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ORIGINAL ARTICLE

Outcomes of Uncemented Bipolar Hemiarthroplasty for Femoral Neck Fractures in Elderly Patients with Cardiac Dysfunction

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ABSTRACT

Objectives: Cementless hemiarthroplasty is advised because it reduces the risk of morbidity and mortality in older individuals who use cement. For older patients with high-risk clinical issues who had femoral neck fractures, we assessed the effectiveness of cementless hemiarthroplasty.

Materials and Methods: The design of this study was a cross sectional study design and this study was conducted in DHQ Teaching Hospital Gujranwala. 48 patients, including 19 male and 29 female, with an average age of 88-years. using cementless hemiarthroplasty to treat patients with femoral neck fractures. 30 patients (62%) had porous-coated femoral stems, while 18 patients had modular femoral revision stems (38 percent). All patients had bipolar femoral heads. Following surgery, the follow-up radiologically was performed at yearly intervals.

Results: The average number of followup years was 4.2. There were no hospital-related deaths among the patients. Six patients (12%) experienced medical difficulties during the period of follow-up, and 4-patients (8%) passed away. Due to acetabular degradation, only the 2 hips were changed to the total hip replacements. One patient was scheduled for a femoral revision due to a sinking of greater than 3 mm. No patients developed heterotopic ossification or acetabular protrusion. The HHA (Harris-hip average) score is 84. One patient experienced dislocation (2 percent).

Practical Implication: The advantages of the cemented technique seem to be offset by its mortality risk and the advantages of the cementless option by its increased morbidity. Thus, in some of these very elderly morbid patients the orthopedic surgeon is faced with a dilemma regarding the correct surgical choice, which should be one that can promise pain relief and rapid resumption of function and, at the same time, prevent mortality and reduce morbidity

Conclusion: An appropriate form of therapy for fractures in femoral neck in older individuals with risk of clinical issues, particularly those of the cardiopulmonary character, is cementless hemiarthroplasty. With this technique, after cemented hemi-arthroplasty the risk of fat embolism and hypotension is reduced.

Keywords: Uncemented Bipolar Hemiarthroplasty, Uncemented Femoral Prosthesis, Hemiarthroplasty In Elderly, Cardiac Dysfunction, Femoral Neck Fracture.

INTRODUCTION

As people age, there are more femoral neck fractures.[1] Displaced femoral neck fractures are typically treated surgically, with the hemiarthroplasty which is a common procedure for senior patients.[2] The Hemiarthroplasty is a simple surgical treatment that requires less blood loss and less time in operation.[3] Although cemented prostheses are more often used, surgeons prefer uncemented implants due to the potential effects of the cement on cardiopulmonary system and the high technical difficulty of revising cemented prostheses.[4] The debate over whether or not to cement the hemiarthroplasty is ongoing.[5–7] We provide the outcomes of the uncemented hemiarthroplasty in the elderly patients with the neck fractures femoral in an effort to address this. Hemi- or total hip arthroplasty is an accepted treatment of fracture neck of femur in the elderly [2]. Cemented prostheses have been used with high success rates [5,6] but are associated with high perioperative morbidity (hemodynamic instability, cardiopulmonary complications, etc.) and mortality [4,7]. Cementless stems avert this so-called 'cement reaction' or bone cement implantation syndrome, [2,7] though there have been many complications noted with this technique (for example, intraoperative and immediate postoperative fractures, loosening and subsidence, with thigh pain etc) [2,5].

Osteoporotic hip fracture continues to increase among elderly patients worldwide along with increasing life expectancies and have become a substantial cause of morbidity and mortality in these patients [1]. Femoral neck fracture is a common type of hip fracture in aging populations and is most effectively managed with hemiarthroplasty (HA) [2]. Although recent advances in perioperative management and rehabilitation have reduced the incidence of mortality after hip fracture [3,4], most elderly patients have multiple comorbidities and poor physical condition. Therefore, it is of paramount importance to reduce the operation time and rate of reoperation. There are several reasons such as infection, periprosthetic fracture, and dislocation for reoperation after HA [5,6]. Although the incidence of dislocation after HA is lower than that after total hip arthroplasty, dislocation may be a more devastating complication following HA considering that HA is performed mainly in fragile osteoporotic elderly patients [7]. There are several risk factors associated with dislocation after HA, including patient-related factors such as cognitive impairment, abductor muscle weakness, and neurological problems and surgeon-related factors such as implant position and surgical approach [8]. Among these factors, surgeons can control the implant choice and surgical approach. The femoral head and cup size and stem alignment is not significant. It has been known that the posterolateral approach, which is one of commonly used approaches in hip arthroplasty, shows higher incidence of dislocation than other approaches although this approach has several benefits such as less bleeding, operation time, and damage to abductor muscles [9,10]. In addition, several studies on HA in elderly patients with hip fracture reported an increased incidence of dislocation following surgery through the posterolateral or posterior approach [6,11,12]. The dislocation rate of HA in previous study was 1.7% to 9%. The higher incidence of dislocation is attributed to posterior capsule and short external rotators (SER) muscle damages. Therefore, dealing with these structures is very crucial to prevent dislocation following HA in elderly patients. The authors have performed HA via SER preserving posterolateral approach to reduce dislocation in elderly patients with hip fractures.

