Current Perspectives in Primary Total Hip Arthroplasty

Written by Nicola Parry

In a symposium on hot topics and controversies in primary total hip arthroplasty (THA), various speakers shared their perspectives on topics such as choice of thromboembolic prophylaxis, femoral component, and bearing surfaces.

Vincent D. Pellegrini Jr, MD, Medical University of South Carolina, Charleston, South Carolina, USA, and Robert L. Barrack, MD, Washington University School of Medicine, St Louis, Missouri, USA, discussed the issue of thromboembolic prophylaxis in THA. According to Dr Pellegrini, despite improvements in postoperative recovery protocols and shorter hospital stays, thromboembolic events remain a challenge in patients undergoing THA, with 80% to 85% of events continuing to occur within 3 months of hospital discharge. And despite extensive research in the past few decades, there is still controversy concerning the best prophylactic regimen in patients undergoing primary THA, although pharmacologic agents continue to be the favored approach.

However, although newer generation anticoagulants such as rivaroxaban significantly reduce the rate of deep vein thrombosis and pulmonary embolism, by 50%, compared with fractionated heparin, bleeding risk remains significant [Turpie AGG et al. *Lancet*. 2009].

Interestingly, recent research has led to the reevaluation of aspirin use in venous thromboembolism (VTE) prophylaxis. Dr Pellegrini shared data from studies investigating its use in the prevention of recurrent VTE in the nonsurgical setting, showing that aspirin lowered all-cause mortality, deep vein thrombosis, and pulmonary embolism, without an accompanying increase in bleeding [Becattini C et al. *N Engl J Med*. 2012; Brighton TA et al. *N Engl J Med*. 2012].

Dr Pellegrini emphasized that he prefers to use warfarin as the best compromise between safety and efficacy. His current routine involves regional anesthesia using a spinal and a lumbar plexus block and 6 weeks of warfarin therapy with a target international normalized ratio of 2, in combination with pneumatic compression boots.

Dr Barrack highlighted how the American Academy of Orthopaedic Surgeons, the American College of Chest Physicians, and the Centers for Medicare and Medicaid Services now share a uniform approach to VTE prophylaxis for the first time. Instead of considering deep vein thrombosis as an end point, they all now focus on minimizing symptomatic events and bleeding complications.

He further advocated the use of aspirin for VTE prophylaxis, particularly in conjunction with contemporary methods of mechanical compression. Sharing data from a study conducted at his institution where 1859 prospectively enrolled patients undergoing THA were evaluated, he demonstrated that risk stratification and use of a mobile mechanical compression device (MCD) and aspirin is an efficacious and cost-effective strategy for VTE prophylaxis in THA, with a higher level of patient satisfaction.

Routine-risk patients (n = 1402) in the nonrandomized study received MCDs and aspirin prophylaxis postoperatively, while the high-risk patients (n = 457) received MCDs, anti-embolism stockings, and warfarin therapy. The use of MCDs and aspirin was superior to warfarin in high-risk patients with regard to bleeding and wound complications, with similar efficacy in preventing VTE. At 4 to 6 weeks postoperatively, the incidence of symptomatic VTE was the same in routine- and high-risk cohorts and nonsignificantly lower in the routine-risk cohort after 6 months. However, in high-risk patients who had received low-intensity warfarin therapy, the risk of all major complications was significantly greater than the routine-risk group, including major bleeding (2.0% vs 0.5%; $P < .006$), wound problems (1.2% vs 0.2%; $P < .01$), and wound drainage ≥ 7 days postoperatively (11.1% vs 4.7%; $P < .0001$).

High-risk patients were also more likely to be readmitted to the hospital during the first 6 months postoperatively than routine-risk patients (14.1% vs 10.0%; $P = .02$), with more of these admissions directly due to anticoagulant therapy in high-risk patients (7.5% vs 2.8%; $P = .23$).

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John W. Barrington, MD, Joint Replacement Center of Texas, Plano, Texas, USA, and Daniel J. Berry, MD, Mayo Clinic, Rochester, Minnesota, USA, discussed femoral component selection in THA. Dr Barrington noted that shorter stems are advantageous because they reduce stress shielding, preserve femoral bone stock, avoid proximal-distal mismatch, and are easier to insert less invasively.

