculoskeletal Infection Society