The advantages of the cemented technique seem to be offset by its mortality risk and the advantages of the cementless option by its increased morbidity [8,10]. Thus, in some of these very elderly morbid patients the orthopedic surgeon is faced with a dilemma regarding the correct surgical choice, which should be one that can promise pain relief and rapid resumption of function and, at the same time [11,12], prevent mortality and reduce morbidity

MATERIALS AND METHODS

*The design of this study was a cross sectional study design and this study was conducted in DHQ Teaching Hospital Gujranwala. We carried out forty-eight uncemented hemiarthroplasty procedures on the elderly patients between January 2001 and May 2006. The average age of patients (29 female and 19 male) was 88 years (range: 78-102 years). Garden stages III and IV displaced intracapsular femoral neck fractures were present in all cases. 48 patients received femoral stems, 30 of which had porous coatings, and the eighteen had revision stems that were modular in design (Helios, Biomet, Europe).*Figure 1, Figure 2Figure 1: (a)The radiograph of a woman having a femoral neck fracture.
(b) after performing cementless hemiarthroplasty.

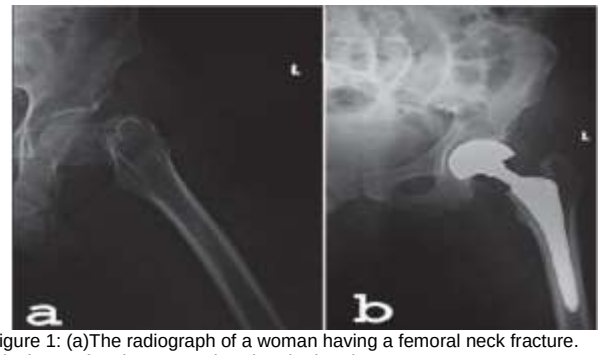

Figure 1: (a)The radiograph of a woman having a femoral neck fracture.
(b) after performing cementless hemiarthroplasty.

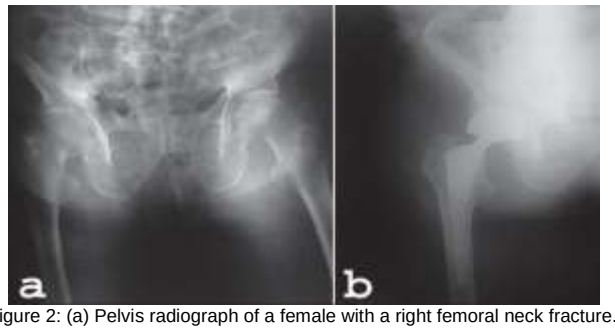

Figure 2: (a) Pelvis radiograph of a female with a right femoral neck fracture.
(b) After 3-months the Followup X-ray of the same patient.

