

INPLASY

Porous tantalum acetabular cups in primary and revision total hip arthroplasty: what has been the experience so far? – A systematic literature review

INPLASY202430042

doi: 10.37766/inplasy2024.3.0042

Received: 12 March 2024

Published: 12 March 2024

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ADMINISTRATIVE INFORMATION

Support - No financial support.

Review Stage at time of this submission - Completed but not published.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202430042

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 12 March 2024 and was last updated on 12 March 2024.

INTRODUCTION

Review question / Objective Investigate the potency of tantalum acetabular components in primary and revision THA, augmenting orthopaedic surgeons' knowledge in their course of action when dealing with challenging cases.

Condition being studied As the population is steadily growing older, hip joint related problems have also sprout and the majority of them need to be addressed surgically. The biggest and most common of these is hip arthritis, a disease that was not treatable surgically until the middle of the 20th century. A material revolution of the 20th century was total hip arthroplasty (THA), which was heralded as the "operation of the century", featuring beneficial impact on the patients' quality of life and their daily needs. One of the most

significant complications though, is mechanical failure of the procedure that requires a revision surgery (rTHA). As time goes by, there is an enormous development in science and medicine, leading to an evolvement of the surgical techniques and materials used for bone implants.

METHODS

Participant or population Reporting on human patients undergoing primary or revision total hip arthroplasty.

Intervention Total Hip Arthroplasty and Revision Hip Arthroplasty.

Comparator Direct comparison between tantalum acetabular cups and conventional titanium acetabular cups employed in total hip arthroplasty.

Study designs to be included Radiological evaluation (cup migration, osteointegration). Clinical (functional scores, need for subsequent revision, patient-reported outcomes). Postoperative complications.

Eligibility criteria Direct comparison between tantalum acetabular cups and conventional titanium acetabular cups employed in patients who underwent total hip arthroplasty or revision hip arthroplasty. All articles should be in English language.

Information sources The Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines were utilized in this systematic review. A concise and systematic search was performed for articles published in the following computerized literature databases: MEDLINE/Pubmed, Google Scholar, Web of Science and Embase.

Main outcome(s) Porous tantalum acetabular cups appear to be a valuable option in revision total hip arthroplasty, providing clinical improvement, radiological stability, and promising long-term outcomes. However, ongoing research, longer follow-up periods, and careful consideration of patient factors are essential to further validate and refine the use of tantalum in various clinical scenarios.

Quality assessment / Risk of bias analysis The Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines were utilized in this systematic review and no ethical approval was needed. Overall bias unclear.

Strategy of data synthesis The search utilizing the aforementioned keywords yielded 442 unique articles, until the 15th of October 2023. The studies were analysed for duplication with resulting number of studies to 158. The authors independently reviewed the titles and abstract of each result, and those that were clearly irrelevant and/or failed to pertain to the pre-determined inclusion criteria (n=83) were eliminated. The remaining seventy-five (n=75) articles were further scrutinized for clearly relevant trials that indisputably met the inclusion criteria, eliminating a further 24 trials. The full-texts of the remaining fifty-one (n=51) articles were independently reviewed by the authors of this review, who agreed upon all to be objectively relevant to this summary in discussion.

Subgroup analysis Patients treated with porous tantalum acetabular cups for THA or rTHA and

patients treated with porous titanium acetabular cups.

Sensitivity analysis Sensitivity analyses based on quality/RoB was not conducted.

Country(ies) involved Greece.

Keywords tantalum, bone loss, primary total hip arthroplasty, revision total hip arthroplasty, acetabular component, hip, acetabulum, acetabular cup.

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