



Review

Total hip replacement for hip fracture: Surgical techniques and concepts



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ABSTRACT

When treating a hip fracture with a total hip replacement (THR) the surgical technique may differ in a number of aspects in comparison to elective arthroplasty. The hip fracture patient is more likely to have poor bone stock secondary to osteoporosis, be older, have a greater number of co-morbidities, and have had limited peri-operative work-up. These factors lead to a higher risk of complications, morbidity and perioperative mortality.

Consideration should be made to performing the THR in a laminar flow theatre, by a surgeon experienced in total hip arthroplasty, using an anterolateral approach, cementing the implant in place, using a large head size and with repair of the joint capsule. Combined Ortho-geriatric care is recommended with similar post-operative rehabilitation to elective THR patients but with less expectation of short length of stay and consideration for fracture prevention measures.

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Introduction

The incidence of hip fracture is increasing year on year [1–3]. The total number of recorded intra-capsular hip fractures in the United Kingdom for 2014 was 64,102 [4]. The surgical options for an intracapsular fracture include internal fixation, hemiarthroplasty or total hip replacement (THR).

The United Kingdom National Institute for Clinical Excellence (NICE) [5] stipulates that patients with displaced intra-capsular fractures should have the option of a THR discussed if–

- They are able to walk independently outdoors with no more than one stick
- They are not cognitively impaired
- And are medically fit for the anaesthetic and the procedure

Partly as a consequence of these guidelines there has been a steady increase in the number of total hip replacements performed for hip fracture patients in the UK. In 2011 10.7% of eligible hip fracture patients received THR. This increased to 19.1% in 2013 and 26% in 2015 [4]. The figures from the UK National Joint Registry of England, Wales (NJR) also corroborate this with 1698 THR in 2011 for hip fracture compared to 3246 THR in 2014 (NJR 2011–14) [6].

A number of randomised trials and case series reports have to date shown favourable outcomes for THR in comparison to hemiarthroplasty [7–11]. These reports have however highlighted the potential for an increased risk of specific complications, particularly dislocation [11]. This has led to the suggestion that the surgical technique used for a standard patient with an arthritic hip should be modified for a THR in a hip fracture patient. The authors believe that a THR for a hip fracture is a different operation and has different challenges to that of a primary elective THR for arthritis (Fig. 1). This review draws attention to the possible operative modifications that may differ from a standard ‘elective’ THR.

Surgical expertise

We recommend performing the THR in a laminar flow theatre [12]. All of these cases should be performed or supervised by surgeons regularly performing hip arthroplasty. There is evidence that dislocation rates are higher in surgeons performing less than 5 THR per year in the elective population [13]. It is no longer

acceptable for occasional hip surgeons to be undertaking these cases. The same study also found an association between dislocation and an operative duration of over 180 min [13]. Units should have a policy of calling for senior assistance if the case is not in line for completion within 90 min total surgical time.

Surgical approach

We recommend using an antero-lateral approach. This is primarily due to the reduction in risk of hip dislocation, which has been demonstrated in the hip fracture population [14–16]. In elective hip arthroplasty it is accepted that there is a small but definite difference in dislocation rate between the anterolateral and posterior approach [6]. Stafford et al. reviewed the THR records for hip fracture patients submitted to the National Joint Registry (NJR) [15]. They reported that revision rates were significantly higher in hip fracture patients treated with THR by the posterior approach compared to other approaches (anterior/lateral) (3.5% vs 1.3%, $p=0.02$). In a series of 713 hips Enocson et al. suggested an increased rate of dislocation in fractured hip THR using the posterior approach in comparison to the anterolateral approach 12% versus 2% $p < 0.001$ respectively [16].

There is however an increasing trend towards elective hip replacement being inserted via the posterior approach [6], and it is unknown if it is better to have an experienced arthroplasty surgeon use a posterior approach with which they are familiar than an inexperienced one using an antero-lateral approach. If the posterior approach is used then capsular repair and repair of the short external rotators with a strong non-absorbable suture using trans-osseous sutures in the greater trochanter should always be performed. We suspect a surgeon will achieve the best results using the approach they are most familiar with. However, whatever approach is chosen outcomes should be regularly audited, specifically surgeon, approach and dislocation rate. This should also include formal training of THR in hip fracture patients by senior arthroplasty surgeons.

Cemented v uncemented hip replacement

We recommend using a cemented cup and stem for hip fracture patients. Evidence from the NJR has demonstrated an increased rate of revision in patients treated with un-cemented versus cemented prosthesis for hip fracture (hazard ratio (HR) 1.33, $p=0.021$) [15,17]. We therefore recommend using a cemented cup and a cemented stem for hip fracture patients.

An increased risk of bone cement implantation syndrome exists in hip fracture patients. This is reflected in the higher mortality in hip fracture patients treated with a cemented implant at 24 h. However, this difference has disappeared at 7 days and uncemented implants have a higher mortality at 3 months [19,20]. The authors take the view that where a patient is felt to be at significantly increased risk if the bone cement were to be pressurised, this would suggest they are not medically fit enough to have a THR rather than a hemiarthroplasty. The use of bone cement should always be discussed with the anaesthetic team at the pre-operative theatre briefing and at a ‘time out’ check prior to cementing [21]. Full precautions and an appropriate cementing

- Older patient age group
- Osteoporotic bone
- Greater number of associated co-morbidities
- Need to avoid prolonged surgery
- Increased risk of dislocation
- Lower life expectancy in comparison to patients undergoing elective THR
- The operation may be more likely to be undertaken by non-specialist hip surgeons or surgeons in training
- Patient not preoperatively prepared for arthroplasty surgery (medically or socially)

Fig. 1. Issues to consider for hip fracture patients.

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