All patients received bipolar femoral heads from Biomet (Europe) that ranged in size from 42 to 60 mm. Prior to the initial trauma, all of the patients could walk, however 10 (20%) of them required assistance. According to ASA (American Society of Anaesthesiologists) categorization, each patient was either grade IV or III. All of the patients had significant medical conditions that posed a substantial mortality risk. Table 1. The trial group did not contain patients having history of osteoarthritis or prior injuries hip. After patient is positioned in lateral position, the procedure is performed using the posterolateral approach. The separation of fascia is done in the line with the incision of skin above the greater centre of trochanter after subcutaneous tissues have been divided. The fibres of gluteus maximus are separated bluntly. A removed bursa of trochanteric. A palpable sciatic nerve is felt. The nerve is protected as brief external rotators were divided. A T-incision is used to separate the capsule, but the entire capsule is left in place for future repair. A hip is softly adducted, flexed, and rotated internally after the femoral head has been removed. The femoral canal is reamed with reamers of increasing diameters. Broaches are carefully positioned after cortical reaming has been sensed. It is evaluated how well the broach fits into the canal. Without moving broach in canal, adequate rotational and axial stability is evaluated. Inserting the chosen porous-coated femoral stem. Additionally, rotational and extraction forces are used to determine the femoral stem's exact size. The hip is decreased afterward introducing pre-determined and measuring the femoral bipolar head, and stability of the hip joint has then assessed once more. The capsule has been solidly mended. The already separated soft tissues are mended to complete procedure after bleeding vessels are under control. Antibiotics were given to the patients as preventative care for three days. On the first postoperative day, managed therapy for the sitting, walking with the toe touches bearing weight was started, and standing depending on patient's overall condition. The patient was kept in the hospital until they could walk with a walker or crutches. Throughout the duration of the hospital stay, elastic stockings were worn. To prevent flexing the hip past 90 degrees, patients were provided occupational and instructions assistance. On the fifteenth postoperative day, the skin sutures were taken out.

After the six weeks, whenever the patient get pain-free and comfortable, full weight-bearing was usually permitted. The period of follow-up (postoperative) included the clinical and radiological evaluations of the patients. The Harris hip scoring system was used to conduct a clinical evaluation. By means of the VAS (visual analogue scale), pain was assessed. A zero-score meant that there was almost no pain, while a score of 1 to 5 meant there was minor, transient pain. Scores between 5 and 8 indicated considerable, ongoing pain, whereas scores above 8 indicated crippling pain. Mobility was evaluated using criteria, criteria were: being able to walk unaided, being able to walk with aid of the cane or the walker, and being able to descend and ascend stairs. Anteroposterior pelvic and lateral hip roentgenograms were collected for the radiographic evaluation at predetermined post-operative intervals: 3-months, 6-months, 1-year, and subsequently yearly. The approach was used to evaluate the stability and fixation of the femoral stem. Any positional change greater than 3 mm that can be seen on multiple radiographs is considered to be a femoral stem sinking. Stable with growth of bone, stable through fibrous in-growth, and also unstable femoral stems were the three categories. The technique reported by study was used to radiographically assess acetabular protrusion and erosions. The acetabular cartilage erosion that was used to assess joint space narrowing was measured in millimeters. The Brooker classification was used to assign grades to heterotopic ossification. The Low-molecular weight of heparin was introduced to all patients following surgery. Initiated the twelve-hours before procedure and continuous for the ten-days after, 4000 anti-Xa IU administered dose was given.

RESULTS

While average period of follow-up was the 4.2 years, the average operating time was 48 to 20 minutes. Throughout their stay in the hospital following surgery, none of the patients passed away. Table 2 displays perioperative medical problems. Four patients (8%) passed away throughout the follow-up period as a result of renal failure and myocardial infarctions. Due to acetabular erosion, only the 2 hips (4-percent) were changed to overall hip arthroplasty. One patient's joint space narrowed by one millimetre, while the other patient's narrowed by two millimetres. One patient was scheduled for a femoral revision due to a sinking of greater than 3 mm. According to the Engh et al. classification scheme, the other femoral stems showed evidence of bone ingrowth and were radiographically stable. There was no heterotopic ossification or acetabular protrusion in any of the patients. The mean HHS (Harris-hip score) at last follow-up was 84. (Range: 52 to 92). 34 patients (71%) had pain scores of zero, ten (21%) had scores between one and four, two (4%) had scores between five and eight, and two (2%) had scores more than eight (4 percent).

Table 1: Medical Co-Morbidities Pre-Operative Of Our Patients

	Patients' number
Diabetes	25
Chronic lung disease	27
Neuromuscular disease	5
Chronic renal insufficiency	25
Cardiovascular disease	34

At least 2 complications among these were found in 34 patients

Table 2: Medical Complications Perioperative

	Patients number
Pulmonary embolism	0
Deep venous thrombosis	2
Congestive heart failure	2
Myocardial infarction	2

Thirteen patients (30%) required the use of walkers or crutches to move about. The 10-percent of patients, or 5 patients, were unable to descend or ascend stairs without the assistance. These patients have an active and minimal capacity for other exercise or walking before operation; they are neither bedridden nor wheelchair-bound. The remaining patients were independent walkers, however 19 (65%) of them need a walking aid for a far distance. The One superficial infection and one dislocation were observed as complications; both of these infections responded to parental anti-biotherapy. For the displaced hip, closed the reduction under the utilization of general anesthesia.

