RUSH UNIVERSITY MEDICAL CENTER

A Randomized Trial of Static and Articulating Spacers for Treatment of the Infected Total Hip Arthroplasty

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Introduction

- Although the use of an interim antibiotic spacer is considered standard as part of a two-stage exchange protocol, the use of an articulating versus a static spacer is controversial.

- Purpose: To compare perioperative complications and postoperative outcomes between static and articulating spacers for the treatment of chronic periprosthetic joint infection (PJI) complicating total hip arthroplasty (THA)

Methods

- Randomized controlled trial performed at 3 centers

- 52 Patients who met MSIS criteria for chronic PJI after a primary THA who were scheduled for a two-stage exchange arthroplasty were randomized to a static (23 patients) or articulating spacer (29 patients)

- Power analysis determined that 44 patients (22 in each arm) were required to identify a 20 minute difference in operative time (primary outcome) at the second stage reimplantation (Beta = 0.80 and alpha = 0.05)

- Secondary outcome measures collected included the need for blood transfusion, hospital length of stay, and discharge disposition

- Static spacers were hand-molded with a rod of antibiotic-impregnated cement that was placed down the femoral canal and cement beads of sufficient quantity to fill the acetabulum (Figure 1A)

- Articulating spacers were constructed using antibiotic-impregnated cement and silicone molds from the Stage One system (Zimmer-Biomet, Warsaw, IN), and sized to fit the proximal femur and the acetabulum (Figure 1B).

- There were no differences in mean age, gender or preoperative PROM suggesting appropriate randomization

Figure 1. AP radiograph of a static (A) and articulating (B) hip spacer

Table 1. Outcomes at Stage 1 and Stage 2

	Articulating (N=20)	P-value	Static (N=20)
Stage 1			
Operative time (min)	163.0 ± 35.8	0.194[1]	157.8 ± 68.4
Hospital Length of Stay (days)	**5.4 ± 1.3 (median of 5)**	**0.006[3]**	**8.6 ± 7.0 (median of 7)**
Discharge Disposition			
Home	14 (70.0%)	0.056[2]	7 (35.0%)
Extended Care Facility	6 (30.0%)		13 (65.0%)
Extended Trochanteric Osteotomy Used	4 (20.0%)	0.480[2]	7 (35%)
Transfusion needed	7 (35.0%)	0.523[2]	10 (50.0%)
Organism			
Methicillin Sensitive *Staphylococcus aureus*	7 (35.0%)	0.293[2]	6 (30.0%)
Staphylococcus epidermidis	7 (35.0%)		3 (15.0%)
Streptococcus species	0 (0.0%)		3 (15.0%)
Multiple organism	2 (10.0%)		0 (0.0%)
Methicillin Resistant *Staphylococcus aureus*	0 (0.0%)		1 (5.0%)
Other	1 (5.0%)		3 (15.0%)
Culture negative	3 (15.0%)		4 (20.0%)
Stage 2			
Additional spacer needed	2 (10%)	1.000[2]	3 (15%)
Operative time (min)	144.5 ± 40.5	0.499[1]	142.8 ± 50.8
Hospital Length of Stay (days)	**3.6 ± 1.1 (median of 4)**	**<0.001[3]**	**6.3 ± 3.0 (median of 5)**
Discharge Disposition			
Home	16 (80.0%)	0.342[2]	19 (95.0%)
Extended Care Facility	4 (20.0%)		1 (5.0%)
Extended Trochanteric Osteotomy Used	1 (5%)	1.000[2]	0 (0.0%)
Transfusion needed	6 (30.0%)	0.200[2]	11 (55.0%)

1Student's T-test with alpha=0.05 being significant; 2Fisher's exact test with alpha=0.05 being significant
3Wilcoxon Rank-sum Test for a median comparison with alpha=0.05 being significant

Results

- Four patients were never reimplanted, 7 patients were lost prior to 2-years and one patient died during hospitalization after the second stage procedure leaving 40 patients followed for a mean of 3.2 years (range, 2 to 7.1 years)

- At the time of the second stage, there were no differences in operative time (143 minutes static vs. 145 minutes articulating, p=0.499)

- Length of hospital stay, however, was significantly longer in the static cohort after stage 1 (8.6 vs. 5.4 days, p=0.006) and stage 2 (6.3 vs. 3.6 days, p<0.001)

- Although it did not reach statistical significance with the numbers available for study, nearly twice as many patients in the static group were discharge to an extended care facility after stage 1 (65% vs 30%; p=0.056)

- There was no significant differences in clinical outcome scores or complications, however when difference existed they favored the patients treated with an articulating spacer.

  - *Three patients in the static group as opposed to two in the articulating group required a second operative debridement and spacer exchange prior to reimplantation*

  - *Failure secondary to infection was 25% in the static group and 15% in the articulating group*

  - *The dislocation rate was 10% in the static group and 5% in the articulating group*

Conclusions

- Perioperative and postoperative outcomes of all-cement static and articulating spacers were similar

- The longer length of hospital stay and greater proportion of discharge to an extended care facility associated with the use of static spacers may have important economic implications

- When differences existed they favored the articulating group