Collared vs Collarless Hydroxyapatite-Coated Stems in Uncemented Primary Total Hip Arthroplasty – A Systematic Review and Meta-analysis

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INTRODUCTION: Periprosthetic femur fractures (PPF) remain a major complication following THA and are expected to increase along with the number of THAs performed. The use of a collared femoral component has been suggested as a potential method to mitigate this issue. Several studies attempted to report differences between collared and collarless uncemented stems. However, there is no consensus on which femoral implant design is preferable. Herein, we performed a systematic review and meta-analysis aiming to compare PPF rates between collared and collarless hydroxyapatite-coated femoral stem implants in uncemented THA.

METHODS: This systematic review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. PubMed, Embase, and Cochrane databases as well as grey literature were systematically searched to identify relevant studies since the date of inception to April 1, 2024. A random effects model meta-analysis was conducted and the I^2 statistic was used to assess for heterogeneity.

RESULTS: A total of 102,629 patients (51,512 collared; 51,117 collarless), were included in the final analysis (Figure 1). Collared stems were associated with significantly lower rates of postoperative PPF within 90 days after THA (0.2% vs 0.9%, OR: 0.33, 95% CI: 0.15-0.75, P= 0.008) compared to collarless stems (Figure 2). After analysis of studies with up to 10 years follow up, collared stems were again associated with significantly lower rates of postoperative PPF (OR: 0.29, 95% CI: 0.16-0.51, I^2: 71.5%).

DISCUSSION AND CONCLUSION: Collared stems were associated with significantly lower PPF rates compared with collarless stems. Prospective randomized controlled trials are warranted to validate our results as the current literature is inconclusive, due to heterogeneity in indications for each stem design and outcome reporting.

Figure 2. Forest plot demonstrating significantly less periprosthetic fracture rates of collared stems, compared with collarless stems within 90 days postoperatively

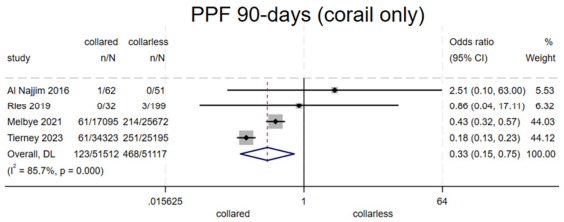

Figure 1. PRISMA flow chart