DISCUSSION

The approved method for treating fractures of the displaced femoral neck in the elderly individuals having a short life expectation and bone stock inadequate is cemented the femoral fixation of hemiarthroplasty [13,14]. The rapid stability and capacity to bear weight are both made possible by the cemented attachment. Additionally, the patient's postoperative general condition is improved by this.[15,16] The approach of Cemented femoral has linked also to higher risk of the hypotension and fat embolism, though. According to research cement fixation during femoral hemiarthroplasty is linked to more extensive thromboembolic cascades than when without the utilization of cement.[17] Additionally, during cementation, significant drops in the output of cardiac and the stroke volume have been shown by research.[18]

Due to improved outcomes clinically with the contemporary implantation and noticeably lower the peri-operative morbidity, many surgeons have now adopted the porous-coated uncemented fixation.[3] For cemented and cementless hemiarthroplasty, there have been found to be significant disparities in death rates. According to study, individuals who had a cemented hemiarthroplasty had a mortality rate of 14.8% as compared to the 9.8% in uncemented group.[19] Statistics showed the significant difference. In hemiarthroplasties, the acrylic cement utilization was linked to higher rates of morbidity and mortality. Mortality and morbidity were unaffected by the operating surgeon's experience or grade. In addition, study reported 15% death rates in cement-cemented hemiarthroplasty and the 7% in the cementless hemiarthroplasty within the follow-up of first five weeks, as well as 13% in the reoperation rates in group of cement-cemented and the 6% in uncemented group. The similar outcomes were seen in our hospital as well. We have used to favour the cemented hemiarthroplasty, but then we noticed that many patients died during or after surgery while being hospitalised, usually from cardiovascular issues. However, there were neither postoperative or intraoperative deaths while patients in our uncemented group of patients was hospitalised. Only four patients (8%) passed away over the monitoring period. We think that the decrease in fatality rate is likely the result of a combination of better medical care, anaesthetic techniques, and the cementless technique itself.

It has not been demonstrated that cemented fixation in elderly individuals offers better durability, fixation, or the long-term performance than current uncemented designs, it had also linked to a potential increase in the intra-operative pulmonary issues and the cardiac arrest.[20] The poor quality of bone was not considered to be the contra-indication, and investigations have also shown that reliable attachment of porously coated components are possible in the osteoporotic bones.[21] In investigation, we discovered that early fitting and filling of femur's the medullary canal have crucial for successful outcomes at femoral stem insertion time. The femoral medullary cavity can be prepared in the best possible way to achieve this.[22] We favoured modular-type revision femoral stems when filling the medullary canal was extremely challenging. There are some studies on the use of modular femoral prosthesis for primary total hip arthroplasty in patients over the age of 70 as well as for treatment of fractures of per-trochanteric. Even in the patients having larger medulla, the fill anatomic can be attained by adjusting the proximal and distal femoral canals.[23] These patients have not been documented to have any emboli. For some patients, a total hip replacement is advised. For older individuals with a short life expectancy, hemiarthroplasty is recommended.[24]

Compared to patients who had hemiarthroplasty with cement, it had been observed that the patients who had experienced of uncemented hemiarthroplasty more hip pain. Studies have shown that there was no discernible difference in postoperative pain scores between the two groups, nonetheless.[25] Although increased the utilization of the walking aids following the uncemented fixation is one more disadvantage of this technique, pain was not significant issue in our study. In our study, 10% of the participants had trouble climbing or descending stairs without assistance. All of these patients did, however, also have some additional medical conditions, such as neurological abnormalities. According to reports, cementless hemiarthroplasty takes less time to perform on average than cemented hemiarthroplasty.[26] However, there was no statistically significant change. Additionally, we noticed that our patients had shorter operation times. We think that the dangers associated with anaesthesia are reduced by shorter operating times with cementless hemiarthroplasty.

CONCLUSION

In conclusion, our study demonstrates that older individuals who have the uncemented hemiarthroplasty for the fractures of displaced femoral neck had favourable outcomes. The short period of follow-up of this study is a weakness, so we plan to extend follow-up to assess long-term outcomes. Cementless hemiarthroplasty may be especially advantageous for elderly patients with high-risk cardiovascular conditions due to the shorter operating periods and decreased death rates brought on by the absence of complications connected to cement.

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