



Opinion

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Total Hip Arthroplasty in Young Adults



Sharma S, Elhence A*, Banerjee S, Jalan D, Gahlot N, Barwar N, Rathore KS, Yadav SK, Choudhary R and Sharma PK

Department of Orthopaedics and Pharmacology, All India Institute of Medical Sciences, India

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*Corresponding author: Elhence A, Department of Orthopaedics and Pharmacology, All India Institute of Medical Sciences, India, Tel: 91-8003996926; Email: abhayelhence@gmail.com

Opinion

Total Hip Arthroplasty (THA) is rarely recommended in young adults in view of the potential requirement of multiple revisions. Young age with its associated high activity levels is a known risk factor for revision [1]. Post-revision hip function recovery is poorer than a primary THA and has worse implant survival [2-4]. This has prompted Orthopaedic surgeons to rely upon conservative management and/or hip preservation surgeries. The functional outcome of both mentioned modalities is significantly worse than a THA. A delay in primary THA worsens the preoperative functional status and deformities, which are significant predictors of postoperative functional outcome after a primary THA [5]. Hip preservation surgeries are useful up to a limited degree (Tonn is Grade 1 for Dysplastic hip) but distort the anatomy and hence biomechanics of hip joint which complicates the procedure whenever it is done affecting the functional outcome [6-9]. Hence, patients with early onset osteoarthritis of hip tend to have a worse outcome and high revision rate even after delayed primary THA that is further complicated by systemic side effects of prolonged analgesic use. This coupled with poor functional ability in youth, the most active and productive period of an individual's life results in significant personal, professional and economic loss to the patient. Hence, the potential benefit of delayed primary THA at the cost functional status is itself in question and requires a more detailed study.

Recent data on the long term survival following primary THA along with improvements in bearing surfaces and surgical techniques/implants has shown promising results. This has prompted some Orthopaedic surgeons to explore the option of THA at a young age.

The major indications for THA [10] in patients younger than 20 years (as per Norwegian Arthroplasty Register) are summarized as follows:

- i. Paediatric Hip Diseases: Developmental Dysplasia of Hip, Perthes' Disease, SCFE, Avascular Necrosis of Femoral Head, Arthrogryposis, Myeloproliferative syndrome.
- ii. Systemic Inflammatory Diseases: Juvenile Idiopathic Arthritis (most common), Ankylosing Spondylitis, SLE, Psoriatic Arthropathy
- iii. Sequelae of Trauma: Femoral Neck Fracture, Acetabular Fracture, Hip Dislocation.
- iv. Sequelae of Infection: Septic Arthritis, Tuberculosis
- v. Others: Tumors around hip joint, AVN following chemotherapy, Habitual dislocation.

With improvements in Rheumatologic drugs, a load of patients with Systemic Inflammatory Diseases has reduced [11]. But still, a large subset of patients suffers from non-preventable causes such as Paediatric Hip Diseases. These patients may be offered Hip Preservation Surgeries such as Periacetabular Osteotomies (PAO) in order to delay the need for THA. Studies have shown that these procedures may delay THA up to 30 years and beyond [12]. Studies have shown survival rates (Kaplan-Meier Analysis taking conversion to THA as an end-point) up to 90% at 5 years [13], 84% at 10 years [13,14], 60.4% at 20 years [13] and 29% at 30 years respectively [12]. However, only a limited number of patients may actually derive benefit as previously conducted studies have also shown that Tonnis Grade 2, 3 and 4 Osteoarthritic changes have early failure rates (Mean survival <5 years) [13,15]. In comparison, THA done in young individuals (defined as below 30 years of age), 10-year survival rates range between 89-93% in various studies [16,17]. Even for individuals undergoing THA before 20 years, the 10-year survival rate is 70% [10]. Moreover, patients undergoing THA tend to have a better functional ability in comparison to patients managed conservatively for advanced OA of the hip (who cannot be offered Hip preservation surgeries).

In case of patients with a vascular necrosis (AVN) due to non-traumatic causes, various modalities such as Core Decompression (CDC) (with/without fibular Strut Grafting/stem cells augmentation) have been offered to the patients. However, these modalities have shown viable results only before the onset of OA (up to Modified Ficat-Arlet Stage II-A) [18,19]. Even in the patients undergoing CDC at early stages, 30-40% experience progression of disease pathology at a more rapid pace than those without any intervention [20]. Proximal Femoral Osteotomies have been offered to improve biomechanics in patients with Osteoarthritis (with highly variable results) [21], but these patients' pathology tends to progress as the pathology of AVN remains unaffected and ultimately the requirement for THA arises. Moreover, Proximal Femoral Osteotomies are suited only for patients with localized lesions where it is possible to bring the collapsing segment out of weight-bearing zone [21]. All these procedures distort the anatomy of proximal femur, making the THA procedure technically more demanding [22], which may worsen the outcome of the surgery of last resort.

Hence, practically for all major modalities of OA in the young population, alternative surgical procedures have more or less proved to be a false dawn with THA as the last resort. With improvements in surgical techniques and bearing surfaces, the pattern of failure of THA has been changed considerably. Loosening (whether septic or aseptic) has become less common (as shown in a systematic review comparing outcome of THA done in patients <30 years of age before and after 1988, 70.7% vs 48.0%) [11]. There has been a relative (not absolute) increase in wear of bearing surface as a cause of failure (24.0% after 1988 vs 3.1% before 1988). The same study registered a statistically significant reduction in revision rates (12.3% vs 19.6%) after 1988 [11]. A change in pattern of failure has allayed the concern of reduced bone stock to some extent. The advent of newer materials like trabecular metal augments/shells and bone banking has improved the management in patients with limited bone stock [23-25]. These improvements have also improved the outcome following the revision process [23-25], which may potentially reduce the number of revisions needed over lifetime (long-term results still awaited). Moreover, improved survival rates have emboldened the Orthopaedic surgeons to offer THA at a younger age.

In short, with changing lifestyles in a competitive world; young patients' expectation after a procedure increase, which can be better, fulfilled with arthroplasty in comparison to alternative modalities. This trend has been augmented by improvements in surgical techniques and material sciences resulting in an improvement in implant survival and functional outcome. Hence, in the 21st century, it should be more difficult to delay the benefits of arthroplasty to younger age group patients.

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