



## Hip Arthroplasty Done for Osteoarthritis vs. Hip Fractures: A Comparison

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### Abstract

**Introduction:** Osteoarthritis and femoral neck fractures are two important entities which are indications for hip arthroplasties and cause a significant burden to the healthcare system. It is imperative to compare the patient characteristics and operative complications in both these cohorts and whether existing NICE guidelines for patient selection is appropriate.

**Materials and Methods:** 300 patients' data from a district general hospital in Surrey, United Kingdom was retrospectively studied and analyzed.

**Results:** From our study, it was clear that women suffered more hip fractures than men. Average length of hospital stay was higher in the group that received Hip Hemi-arthroplasty compared to the patients who received a Total Hip Arthroplasty ( $12.7 \pm 9$  vs  $8.2 \pm 3.9$  days). Institutionalized patients were more likely to have HHA compared to those living in their own homes ( $p$ -value  $< .05$ ). Patients who were selected for HHA had higher mortality rates (53%) during our follow up period compared to those selected for THA. The post-operative dislocation rates were comparable and not statistically significant.

**Conclusion:** Careful patient selection for the type of arthroplasty through existing NICE guidelines has proved beneficial for patients in terms of length of hospital stay and post-operative morbidity and mortality. There is still a need for clearer follow-up guidelines for patients suffering from a hip fracture, which needs to be worked up in detail.

**Keywords:** Osteoarthritis; Arthroplasty; Fractures

### Introduction

Up to a third of the population in the UK, suffer from musculoskeletal complaints [1]. It poses a significant burden to the healthcare system since there are a huge proportion of patients who visit their GP practice with symptoms ranging from mild soreness to sometimes severe debilitating disease. Approximately 1 in 9 adults (10.9%) over 45 years of age in England has osteoarthritis of the hip. According to recent studies, over 2 million people in the UK have sought treatment for osteoarthritis of the hip and almost 93% of hip replacements was done due to OA [2]. On the other end of

the spectrum, hip fractures remain to be a significant cause of mortality. It is quite important to note that during the year 2020, 63284 people in the UK had a hip fracture [3], a huge burden on not only hospitals, but also for care homes and nursing homes. Extracapsular fractures of the hip are managed with internal fixation rather than replacement arthroplasty, since there is inconclusive evidence as to whether the latter provides any advantage [4]. However, for a patient with an intracapsular neck of femur fracture HHA or THA can be offered as a treatment choice – directed by NICE guidelines [5].

Our study aims to

- Compare the pre-operative/operative characteristics and post-operative complications and Oxford Hip Scores in patients undergoing Hip arthroplasties done for OA and hip fractures, with a multicultural global cohort,
- Review whether patient selection was in accordance with NICE guidelines and if it remains relevant in the current scenario.

**Materials and Methods**

Patient data was collected from a district general hospital in Surrey, UK. Patients who had THA for a NOF were followed up in a 3-4 year interval and were asked the Oxford Hip Questionnaire through telephone.

- Patients who had:
  - Elective THA for OA;

- THA for a NOF fracture;
- HHA for a NOF fracture were included
- Data collection was done with Microsoft Excel and statistics were computed with SPSS.

**Results**

A total of 300 patients were retrospectively studied - who underwent either a Total Hip arthroplasty for Osteoarthritis/Femoral neck fractures or Hip Hemiarthroplasty for femoral neck fractures from January 2018 to August 2019.

Patients selected for THA had a mean age of 72.52 years (SD 10.72 95% CI [70.8, 75.2]) and 71.97 (SD 11.2 95% CI [69.8, 74.2]) years for OA and NOF fractures respectively, while patients undergoing HHA were 84 years (SD 8 95% CI [82.43, 85.57]).

Table 1 summarises the results of our study and the parameters that were reviewed.

Parameter	Total Hip Arthroplasty for Osteoarthritis	Total Hip Arthroplasty for Neck of femur fracture	Hip Hemiarthroplasty for Neck of Femur Fracture
Mean age; SD	72.52; 10.72 95% CI [70.8, 75.2]	71.97; 11.2 95% CI [69.8, 74.2]	84; 8 95% CI [82.43, 85.57]
Men; Women	46; 54	30; 70	28; 72
Average length of stay in hospital ± SD	5.4 ± 4.9	8.2 ± 3.9	12.7 ± 9
Co-morbidities			
-Type 2 DM alone	10	2	10
-Hypertension alone	31	34	46
-DM + HTN	6	4	5
-Dementia	0	0	38
Blood transfusion required	3	1	3
Average hours from injury to surgery	N/A	27 ± 11 hours	25 ± 16 hours
Type of implant			
-Cemented	25	30	84
-Uncemented	59	30	16
-Hybrid	16	40	N/A
Pre-operative mobility			
-Independent	64	85	42
-Stick	36	15	24
-Frame	0	0	30
-Wheelchair	0	0	4

