

# Periprosthetic femur fractures: Survival outcomes for open reduction internal fixation and revision arthroplasty

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**Background:** Periprosthetic femur fractures (PPFFx) following total hip arthroplasty are complex injuries that are increasing in incidence. Patients with these injuries have high mortality rates, with some reports showing mortality rates approaching those of hip fracture patients. There is little data available, however, describing comparative mortality outcomes for these patients according to method of surgical treatment. The purpose of our study was to compare the survivorship for patients with Vancouver B PPFFx treated with open reduction internal fixation (ORIF) versus revision arthroplasty, with subgroup analysis of Vancouver B1 and B2 fractures.

**Methods:** We performed an IRB-approved retrospective review of all patients who underwent surgical treatment for Vancouver B PPFFx between 2003 and 2011. Patients were categorized into 2 treatment groups: ORIF or revision arthroplasty. Subgroup analysis of patients treated for Vancouver B1 and B2 fractures was performed. The primary outcome measure was survivorship as identified by the social security death index and analyzed using the Kaplan-Meier method. The secondary outcome measure was the incidence of major complications.

**Results:** 122 of 158 identified patients with Vancouver B PPFFx met our inclusion criteria for further analysis. The mean age was 75.7+ 13.2, with 70 (57%) women. There were no significant cohort differences by age, sex or Charlson comorbidity index between patients who underwent surgical treatment with ORIF versus revision arthroplasty. The mortality rate at 1 year for patients treated for Vancouver B PPFFx was 13.1%. ASA class was highly predictive of mortality ( $p = 0.001$ ). Survivorship, as measured by the Kaplan-Meier method, was significantly decreased for patients treated with ORIF as compared to those treated with revision arthroplasty ( $p = 0.04$ ). In patients > 79 years old, poor survivorship outcomes persisted in patients treated with ORIF while treatment with revision arthroplasty exerted a protective effect on survivorship. The mortality rate at 1 year for patients treated for Vancouver B2 PPFFx was 15.3%. Survivorship for patients with Vancouver B2 fractures treated with ORIF was significantly decreased as compared to those treated with revision arthroplasty ( $p = 0.006$ ).

The overall complication rate was 41.8%, with 25.4% of patients experiencing major complications. The return to OR rate was 17.2%. The Vancouver B2 revision arthroplasty cohort had a significantly greater number of overall complications (48.8%) and major complications (34.9%) than the Vancouver B2 ORIF cohort (20.6% and 10.3%, respectively).

**Conclusions:** Patients with Vancouver B PPFx treated with ORIF have significantly decreased survival compared to revision arthroplasty counterparts. In patients > 79 years old, treatment with revision arthroplasty potentiates survival benefits. Patients with Vancouver B2 PPFx treated with ORIF have highly significantly decreased survival compared to revision arthroplasty counterparts. Despite clear survival benefits, consideration for revision arthroplasty should be balanced with the significantly increased risk of major complications which often result in reoperation.