Femoral head core decompressions: characterization of subsequent conversion to total hip arthroplasty and related complications

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Introduction: Hip avascular necrosis (AVN) can lead to pain and collapse. Surgical core decompression is a well-established, minimally invasive joint-preserving treatment option for early-stage hip AVN. The procedure is theorized to create new channels for angiogenesis and relieve femoral head pressure. However, a large proportion of patients who undergo core decompression may later become candidates for total hip arthroplasty (THA). While the conversion to THA following core decompression has been studied, there is no current literature regarding adverse events in later conversion THA following core decompression. As such, the current study leveraged a large, national administrative database to identify and compare 90-day adverse events and 5-year revision rates of patients undergoing THA for AVN with or without a history of core decompression.

Methods: Adult patients who underwent core decompression and/or THA (primary and conversion) with a laterality-specified diagnosis of hip AVN from Oct 2015 to Oct 2021 were identified with International Classification of Diseases, 10th Classification (ICD-10) and Current Procedural Terminology (CPT) coding within the PearlDiver M157 database. For patients who underwent core decompression, rate/time to subsequent THA within 5 years was assessed. Next, patients with and without a prior history of core decompression before THA were then isolated and 1:4 matched based on age, sex, and Elixhauser Comorbidity Index. Univariable analyses and multivariable logistic regression were used to compare 90-day postoperative complication rates between matched groups. Five-year incidences of revision, dislocation, and periprosthetic fracture were also assessed and compared with Kaplan-Meier curves and log-rank tests. A Bonferroni correction was applied to all adverse event comparisons, with significance defined as $p \leq 0.0014$.

Results: Core decompressions were identified for 3,025 patients, of which 387 (12.8%) went on to subsequent THA within 5 years (**Figure 1**). Of patients who converted to THA, 248 (64%) had THA conducted within the first year from core decompression. The median time from initial core decompression to THA was 252 days. In regard to THA, 26,209 THA patients met study criteria. After matching, 1,320 patients without prior core decompression and 339 with prior core decompression were selected. Between these groups, there were no statistically significant differences in rates of 90-day adverse events or 5-year rates of revision, dislocation, or periprosthetic fracture (**Table 1**, **Figure 2**).

Discussion: Core decompression is a joint-preserving treatment option that may be considered for earlier stages of hip AVN. However, it remains unclear if prior core decompression affects the risks associated with subsequent THA. Critically, the current study demonstrated no short- or longer-term differences in those undergoing THA for AVN with or without a history of core decompression. Without any associated increased risks, this data supports the consideration of hip core decompression for select patients as prior core decompression does not "burn bridges" for future treatment options.

Significance/Clinical Relevance: With the increased use of joint-preserving treatment options, like core decompression, for early-stage hip AVN it is crucial to understand any risks associated with future treatment of patients with a history of core decompression. This study demonstrated there were no difference in short- or longer-term adverse events associated with patients undergoing THA with prior core decompression. These data can help aid the decision-making process for surgeons considering core decompression in patients with AVN who may require subsequent treatment.

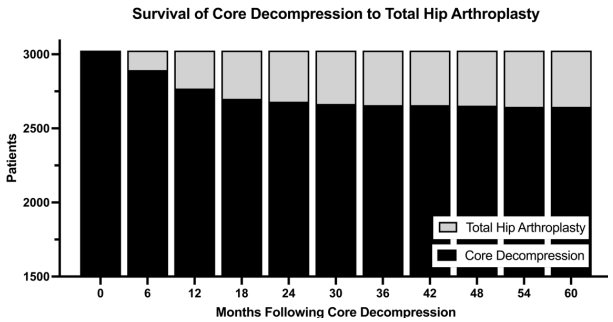

Figure 1. Time-based histogram of core decompression patients that later required conversion to total hip arthroplasty at varying months following initial core decompression.

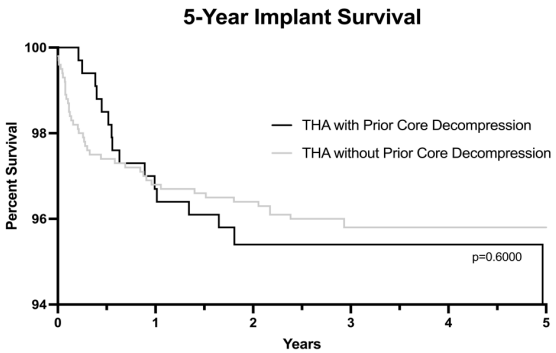

Figure 2. Kaplan-Meier curve comparing 5-year revision-free survival in the matched cohorts of THA patients with a history of prior core decompression compared to patients without a prior core decompression. P-value resulting from a log-rank test is shown.

Table 1. Multivariable analysis, controlling for age, sex, and ECI, of 90-day complications and readmissions of the matched cohort of THA patients with a history of core decompression relative to without a history of core decompression.

	Core Decompressions OR (95% CI)	P-value
Any Adverse Events	1.27 (0.90, 1.78)	P = 0.1670
Severe Adverse Events	1.22 (0.75, 1.92)	P = 0.3988
Surgical Site Infection	1.85 (0.49, 5.96)	P = 0.3227
Myocardial Infarction	0.95 (0.05, 6.48)	P = 0.9643
Cardiac Arrest	0.98 (0.05, 6.65)	P = 0.9840
Sepsis	0.95 (0.31, 2.42)	P = 0.9190
Prosthetic Joint Infection	1.21 (0.44, 2.90)	P = 0.6852
Venous Thromboembolism	1.13 (0.54, 2.18)	P = 0.7200
Dislocations	0.73 (0.29, 1.56)	P = 0.4504
Minor Adverse Events	1.15 (0.76, 1.70)	P = 0.5100
Transfusion	2.12 (0.93, 4.60)	P = 0.0622
Wound Issues	1.23 (0.56, 2.45)	P = 0.5809
Acute Kidney Injury	0.89 (0.39, 1.82)	P = 0.7560
Urinary Tract Infection	1.11 (0.51, 2.24)	P = 0.7730
Pneumonia	1.10 (0.46, 2.36)	P = 0.8220
Readmissions	1.13 (0.74, 1.69)	P = 0.5490