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Comparison of a highly porous titanium cup (tritanium) and a conventional hydroxyapatite-coated porous titanium cup: A retrospective analysis of clinical and radiological outcomes in hip arthroplasty

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Introduction & Aim: The use of 3-dimensional highly porous acetabular cups is increasing. Their structure and mechanical properties mimic those of natural bone; therefore, they should promote stronger biological fixation. In our experience with total hip arthroplasty, radiolucent lines are observed when a 3-dimensional highly porous cup (stryker tritanium) is used. In this study, we compare the clinical and radiographic results between a tritanium cup and a conventional cup (stryker trident HA) over a short time period.

Method: We retrospectively compared consecutive cases of primary total hip arthroplasty using a tritanium cup (130 cases in 118 patients) and a matched cohort of using a trident cap (130 cases in 130 patients) between January 2011 and December 2014.

Results: The mean follow-up duration was 41.3 and 38.1 months (p=0.06) for the tritanium and trident groups, respectively. There were significant differences between the groups for radiolucent lines, cup abduction angle and cup-center-edge angle. Radiolucent lines increased in the tritanium group (36% at 3 months and 60% at final follow-up), whereas they decreased in the Trident group (2.5% at 3 months and 0.8% at final follow-up). The occurrence of radiolucent lines was significantly higher in the tritanium group than in the trident group at each follow-up period. Radiolucent lines were seen in 36% of patients in the tritanium group during follow-up, without initial gaps. One cup loosening in the tritanium group was identified at the final follow-up evaluation.

Conclusion: Both groups showed successful clinical results over short-term follow-up; however, the tritanium group had a significantly higher rate of radiolucent line occurrence around the cups than did the trident group. Thus, radiolucent lines can occur when using highly porous titanium cups; these lines indicate the possibility of future cup loosening. Longer follow-up and assessment of the results of using this implant are necessary.

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