

Does Perioperative Radiation Affect Implant Survivorship of Primary Total Hip Arthroplasty in the Setting of Metastatic Bone Disease: A Multicenter Study

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INTRODUCTION:

Metastatic bone disease (MBD) commonly affects the hip and surgical intervention including total hip arthroplasty (THA) is often indicated to treat the joint and improve function. Patients with metastatic cancer often receive radiotherapy and orthopaedic oncologists must consider surgical risks with operating on irradiated bone and soft tissue. We evaluated surgical outcomes and implant survival of titanium acetabular components in patients treated for MBD in the setting of perioperative radiation.

METHODS:

This was a retrospective review of patients who underwent THA for MBD at three institutions between 2017 and 2021. Outcomes included rates of reoperation, complications, implant survival (IS), and overall survival.

RESULTS:

Forty-six patients who received primary THA for MBD were included in the study. Twenty patients (43.5%) received perioperative radiation for MBD. Six postoperative complications including one superficial wound infection, two dislocations, two pathologic fractures, and one aseptic acetabular component loosening led to five reoperations. There were no significant differences in postoperative outcomes, reoperation after THA, and IS based on radiotherapy status.

DISCUSSION AND CONCLUSION:

To our knowledge, this is the first paper evaluating primary THA outcomes and IS between patients who receive perioperative radiation for MBD to the hip and those who do not. As surgical management is a crucial part of the treatment in alleviating pain and disability in patients with MBD, we continue to recommend THA for patients who received radiation to the operative site.

Table 1. Postoperative Outcomes based on Radiotherapy Status

	p-value	Perioperative Radiation	No Radiation
Total Patients		20	26
Postoperative Complications	p=0.380	4 (20%)	2 (7.7%)
Superficial Wound Infection		0	1
Dislocation		2	0
Pathologic fracture		1	1
Aseptic acetabular component loosening		1	0
Reoperation after THA	p= 0.178	4 (20%)	1 (3.8%)
Overall Survival, months mean (95% CI)	p=0.921	25.90 (15.49-36.32)	20.79 (14.39-27.20)
Implant Survival, months mean (95% CI)	p=0.079	38.58 (28.70-48.45)	35.70 (31.42-39.98)

THA, total hip arthroplasty; CI, confidence interval

Table 2. Overall Survival and Implant Survival

	Univariate Analysis	Multivariate Analysis
Overall Survival		
Mean, months (95% CI)	24.75 (18.12-31.38)	
Chemotherapy	p= 0.428; HR 1.48 (95% CI 0.55-3.99)	
Perioperative Radiation	p= 0.921; HR 1.04 (95% CI 0.46-2.38)	
NLR	p=0.026 ; HR 1.07 (95% CI 1.01-1.13)	p= 0.250; HR 1.04 (95%CI 0.98-1.10)
Albumin	p=0.002 ; HR 0.34 (95% CI 0.18-0.67)	p= 0.007 ; HR 0.38 (95%CI 0.19-0.76)
Implant Survival		
Mean, months (95% CI)	43.47 (38.06-48.89)	
Chronic Steroids	p=0.031 ; HR 12.06 (95% CI 1.25-116.50)	
Perioperative Radiation	p=0.079; HR 7.14 (95% CI 0.80-64.08)	
Acetabular Component (porous titanium vs plasma spray)	p=0.786; HR 0.74 (95% CI 0.08-7.11)	
Femoral Component (cemented vs cementless)	p=0.163; HR 4.20 (95% CI 0.47-37.68)	

CI, confidence interval; NLR, neutrophil lymphocyte ratio; statistically significant p values are bolded