EDITORIALS

Should Total Hip Arthroplasty Be Used for Hip Fracture?

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For an elderly and frail patient, a hip fracture is a severe injury associated with increased morbidity and mortality.[1] Although the majority of femoral neck fractures have historically been treated with reduction and internal fixation, most current guidelines advocate arthroplasty for displaced fractures of the femoral neck in elderly patients.[2,3] The type of prosthesis that should be used in this context remains to be established. Several systematic reviews have reported that the results with total hip arthroplasty are superior to those with hemiarthroplasty in fit, ambulatory patients, but there have been concerns about the greater amount of surgical trauma and the higher potential risk of subsequent dislocation associated with total hip arthroplasty.[4-6]

Therefore, the randomized, controlled trial performed by Bhandari and colleagues and reported in this issue of the *Journal* fills a long-awaited need.[7] The Hip Fracture Evaluation with Alternatives of Total Hip Arthroplasty versus Hemi-Arthroplasty (HEALTH) trial, conducted at 80 centers in 10 countries, enrolled 1495 patients 50 years of age or older who had a displaced femoral neck fracture. All the patients were ambulatory before the fracture. Participants were randomly assigned to undergo either total hip arthroplasty or hemiarthroplasty and were followed for 2 years. The primary end point was an unplanned secondary surgical procedure, which occurred in 7.9% of patients after total hip arthroplasty and in 8.3% after hemiarthroplasty. The analysis of secondary outcomes indicated that total hip arthroplasty resulted in modestly better function than hemiarthroplasty, as assessed with the Western Ontario and McMaster Universities Index (WOMAC) score. There were no significant differences in quality of life or mortality. The results of this trial are likely to have high generalizability, given the large number of centers and patients, and may have implications for hip-fracture management.

When complications lead to a secondary procedure in an older, frail patient, the results can be devastating. The various risk factors for secondary surgical procedures should be acknowledged, and the risk should be reduced as much as is feasible. One major concern after total hip arthroplasty is the risk of hip instability and dislocation,[4,5] and this was the most common reason for secondary procedures in the HEALTH trial. The risk of dislocation can be reduced by avoiding prostheses with small heads (<32 mm).[8] Furthermore, the use of dual-mobility acetabular cups has been shown to lower the risk of dislocation after total hip arthroplasty for hip fracture.[9] In the HEALTH trial, one fifth of the patients assigned to a total hip arthroplasty received a smaller prosthesis head. Dual-mobility acetabular cups were used in only five patients. In addition, uncemented press-fit stems were used in 39% of the total hip arthroplasties and 32% of the hemiarthroplasties.[7] An increased risk of secondary procedures due to periprosthetic fracture, dislocation, and loosening of the prosthesis after arthroplasties with uncemented stems in elderly patients has been reported from several national arthroplasty registries.[10] However, the use of cemented stems in elderly patients with hip fractures, regardless of whether the patient receives a total hip arthroplasty or a hemiarthroplasty, is currently recommended by national guidelines.[2,3]

One implication of the HEALTH trial is that hemiarthroplasty may provide a satisfactory result for the majority of elderly patients with hip

fractures. Considering the nearly equal risk of secondary surgical procedures and the modest benefit in functional outcome, should we abandon the use of total hip arthroplasty in the treatment of hip fractures? Even if the benefits seem smaller than we previously thought, patients with high physical demands and a long remaining life expectancy should probably still be considered for treatment with total hip arthroplasty. Yet the expected remaining lifetime of those patients who potentially could benefit most from a total hip arthroplasty is much longer than the 2-year follow-up period used in the HEALTH trial. However, the number of secondary procedures after hemiarthroplasty may increase with longer follow-up. Therefore, one hopes that the HEALTH investigators will be able to provide long-term results from their trial in the future. Such data would be an even more important contribution to the knowledge base that supports hip-fracture treatment. There is still a need for large randomized, controlled trials or registry-based randomized clinical trials with greater numbers of patients in order to identify how factors such as patient activity level, biologic age, and remaining life expectancy influence the risk of secondary surgical procedures and functional outcome after hemiarthroplasty and total hip arthroplasty. Until then, in light of the results of the trial by Bhandari et al., we should probably be restrictive in the selection criteria for total hip arthroplasty for patients with hip fractures.

Disclosure forms provided by the author are available with the full text of this editorial at NEJM.org.

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Parting the Clouds over Typhoid with a New Conjugate Vaccine

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Typhoid fever is caused by fecal–oral transmission of *Salmonella enterica* serovar Typhi (S. Typhi). It has been a deadly companion to mankind for centuries, affecting 10.9 million persons and resulting in an estimated 116,800 deaths per year.[1] Although vaccines against typhoid have been available for more than a century and have been shown to be protective,[2,3] the approved vaccines (injectable Vi polysaccharide and oral, live-attenuated Ty21a typhoid vaccines) have not been useful in populations with a high typhoid burden, particularly in young children.[4] To address this shortfall, the Bill and Melinda Gates Foundation, as well as other donors, has supported the development of new typhoid conjugate vaccines (TCVs), generated data on disease burden, and coordinated with international stakeholders to introduce the vaccine in countries where typhoid fever is endemic.

Typbar-TCV was developed by Bharat Biotech International in India and was prequalified by the World Health Organization (WHO)[3] on the basis of immunogenicity and evidence of protection (55% efficacy) in a typhoid human challenge model.[5] In this issue of the *Journal*, Shakya et al.[6] report that this vaccine was immunogenic and efficacious against blood culture–confirmed ty-