Living condition			
-Institutionalized	0	1	32
-Non-Institutionalized	100	99	68
Complications			
-DVT	0	7	1
-Wound infection	3	0	7
-Dislocation of prosthesis	1	3	3
Mortality during 3-4 year follow up	11	10	53

**Table 1:** Pre- operative and intra-operative characteristics.

## Discussion

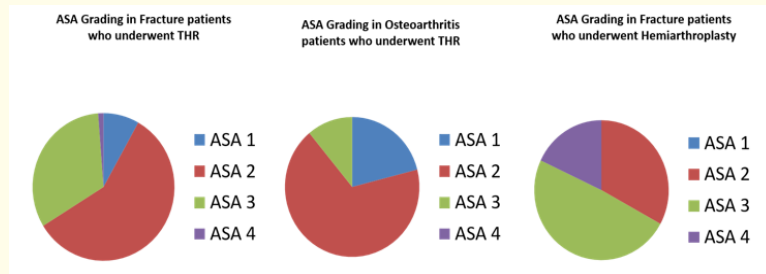
The results of our study reveal that patients selected for THA vary greatly in characteristics from those undergoing a HHA. Candidates selected for THA were relatively younger with a mean age of 73 years and 72 years for OA and NOF fractures respectively. This is lower than the mean age of patients undergoing a HHA – 82 years. Women in general suffered more Neck of femur fractures in our study, irrespective of whether they received a THA or HHA. This is comparable to a Greek study [6] and could be due to the fact that bone quality is poor in women post menopause [7] and they have an increased propensity for falls. Hypertension was a common co-morbidity across all cohorts of patients. It is interesting to note that among patients who received HHA, 38% suffered from dementia. Sadly, these patients are not only at an increased risk of further falls within the next 3 years but according to Singh, *et al.* [8] they would be susceptible to a new care home placement as well. The number of patients who needed blood transfusion either intra or post-operatively was comparable.

Average hours from the time of admission to surgery was reviewed for patients who underwent a THA vs a HHA for a fracture – it was comparable but slightly higher delays for HHA – possibly owing to the fact that the frailer patients need more time to be optimised for surgery. The average length of stay in hospital was lowest for those undergoing a THA for osteoarthritis ( $5.4 \pm 4.9$  days) and highest for those undergoing a HHA for a femoral neck fracture ( $12.7 \pm 9$  days). Again, this should be attributed to the fact that HHA patients have higher post-operative recovery times owing to frailty. Pre-operative mobility was reviewed among each cohort of patients. In the cohort undergoing THA for OA and NOF fractures, most of them were independently mobile without the use of a stick or a frame (64% and 85% respectively), compared to only 42% of

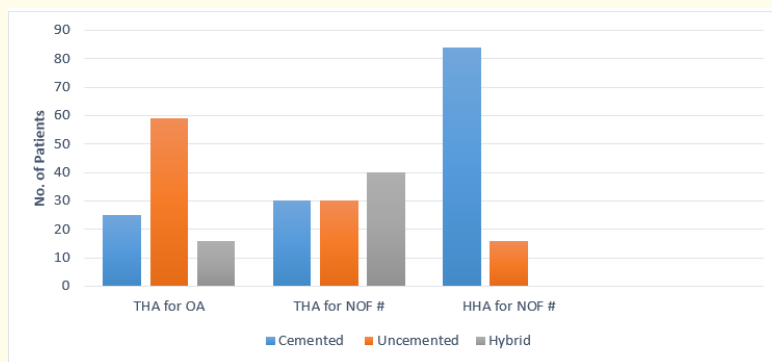
patients who underwent HHA for a NOF fracture. This is again in accordance with NICE guidelines. Moreover, 34% of patients who underwent HHA were either completely dependent on a frame or a wheelchair to get around. It is wise to select patients with limited physical activity as mentioned, to have a Hemiarthroplasty, as backed by a study by Olivier Guyen [9] on the choice of operation. 68% of patients who had a HHA were institutionalized – which is statistically significant compared to those who underwent a THA for the same fracture. (chi-square 37.0173, p value <.05).

