



Hemiarthroplasty or Total Hip Arthroplasty for Displaced Femoral Neck Fracture: A Question of Risk?

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Editorial

Arthroplasty is the preferred treatment for displaced Femoral Neck Fracture (FNF) in the elderly. Total Hip Arthroplasty (THA) has been recommended for the mobile, medically fit and lucid patient but level one study has not demonstrated superiority over Hemi Arthroplasty (HA). Large demographic studies have highlighted substantially elevated risks of mortality and surgical complications relative to elective THA patients and further studies are needed to define the causes for the differences. Arthroplasty rather than fracture fixation has been clearly demonstrated as the treatment of choice for elderly patients with displaced Fractures of the Femoral Neck (FNF) in a number of Randomised Control Trials (RCT) with both short and long-term follow up [1]. In four studies with greater than 9-year follow-up, all reported significantly lower rates of re-operation and improved functional outcome after arthroplasty compared with internal fixation. Even if fixation was performed without complication, long-term pain and function never matched those patients who had a successful arthroplasty [2]. There is broad agreement on the use of cemented rather than uncemented arthroplasty for displaced FNF [1]. However, the optimal type of arthroplasty, namely Total Hemi Arthroplasty (THA) or Hemi Arthroplasty (HA), has not been clearly established, particularly in the younger, lucid and more active patient. A number of RCTs have compared THA and HA but the results have been undermined by small sample size, poor study design and failures to control surgical and implant variables [3-7]. There are also a number of systematic reviews but the conclusions have been weakened by inclusion of studies of outdated monoblock or uncemented implants and retrospective and quasi-randomised publications [8-11]. Quality randomised trials reflecting accepted surgical practise are essential to allow comparison of similar patient cohorts in which there is an equal distribution of unknown confounders. There are two RCTs of reasonable quality which compared the outcome of cemented THA or bipolar HA for displaced FNF in mobile, lucid patients [12,13]. The mean patient age in both studies was 81 years and both groups have published long-term outcome data [14,15]. The Swedish study of Blomfeldt et al. [12] reported on 120 patients and noted significant differences in operating time and blood loss. Increased blood loss, however was not associated with a significant increase in transfusion requirement [12]. All operations were performed by experienced consultant surgeons through a lateral approach and there were no dislocations in either group. The Harris Hip Score (HHS) was significantly superior in the THA group at one year and the difference was maintained at four years [14]. The EQ-5D score was also significantly better in THA group at four years and the authors felt the functional outcome after THA appeared to improve with time. Acetabular erosion was seen in 14% of the HA group at four-years and was classified as Grade 1 in all cases (articular cartilage narrowing with no bone erosion). No HA was revised for acetabular erosion and the overall revision rate was not significantly different between the groups. The Dutch study of van den Bekerom involved a larger group of 252 patients [13]. Operations were performed by experienced surgeons or supervised in-training surgeons but the surgical approach was not standardised, with posterior and lateral approaches used. There were eight dislocations in the THA group compared to none in the bipolar HA group, which was significant ($p = 0.002$). The authors reported a significant association between the use of the posterior approach and THA dislocation ($p = 0.007$), which has been reported by other authors [1]. Significant increases in operating time and blood loss in the THA group were also seen, although the transfusion requirements were not stated. Radiological acetabular erosion was noted in 10% of the HA group at 5 years with two cases requiring revision. However, overall revision rates were not significantly different between the groups at both 5 and 12 years. Furthermore, the modified HHS was not significantly different between the groups at one and four years and unlike the Swedish study, the scores had become almost identical by the twelve year follow-up [15]. Although these studies do not provide the definitive answer to the question of whether mobile, lucid FNF patients would benefit from a THA rather than a HA, the comparable long-term functional outcomes in the

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Dutch study challenges the assumption that THA provides improved functional outcomes after FNF compared to HA. The suggestion that mobile patients receiving a hemi arthroplasty are at an increased risk for revision due to painful acetabular erosion has also been undermined by the similar revision rates between the cohorts in both studies. The rate of acetabular erosion in both the Dutch and Swedish studies was much lower than the rate quoted after unipolar cemented HA in the randomised study of Baker et al. [4]. Despite the conflicting evidence, there persists the notion that THA has the potential to maximise the functional mobility of the lucid FNF patient and a number of authorities, including the UK's National Institute for Clinical Excellence have recommended THA be considered in all FNF patients with good cognitive and physical function[1,16,17]. Whilst THA is a highly reproducible elective operation, there are fundamental differences between elective THA patients and FNF patients and the benefits of THA may not be readily transferrable between the two populations [18]. FNF patients tend to be older and have more comorbidities than elective THA patients. In addition, FNF patients have a higher risk of mortality and medical complications than elective THA patients [19,20]. The differences between the populations have been more clearly defined by two recent large demographic studies, which reported on adverse surgical outcomes of elderly FNF patients undergoing THA compared to elective THA patients. Using the National Hospital Discharge Survey in the USA, Sassoon et al. [21] contrasted the in-patient mortality, complications and length of stay (LoS) in 2,160,000 patients undergoing elective THA with 174,641 patients receiving a THA for FNF. Peri-operative mortality and pulmonary embolism rates were significantly lower following elective THA than after THA for FNF ($p < 0.001$). Haematomas, infections and dislocations were higher in the FNF group and the LoS and percentage of patients discharged to a rehab facility were also significantly higher in the FNF cohort. Le Manach et al. [22] performed a similar analysis using the French National Hospital Discharge Database to identify patients over 45 years undergoing elective THA ($n = 371,191$) or hip fracture surgery for FNF ($n = 319,804$). The populations were matched for age, sex, and preoperative comorbidities using a multivariable logistic model. Analysis revealed a significantly higher risk of mortality ($p < 0.001$) and major postoperative complications ($p < 0.001$) in the hip fracture surgery group. The FNF group were also admitted to intensive care significantly more frequently in the postoperative period than the elective THA group ($p < 0.001$). Mean hospital LoS was considerably longer in the hip fracture group ($p < 0.001$). Similar findings were also reported in a smaller subset of patients less than 60 years who were residing at home before surgery. These large demographic studies suggest that hip fracture in elderly patients may be associated with adverse physiological changes, which increase the risk of complications and mortality following surgery. The Dutch and Swedish RCTs clearly showed that FNF patients undergoing THA may be exposed to increased blood loss, operating time and surgical complexity but without a demonstrably improved functional outcome compared to patients undergoing bipolar HA. The adverse outcomes which may follow THA in FNF may partly explain the reluctance of some surgeons to regularly offer THA rather than HA, particularly in the non-elective setting of a trauma hospital [23]. Primary prosthetic replacement of the femoral head was recognised as the optimal treatment for elderly displaced FNF over 60 years ago [24]. The precise type of replacement remains to be established and the results of large, well conducted RCTs are awaited [25]. The improved functional outcomes that almost invariably follow elective THA for

arthritis may not be seen in the FNF population because of fundamental physiological differences between the patient populations. Caution is recommended when offering THA to elderly patients with displaced FNF because of potentially higher surgical risks without appreciable functional gains.

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