

The Effect of Implant Type on Re-operation Rates Following Endoprosthetic Reconstruction Surgery

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Background:

Endoprosthetic reconstruction following oncologic resection of periarticular bone has become the standard of care. How-

ever, prospective evidence supporting the use of cemented or uncemented implants in endoprosthetic reconstruction is lacking. Implant failure resulting in reoperation can have extremely negative consequences in this oncologic population; reoperations may delay chemotherapy, increase the risk of surgical site infection, and negatively affect the overall survival in these patients. This study aims to determine the effect of cement fixation compared to cementless fixation on all-cause reoperations one year post-operatively.

Methods:

The Prophylactic Antibiotic Regimens In Tumor Surgery (PARITY) trial was a multi-centre, randomized controlled trial using a parallel two-arm design. From January 2013 to October 2019, 604 patients >12 years of age undergoing surgical excision and endoprosthetic reconstruction of a lower extremity primary bone tumor were randomized to receive either long- or short-duration post-operative prophylactic antibiotics. Participants were followed post-operatively at regular intervals for one year. This secondary analysis utilized a multivariate cox proportional hazards model to assess the independent relationship between fixation group and implant survivorship with all-cause revision as the endpoint.

Results:

A total of 529 patients were included in the analysis. There were 396 cemented implants and 133 uncemented implants. Patients undergoing cement fixation were significantly older and were more likely to have a diagnosis of metastatic bone disease. There were no significant differences found in all-cause reoperation (HR:0.99, 95%CI:0.65 – 1.51, p=0.952), septic reoperation or aseptic reoperation between cemented and uncemented fixation one year post-operatively. Significant predictors of outcome were total operative time (HR:1.09, 95%CI:1.02 – 1.18, p=0.017), diagnosis of giant cell tumor (HR:0.10, 95%CI:0.01 – 0.94, p=0.044), and of metastatic bone disease (p=0.025).

Conclusion:

Cement fixation compared to cementless fixation has no effect on all-cause reoperation rates in endoprosthetic reconstruction surgery. A

surgery of longer duration confers a higher risk of revision surgery; therefore, surgeons should consider the most efficient fixation type in oncologic populations in order to reduce risk of revision.