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Is There a Difference in Outcomes Between Collared and Noncollared Uncemented Femoral Stems in Primary Total Hip Arthroplasty?

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Is there a difference in outcomes between collared and non-collared uncemented femoral stems in primary total hip arthroplasty?

Response/recommendation: The use of both collared and noncollared uncemented femoral stems result in an excellent clinical outcome in patients undergoing total hip arthroplasty (THA). However, the rate of periprosthetic fractures is lower for the collared stems despite similar survivorship.

Level of evidence: Strong.

Delegates vote: Agree 84.6%, Disagree 9.7%, and Abstain 5.8% (strong consensus).

Rationale

The literature is rich with numerous studies, including many high-volume national registries and some systematic review studies, comparing collared versus noncollared uncemented femoral stems in patients undergoing total hip arthroplasty (THA). This systematic review was conducted to extract data related to these two different designs of femoral stem.

The studies collected data on important variables such as subsidences, periprosthetic fractures, overall complications, and the need for revision surgery. In addition, patient-reported outcomes (using Western Ontario and McMaster Universities Osteoarthritis Index, Harris hip score, The University of California-Los Angeles score), radiographic outcomes, and survivorships were evaluated. The influence of surgical approach, age, and other variables were also assessed [1,2].

In general, all studies reviewed demonstrated excellent survivorship for both stem types with similar radiographic and functional outcomes [1,3]. However, there was a significant difference between the two stems with regard to the rate of 90-day periprosthetic fracture, subsidence, and rotational instability, with data

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favoring collared uncemented femoral stems [4–10]. Alternatively, subsidence may not be clinically relevant as the revision rate is similar [1] and some articles may have a bias on a particular stem type.

Among many recent studies, seven reported on the patients from national registries that included the American, Australian, German, Norwegian, and the United Kingdom joint registries. The studies were conducted over the last 5 years and included a large number of patients that ranged from 59,518 to 337,647 undergoing THA. The main outcome of these studies was periprosthetic fracture incidence and collared stems [4–10].

There were four systematic reviews with slightly different analyses and conclusions. There were two systematic reviews that demonstrated decreased complication rates with long stems as well as collared ones [3,11]. There were three reviews that showed no difference in revision rates [1,3,11]. A single review found lower revision rates with collared stems [2]. The finding of higher revision rates in one review could be due to the use of smaller stems [9]. A systematic review included only randomized controlled studies and found differences in subsidence rates, but no superiority of collared stem [3] and otherwise similar clinical outcomes [1–3,11].

An explanation was offered regarding the differences in the rate of subsidence and periprosthetic fracture seen between the two stems. The collar, resting on the calcar, is believed to provide a protective effect against subsidence and subsequent fracture [2]. The rotational stability of collared stems is also thought to be higher. However, there are some unresolved issues. There is a theoretical issue with the use of collared stems. The collar, particularly when prominent, is thought to be responsible for iliopsoas tendon irritation and subsequent groin pain. Another issue with the use of collared stems relates to the need to seat the stem on the calcar, which in itself can result in intraoperative periprosthetic fractures, which can be treated during the same surgical procedure without requiring subsequent revision surgeries. The rate of intraoperative fractures was not reported in any of the studies that we reviewed.

In conclusion, it appears that the use of collared stems (at least the one common stem that was evaluated) results in a reduction in the rate of periprosthetic fracture, while noncollared stems provide comparable results in terms of long-term survival and functionality. Thus, surgeons starting to familiarize themselves with the use of a femoral stem at the start of their career may want to consider these findings that may influence their choice of a femoral stem.

CRediT authorship contribution statement

Levent Bayam: Writing – review & editing, Writing – original draft, Supervision, Conceptualization. **Kayahan Karaytug:** Supervision. **Oliver Marin-Pena:** Writing – review & editing, Writing – original draft, Project administration, Conceptualization. **Adam Rana:** Writing – review & editing, Writing – original draft, Conceptualization. **Emilio Romanini:** Investigation, Conceptualization. **Eryou Feng:** Investigation. **Remzi Tozun:** Methodology, Investigation, Formal analysis.

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