Abstract #11383

Cemented vs. Uncemented Hip Arthroplasty for Metastatic Bone Disease

Raj G Patel, B.S. (1)
Christina Gutowski, M.D. (2)
Atif Ahmed, M.D. (3)
Bang Hoang, M.D. (4)
David Geller, M.D. (5)
John A Abraham, M.D. (6)

Conflicts of Interest: none

1. (Corresponding author)
Thomas Jefferson University
9 N. 9th St. Apt 617
Philadelphia, PA 19107
raj.patel@jefferon.edu
Ph. 630 965 4723

2. Thomas Jefferson University
Department of Orthopaedics
925 Chestnut St.
Philadelphia, PA 19107
gutowski1@gmail.com
Ph. 609 851 4998

3. Albert Einstein College of Medicine
Department of Orthopaedics
ahmedati08@gmail.com

4. Montefiore Medical Center
Medical Arts Pavilion
3400 Bainbridge Avenue
Bronx, NY 10467

5. Montefiore Medical Center
Medical Arts Pavilion
3400 Bainbridge Avenue
Bronx, NY 10467
dgeller@montefiore.org

6. Rothman Institute of Orthopedics
925 Chestnut St.
Philadelphia, PA 19107
John.abraham@rothmaninstitute.com
Ph. 267 339 3500

Abstract #11383

Cemented vs. Uncemented Hip Arthroplasty for Metastatic Bone Disease

Background: The proximal femur is the most common site of metastatic disease to the long bones.[1] Hip arthroplasty—total hip replacement or hemiarthroplasty— is often the treatment of choice when a femoral neck lesion compromises hip stability or leads to pathologic fracture.[2] Cemented arthroplasty has long been the gold standard because it was thought to provide optimal fixation in the setting of metastatic lesions and fractures. Although cemented hip arthroplasty was thought to have superior revision rates when compared to uncemented fixation, recent literature indicates a significant difference may not exist.[3-6] A major advantage of cementless hip arthroplasty is the potential for osseointegration, but it is commonly argued that in the setting of metastatic lesions, decreased bone ingrowth may occur. However, there is good evidence to suggest that osseointegration does occur in radiated bone[7], and limited evidence suggesting failure of osseointegration in metastatic bone disease. Preliminary reports of uncemented hip arthroplasty for metastatic disease have demonstrated adequate outcomes.[8] Cemented arthroplasty for metastatic disease is also associated with significant cardiopulmonary and other complications.[9] As cancer patients' survival improves, bone lesion treatment plays an increasing role in reducing patient morbidity and enhancing quality of life.[10] Therefore, hip arthroplasty technique needs to be thoroughly evaluated to provide the most effective treatment for this population.

Purpose: This study aims to compare outcomes in patients who underwent uncemented and cemented hip arthroplasty due to metastatic bone disease. Primary endpoints are revision rates and survival. Secondary endpoints include loosening, dislocation, fracture, ambulatory function, infection, wound complications, disease status, and thromboembolic events. In this population, we hypothesize that cementless hip arthroplasty will be at least noninferior to cemented hip arthroplasty with respect to these endpoints.

Patients and Methods: This is a retrospective study. The inclusion criteria include presence of metastatic bone disease of the femoral neck requiring hip arthroplasty (total or hemi; cementless or cemented). Patients must have undergone staging prior to surgery. Patients with previous hip arthroplasty on the same hip were excluded. The two cohorts consist of patients who underwent uncemented arthroplasty and cemented arthroplasty. In all cases, gross disease was removed with removal of femoral head prior to stem fixation. The following endpoints were compared between the two groups: revision rate, survival, wound complications, infection, loosening, fracture, dislocation, disease status, and ambulatory function. Data is presented as frequency (percent) for categorical data and mean +/- standard deviation for continuous data. Follow-up time after surgery is presented as mean +/- standard deviation. Statistical testing is performed using $\chi 2$ for categorical variables. A statistically significant difference is defined as a P values equal or less than .05. All P values are 2-sided.

