Femoral Stem Design Influences Post Operative Periprosthetic Femoral Fracture (POPFF) Risk & ndash; A Multi-Centre United Kingdom Study

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INTRODUCTION: As the clinical burden of post operative periprosthetic femoral fractures (POPFF) continues to grow, interest is increasing in the role different femoral stem designs play in modifying long-term POPFF risk. The primary aim of this multi-centre study was to compare the long-term survivorship and POPFF rate of a composite beam (CB) cemented femoral stem with a polished taper slip (PTS) cemented femoral stem.

METHODS: Between 2008 and 2013, 3198 consecutive total hip arthroplastys were performed using either the Exeter V40 (PTS) cemented femoral stem or the Lubinus SP II (CB) cemented femoral stem within three main participating hospitals. Acetabular components were either uncemented or cemented based on surgeon preference. Basic patient demographics and operative details were collected at time of surgery. Patient records and national radiographic archives were reviewed at minimum 10-years following surgery to identify occurrence of subsequent revision surgery, dislocation or periprosthetic fracture.

RESULTS: At mean 10.2-year follow-up (SD 2.9), 2214 patients (984/3198) remained alive. Mean patient age at surgery was 67.6 years (SD 11.2, 15 - 94 years). There were 1993 women (62%). Analysis of all-cause THA failure demonstrated CB stem survivorship of 97.3 % (95% confidence intervals, 95.3%-99.2%) and PTS stem survivorship of 95.8% (95% confidence intervals, 94.8%–96.8%) at 13 years. Risk of POPFF was significantly higher in the PTS group (RR 5.2, Cl 1.9 to 14.3, P = 0.0016), where POPFF accounted for 49% of major reoperations/ revision surgeries (36/73). However, risk of Vancouver type A and C fractures was not significantly different between stem types (p> 0.05). Older age at operation was associated with increased POPFF risk (P =0.007), whilst patient American Society of Anesthesiologists (ASA) class and sex had no impact. Risk of dislocation was significantly higher in the CB group (RR 2.1, Cl 1.0 – 4.3, P = 0.03).

DISCUSSION AND CONCLUSION: Patients may be counselled that PTS cemented femoral stems come with increased risk of Vancouver type B POPFFs when compared to CB stems. Indeed, POPFF is the main mode of failure of PTS stems, accounting for nearly 50% of revisions once open reduction and internal fixation (ORIF) is accounted for. Previous registry data has therefore underestimated the rate of failure of PTS stems, since POPFF treatment with ORIF is not typically captured. However, the impact on overall long-term survivorship is relatively small, and other factors such as patient age and dislocation profile may continue to influence choice of femoral stem in individual patients.

