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Cost-effective implants in hip replacement surgery

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New research led by the Hip Implant Prosthesis Study (HIPS) team at the University of Bristol Medical School has shown that small-head (less than 36 mm in diameter) cemented metal-on-plastic hip replacements are the most cost-effective in men and women older than 65 years. For adults younger than 65, small-head cemented ceramic-on-plastic hip replacements are more likely to be cost-effective. The study found no evidence that uncemented or hybrid hip replacements are cost-effective options, while large-head implant sizes (more than 36 mm) are also not cost-effective.

The research follows the team's findings published last year in *BMJ* from a large review of randomised controlled trials, where no evidence was found that newer implants such as ceramic or uncemented implants were better than the traditional cemented metal-on-plastic ones, whereas metal-on-metal and resurfacing implants were worse.

There are many different types of implants available for hip replacements at a wide range of costs. However, it has been unclear whether the more expensive implants are able to last longer for patients and save expensive revision surgeries for the NHS.

Some of the more modern types such as uncemented ceramic-on-ceramic and uncemented ceramic-on-plastic are considerably more expensive than the older cemented metal-on-plastic hips, although there is little evidence that they avoid revision surgeries in the longer term. HIPS has shown that the older the patient, the more likely cemented

metal-on-plastic hip replacements are cost-effective. Despite a lack of cost-effectiveness evidence, uncemented or hybrid combinations are increasingly used in younger adults worldwide.

The NIHR-funded research, published online in Value in Health, has reported the largest cost-effectiveness economic model study of hip implants to date, comparing 24 different types of hip implants commonly used in clinical practice. Implants which are no longer recommended for use and thus in decline in clinical practice, such as metal-on-metal and resurfacing implants, are excluded from analyses. Implants are ranked by cost-effectiveness for each patient group of different sex and age profiles. The HIPS team used data from two large national cohorts, the National Joint Registry for England, Wales, and the Northern Ireland, and the Swedish Hip Arthroplasty Register. The researchers combined the two registers and analysed over one million patients with total hip replacement in the two countries with over 30 years follow-up.

Dr Elsa Marques, Senior Research Fellow in the Musculoskeletal Research Unit at the Bristol Medical School: Translational Health Sciences (THS), who led the study, said: "Small-head cemented metal-on-plastic implants have the longest track-record of use; they are safe and the cheapest implant type on the market, but tend only to be favoured for older patients. Currently only 30 per cent of patients in the NHS are offered a cemented implant, whereas the uptake of uncemented implants has been rising in the UK in the last ten years, particularly for younger adults."

"Our findings produce new evidence to inform clinical practice. Regardless of their bearing material, there is no effectiveness or cost-effectiveness evidence that uncemented implants last longer and avoid revision surgeries for any patient group. We hope this information will help patients, clinicians, and decision-makers make better informed

decisions for patients and reduce the financial burden of hip replacement surgeries."

Ashley Blom, Professor of Orthopaedic Surgery and Head of Translational Health Sciences at the Bristol Medical School (THS) and who leads the statistical analysis team of the National Joint Registry, commented: "This study is extremely helpful in assisting health care providers, patients and surgeons to select the appropriate implants. We now have good evidence as to which implants are most effective and most cost-effective."

Metal-on-plastic implants also remain the most commonly used bearing surface material in Sweden, Norway, Australia, and the United States, although in some countries, such as the United States and Australia, they are more commonly fixed without cement.

More information: Christopher G. Fawsitt et al. Choice of Prosthetic Implant Combinations in Total Hip Replacement: Cost-Effectiveness Analysis Using UK and Swedish Hip Joint Registries Data, *Value in Health* (2018). DOI: 10.1016/j.jval.2018.08.013

José A López-López et al. Choice of implant combinations in total hip replacement: systematic review and network meta-analysis, *BMJ* (2017). DOI: 10.1136/bmj.j4651

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