Results: In this 63 patient population, the mean follow-up time was 9.2 months. The cemented hip arthroplasty and uncemented hip arthroplasty cohorts comprised of 29 patients and 34 patients, respectively. Demographic information is listed in table 1. In the cemented population, 13.8% of patients died from their disease. 17.6% of uncemented patients died from their disease. On last follow-up for the cemented cohort, 79.3% had disease without progression and 20.7% had disease with progression or metastasis; for the uncemented cohort, 60% had stable disease, 10% had no disease, and 30% had disease with progression or metastasis. The mechanical complications examined were loosening, fracture, revision, and dislocation. Implant loosening occurred in 0% and 2.9% of patients in the cemented and uncemented cohorts, respectively. Revision arthroplasty was required in 3.4% and 2.9% of patients in the cemented and uncemented cohorts, respectively. The revision in the cemented group was due to recurrent hip dislocations. One revision in the uncemented cohort was required for local disease progression. Other complications examined were thromboembolic events, wound infection, and wound complications, as well as irrigation and debridement for any reason. None occurred in the cemented population. In the uncemented population, wound complications occurred in 5.9% of patients, including

hematoma and dehiscence; irrigation and debridement was required in 3.2% of patients. This represents preliminary data. Complete statistical and chi-square analysis will be completed prior to presentation.

Conclusion: Hip replacement in the setting of metastatic disease is traditionally thought to require cemented arthroplasty. Although this is a small retrospective study, the results presented demonstrate that uncemented hip arthroplasty may have equivalent outcomes. This study has several limitations, primarily small sample size, retrospective design, and potential selection bias. However, it suggests that a larger scale study may be useful in determining the role of uncemented arthroplasty for metastatic disease to the hip, to determine if in certain patients it may be a reasonable option.

1. Schneiderbauer MM et al. Patient survival after hip arthroplasty for metastatic disease of the hip. *J Bone Joint Surg Am*. 2004;86:1684

2. Issack PS et al. Management of Metastatic Bone Disease of the Acetabulum. *J Am Acad Orthop Surg*. 2013;21:685-695.

3. Morshed S et al. Comparison of cemented and uncemented fixation in total hip replacement. *Acta Orthopaedica*. 2007; 78(3): 315-326.

4. Gwynne-Jones DP et al. The Morscher Press Fit acetabular component. *J Bone Joint Surg Br*. 2009;91:859-864.

5. Stefl MD, Johnston RC et al. Primary Cementless Acetabular Fixation at a Minimum of Twenty Years of Follow-Up. *J Bone Joint Surg Am*. 2012;94:234-239.

6. Corten K et al. What Works Best, a Cemented or Cementless Primary Total Hip Arthroplasty. *Clin Orthop Relat Res*. 2011;469:209-217.

7. Kim Kl et al. Uncemented total hip arthroplasty in patients with a history of pelvic irradiation for prostate cancer. *J Bone Joint Surg Am*. 2007; 89(4):789-805

8. Thein R et al. Uncemented arthroplasty for metastatic disease of the hip: preliminary clinical experience. *J Arthroplasty*. 2012; 27(9):1658-62.

9. Price SL et al. Complications of cemented long-stem hip arthroplasty in metastatic bone disease revisited. *Clin Orthop Relat Res*. 2013; 471(10):3303-07.

10. Price SL, et al. Complications of Cemented Long-stem Hip Arthroplasty in Metastatic Bone Disease Revisited. *Clin Orthop Relat Res*. 2013;471:3303-3307.

Table 1. Demographics

Patients: n = 63		
	Cemented: n = 29	**Uncemented: n = 34**
Age*	59.9 years (45-93)	61.4 years (17-96)
Sex	M- 41.4% F- 58.6%	M- 32.4% F- 67.7%
Follow-up Time*	9.6 months (1-41)	8.7 months (1-31)
Length of Hospitalization*	12.9 days (3-31)	10.2 days (3-35)
Replacement Type	Hemiarthroplasty- 7.9% Total hip- 93.1%	Hemiarthroplasty- 29.4% Total hip- 70.6%
Primary Tumor Type		
Breast	31%,	32.4%
Multiple Myeloma	6.9%	17.6%
Renal	10.3%	11.8%
Lung	20.7%	2.9%
Lymphoma	3.4%	11.8%
Uterine	6.9%	5.9%
Prostate	3.4%	5.9%
Adenocarcinoma	6.9%	2.9%
Other	10.3%	8.8%
Chemotherapy	75.9%	81.8%
Radiation therapy•	41.4%	61.7%

•ipsilateral hip or pelvis
* Values listed as mean (range)

Table 2. Results/complications

	Cemented	Uncemented
Oncologic		
Death from disease	13.8%	17.6%
Disease status at last follow-up	No disease- 0% Stable disease- 79.3% Progression/metastasis- 20.7%	No disease- 10% Stable disease- 60% Progression/metastasis- 30%
Mechanical		
Loosening	0%	2.9%
Fracture	0%	0%
Revision	3.4%	2.9%
Dislocation	3.4%	0%
Biological		
DVT/PE	0%	0%
Infection	0%	0%
Irrigation& Debridement	0%	2.9%
Wound complication*	0%	5.9%

Values reported as percent.

* Complications included seroma, hematoma, and dehiscence