He discussed a study in patients who underwent primary THA, which compared the use of a short standard stem (n = 849) with one of similar geometry that was 35 mm shorter (n = 902) for a given stem size [Barrington JW, Emerson RH Jr. *J Arthroplasty.* 2013]. The results showed that short and shorter stems demonstrate similar stability in THA. At 7 years postoperatively, survivorship was 99% in both the short and shorter groups, as was the number of surgeries that were revised (8 vs 9); 8 additional re-operations were required in the short group, compared with 3 in the shorter group. The Harris Hip Scores were also similar in both groups (Δ47 vs Δ48). No failure mechanism ≥ 0.7% was seen using either stem size.

Comparison studies have shown that short uncemented stems work well in patients who are young or elderly, have rheumatoid arthritis, or even hip fracture, said Dr Barrington. Dr Barrington concluded that the short uncemented stem works well in most hips and is his choice in > 90% of THAs, although he chooses not to use them in about 7% of cases—namely those in which there is altered rotational anatomy (in which case he chooses a fluted or modular stem) or in female patients > 75 years, in whom survival of cemented stems is greater than that of uncemented ones [Mäkelä KT et al. *BMJ.* 2014].

Dr Berry, in contrast, prefers to use a standard length uncemented tapered stem in most patients. He discussed that these stems perform well, with high early and long-term success rates and outstanding clinical results with few complications. The long stem optimizes alignment and biomechanical performance and helps to distribute forces over a large surface area, so it is therefore more forgiving. Surgeons are also familiar with their well-established implanting technique.

He noted that short stems have never been demonstrated in a level 1 study to result in less thigh pain than long stems; and although short stems result in more normal physiologic loading than long stems, they still lead to femoral remodeling. While long stems may be slightly more difficult to remove, it is uncommon to need to remove them, except in rare cases of failure. And except for when using certain operative approaches, short stems are typically not easier to implant than long stems and are easier to malalign, resulting in changes in bone biomechanics. Dr Berry also emphasized that, in addition to the problem of malalignment, concerns such as stem subsidence, intraoperative fractures, and lack of long-term data should prevent their widespread use in THA until more compelling evidence and data become available [Khanuja HS et al. *J Bone Joint Surg Am*. 2014].

Javad Parvizi, MD, Thomas Jefferson University Hospital, Philadelphia, Pennsylvania, USA, and Laurent S. Sedel, MD, PhD, Clinique Saint Jean de Dieu, Paris, France, discussed optimal bearing surfaces in THA. Dr Parvizi began by focusing on the use of ceramic-on-highly cross-linked polyethylene (HXLPE). Polyethylene wear and resulting osteolysis were 2 major reasons for the introduction of alternate bearing surfaces to conventional polyethylene, and, according to Dr Parvizi, HXLPE is one such material that has been successful in reducing these problems.

As people live longer and lead increasingly active lives, the longevity of the THA (determined largely by the bearing surface) becomes increasingly important. Dr Parvizi therefore stressed the importance of choosing a surface that offers maximal THA longevity for the patient. Ceramic is one such biocompatible material that leads to better longevity of the hip. Compared with metal (cobalt-chromium), the use of ceramic-on-HXLPE articulation affords better wear properties in THA. Ceramic is a more wettable material, and therefore improves lubrication, and its small grain size improves bearing contact and reduces friction and wear. It also reduces the potential for stem corrosion [Kurtz SM et al. *Clin Orthop Relat Res.* 2013], ceramic fracture, and squeaking, as can occur with ceramic-on-ceramic (CoC) bearings, said Dr Parvizi.

Prof Sedel also highlighted the advantages of ceramic, including recent data suggesting that it might reduce the incidence of prosthetic joint infection [Streicher RM. EHS 2014 (abstr)]. In contrast to Dr Parvizi, however, he advocated that CoC bearings are the optimum choice in most cases of THA in younger and more active patients. Discussing results from international registries and long-term series, he highlighted that this pairing produces excellent long-term outcomes.

In addition, CoC bearings result in minimal wear, no osteolysis or adverse biological effects such as hypersensitivity, and an extremely low fracture risk. Recent data have also shown that CoC bearings improve long-term hip stability, resulting in less risk of long-term dislocation, compared with alumina-on-polyethylene bearings [Hernigou P et al. *Clin Orthop Relat Res.* 2013].

Prof Sedel emphasized that CoC is best for young, active patients [Vendittoli PA et al. *Acta Orthop Belg.* 2013], and those whose life expectancy is > 15 years. It is the only material that provides excellent outcomes in young patients, with low wear, joint stability with limited long-term dislocation, an unlimited ability to perform sports and activities, and decreased infection risk, he concluded.