

High Rates of Mechanical Failure After Non-Oncologic Salvage Arthroplasty Using the Compress® Implant After Prior Periprosthetic Joint Infection

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INTRODUCTION:

Non-oncologic salvage arthroplasty is growing quickly in prevalence due to increasing patient longevity and technology that allows for multiple revisions. The Compress® (CPS) implant is an alternative to stemmed implants with the benefit of preserving bone stock. In addition, prior studies have demonstrated low rates of mechanical failure after non-oncologic revision arthroplasty with high rates of long-term survivorship using the CPS implant. However, only a small number of patients with a history of periprosthetic joint infection were included in these studies. The aim of this study is to report the survivorship and modes of failure after non-oncologic salvage arthroplasty using the CPS implant in patients with a history of periprosthetic joint infection.

METHODS:

We retrospectively reviewed 37 implants in 30 patients with a history of periprosthetic joint infection treated with non-oncologic revision total hip (THA) or revision total knee arthroplasty (TKA) using the CPS implant by a single surgeon from 2004 to 2019. Revision using the CPS implant was performed as part of a 2-stage exchange protocol or after a previous 2-stage exchange protocol for periprosthetic joint infection. Follow-up was for a minimum of 2 years or until failure, defined as CPS implant removal. Competing risk analysis was performed to calculate the cumulative incidence of mechanical and other modes of failure. Mechanical failure was defined as aseptic loosening with lack of osteointegration at the CPS fixation or periprosthetic fracture. Kaplan-Meier analysis was performed to determine implant survivorship.

RESULTS:

Of the 37 CPS reconstructions, 26 were performed for revision TKA and 11 for revision THA. There were 11 failures due to periprosthetic fracture and 7 failures due to aseptic loosening for a total of 18 mechanical failures. The median time to mechanical failure was 6 months (range 1-36 months). There were 9 failures due to periprosthetic joint infection. There were no other modes of failure. The cumulative incidence of mechanical failure was 41% (95% CI 25%-56%) at 2-years and 51% (95% CI 33%-66%) at 5-years. The cumulative incidence of periprosthetic joint infection was 16% (95% CI 6%-30%) at 2-years and 27% (95% CI 13%-43%) at 5-years. Overall implant survivorship was 43% (95% CI 30%-63%) at 2-years and 23% (95% CI 12%-44%) at 5-years.

DISCUSSION AND CONCLUSION:

Non-oncologic revision arthroplasty with the CPS implant in patients with a history of periprosthetic joint infection was associated with high rates of mechanical failure. Poor bone viability and vascularity secondary to multiple prior revision surgeries and previous infection may contribute to poor compressive osteointegration. Further studies of the survivorship of the CPS implant in this patient population are warranted.

Figure 1. Competing risk analysis of failure after revision Compress reconstruction with mechanical failure and infection as competing events.

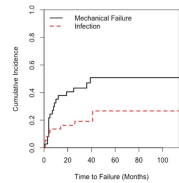


Figure 2. Kaplan-Meier plot demonstrating implant survivorship after revision Compress reconstruction. Overall survivorship was 43% (95% CI 30%-63%) at 2-years and 23% (95% CI 12%-44%) at 5-years.

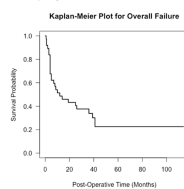


Table 1: Patient Characteristics

Patient Characteristics	All Revision CPS Patients
Number of implants	37
Age (mean years; range)	63 (32-84)
Sex	
Female	18
Male	19
BMI (kg/m ²)	34.2
Procedure	
Revision THA	11
Revision TKA	26
Prior Surgical Procedures (mean; range)	5 (2-16)

Table 2. Cumulative incidence of mechanical failure and infection after revision Compress reconstruction.

Mode of Failure	Cumulative Incidence of Events (95% CI)			Total Number of Events
	1-Year	2-Year	5-Year	
Mechanical Failure	38% (22%-53%)	41% (23%-59%)	51% (33%-66%)	18
Infection	14% (5%-27%)	16% (8%-30%)	27% (13%-43%)	9