Intra-operative characteristics such as ASA grading (summarised in Figure 1) and the type of implant were reviewed. The American Society of Anaesthesiologists classify patients based on general health and co-morbidities from Grade 1-5. Most of the patients undergoing THA for Osteoarthritis are ASA grade 2. In our study, 68% of patients undergoing THA for a fracture were ASA 2 compared to 57% having the same surgery for OA. Evidently, patients selected for HHA were more in the ASA 3 category – 49% of them. The most common co-morbidity was found to be hypertension, followed by dementia and heart disease such as AF, CCF and Previous MI, as summarised in figure 3.

The type of implant used – cemented or cementless - was reviewed in our study and summarised in Figure 2. Majority of the implants were cementless in the OA cohort (59%) while Hybrid implants were more favoured in the ones having a fracture (40%). Cementless implants gained popularity post 1970s after cement-disease was thought to occur due to PMMA debris - since it provided Osseo-integration of bone into the femoral and acetabular components, maintaining adequate stability and lessening post-operative complications [10].



**Figure 1:** ASA Grading in patients who underwent THA for OA/NOF fractures and HHA for NOF fractures.

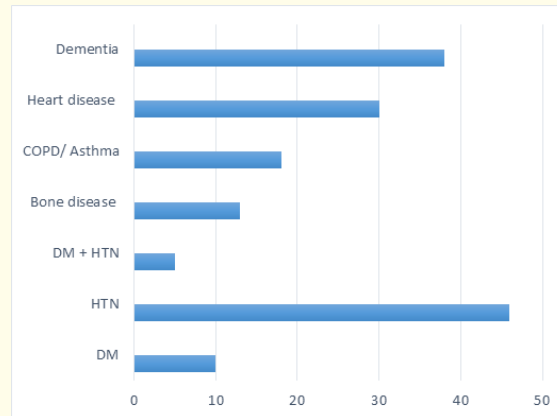


**Figure 2:** Types of implants in THA/HHA.

In the post-operative period, there was no major difference among dislocation rates seen in THA and HHA, although wound infections were more common in patients who received HHA. This could be attributed to the fact that patients who receive HHA are demented, poor physiological reserve, major co-morbidities and there is poor post-operative compliance to wound care and management. 53% of patients who had HHA died in our follow up period – which is statistically significant compared to the cohort undergoing THA for the same fracture (p-value <0.05). There are no standard follow-up regimens for patients suffering from a NOF fracture. Several trials are underway to determine the best possible method to determine long-term outcomes after NOF surgeries. A study by Parsons., *et al.* [11] has shown that EQ-5DL scores after hip fracture corresponds well with Oxford Hip Scores [12] even when applied to patients with cognitive impairment.

In our study, we called through telephone - patients who underwent a THA for NOF fractures and went through the Oxford Hip Questionnaire with new scoring modifications [13]. It was difficult

to assess the true response through a telephonic conversation but we were able to get 41 respondents out of the 100 who were under study. The average OHS was found to be 44.275 in the patients who responded to the questionnaire. This could be compared to a global cohort of patients from various studies where there was age specific average scores for THAs performed for OA. In the study by McLean., *et al.* in Australia, the age matched average OHS for a cohort of patients who underwent THA for OA was 42.456 [14]. A study by Harada S., *et al.* showed an average OHS of 40.6 ± 8.2 [15]. There is no statistically significant evidence that OHS was different in patients who had a NOF fracture or OA. Several limitations were present in the OHS, which are mostly subjective questions that might give a skewed interpretation depending on patient’s understanding of the question, question clarity and the presence of other co-morbidities – comparable to a study conducted by Vikki Wylde., *et al.* [16]. It is also questionable whether OHS remains valid in this current age and scenario and needs updating [17]. People who suffer a NOF fracture, have a HHA and are severely cognitively impaired cannot be followed up with the OHS – and a comprehensive



**Figure 3:** Co-morbidities in HHA patients.

set of guidelines need to be formed with a specific set of follow-up parameters. A trial by Costa ML, *et al.* [18] is aimed at collecting a Quality of Life (QoL) based data set for patients having a hip fracture. Our study supports the evidence that hip fractures need to be followed up more often than not, provided the significant morbidity and mortality it causes.

## Conclusion

From our study, it is evident that careful patient selection in accordance with the existing NICE guidelines has shown to have better outcomes in terms of length of hospital stay, post-operative complications and mortality in a 3-4 year follow up period. More studies are required to establish clearer follow-up guidelines for people suffering from a neck of femur fracture since they form a huge cohort of patients admitted to hospital every year.

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