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RESEARCH

TREATMENT OF INTERTROCHANTERIC FRACTURES IN AMBULATORY ELDERLY; BIPOLAR HEMIARTHROPLASTY OR PROXIMAL FEMORAL NAIL ?

ABSTRACT

Introduction: The management of intertrochanteric fractures in elderly is challenging because of difficult anatomical reduction, poor bone quality and difficulty in weight bearing. Various internal fixation devices can be used for this type of fractures, and primary arthroplasty is also an option for treatment. This retrospective study compares bipolar hemiarthroplasty (BHA) with proximal femoral nail (PFN) in ambulatory elderly patients, focusing on functional results and return to premorbid level of activity.

Materials and Method: The study included 136 patients who underwent operations to treat AO 31-A type intertrochanteric fractures. Patients who were not ambulatory before having fracture were excluded from the study. Of the 78 patients with 31-A1 fractures; 40 were treated with BHA, 33 were treated with PFN and 5 were treated with dynamic hip screw (DHS). Forty patients had 31-A2 type fractures; 24 were treated with BHA, 7 were treated with PFN, 5 were treated with DHS and 4 were treated with different plate-screw systems. Eighteen patients had 31-A3 type fractures; 2 were treated with BHA, 15 were treated with PFN, and 1 was treated with a plate-screw system. Patients with BHA (mean age 80.61 years; range 68-98 years) and PFN (mean age 77.59 years; range 58-94 years) were compared in the final evaluation if they had at least 1 year of follow up documented postoperatively.

Results: Total perioperative blood loss was significantly lower in patients treated with PFN (590 to 390 ml). Time to surgery (4.1 vs 3.9 days), postoperative weight bearing time (2 vs 2 days), and mortality rates (16.66 % vs 18.18%) did not differ between patients treated with BHA and PFN, respectively. Total complication rate (22.4 % vs 28.2 %) was lower, and the duration of surgery (52.8 vs 82.5 min), the time to return to the premorbid daily activity (6.2 vs 8.5 weeks), Harris score (85.8 vs 81.3) and Postel Merle D'Aubigne (PMA) score (14.1 vs 12.2) were significantly better with BHA .

Conclusion: Hemiarthroplasty is not associated with greater postoperative mortality compared with osteosynthesis, although the perioperative blood loss is significantly higher. However, the complication rates are lower and functional results are better; thus, hemiarthroplasty can safely be the first choice of treatment for the intertrochanteric fractures of ambulatory elderly patients.

Key Words: Hip Fractures; Geriatrics; Hemiarthroplasty, Bone Nails; Fracture Fixation, Intramedullary.

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ARAŞTIRMA

İNTERTROKANTERİK KIRIKLARIN AMBULATUVAR YAŞLILARDA TEDAVİSİ; BİPOLAR HEMİARTROPLASTİ YA DA PROKSİMAL FEMORAL ÇİVİLEME?

Öz

Giriş: Yaşlı hastalarda intertrokanterik femur kırıklarının tedavisi anatomik redüksiyonun kolay olmayışı, kemik kalitesinin zayıflığı ve yük vermenin güçlükleri nedeniyle zordur. Bu tip kırıklar için çeşitli internal tespit cihazları kullanılabilir ve birincil artroplasti de tedavi yöntemlerinden biridir. Bu retrospektif çalışma ambulatuvar yaşlı hastalarda bipolar hemiartroplasti ile proksimal femoral çivilemeyi özellikle fonksiyonel sonuçlar ve hastanın kırık öncesi aktivite düzeyine dönüş süresi açısından karşılaştırmaktadır.

Gereç ve Yöntem: Çalışma AO 31-A tipi intertrokanterik kırığı olan 136 hastayı içermektedir. Kırık öncesi ambulatuvar olmayan hastalar önceden çalışmanın dışında bırakıldı. 31-A1 tipi kırığı olan 78 hastanın 40'ı bipolar hemiartroplasti (BHA), 33'ü proksimal femoral çivileme (PFN) ile ve 5'i dinamik kalça çivisi (DHS) ile tedavi edildi. 31-A2 tipi kırığı olan 40 hastanın 24'ü BHA ile, 7'si PFN ile, 5'i DHS ile ve 4'ü değişik plak-vida sistemleri ile tedavi edildi. 31-A3 tipi kırığı olan 18 hastanın 2'si BHA, 15'i PFN ve 1'i plak-vida sistemi kullanılarak tedavi edildi. Son karşılaştırmaya yalnızca BHA (ortanca yaşları 80.61, 68 ile 98 arasında) ve PFN (ortanca yaşları 77,59, 58 ile 94 arasında) kullanılarak ameliyat edilen ve cerrahi sonrası en az 1 yıllık kontrolü bulunan hastalar alındı.

Bulgular: Perioperatif toplam kan kaybı (cerrahi sırasındaki kan kaybı ile cerrahi sonrası drenajdan gelen kanın toplamı) PFN ile tedavi edilen hastalarda anlamlı olarak daha azdı (590'a karşı 390 ml). Ameliyata kadar geçen süre (4,1'e karşı 3,9 gün), postoperatif yük verme süresi (2'ye karşı 2 gün) ve mortalite değerleri (%16,66'ya karşı %18,18) BHA ve PFN arasında farklı değildi. Total komplikasyon yüzdesi (%22,4'e karşı %28,2) BHA de daha düşük, ameliyat süresi (52,8'e karşı 82,5 dakika), cerrahi öncesi günlük aktivite düzeyine dönüş süresi (6,2'ye karşı 8,5 hafta), Harris skoru (85,8'e karşı 81,3) ve Postel Merle D'Aubigne (PMA) skoru (14,1'e karşı 12,2) BHA için anlamlı olarak daha iyi idi.

Sonuç: Hemiartroplasti uygulanan hastalarda perioperatif kan kaybının anlamlı olarak daha fazla olmasına rağmen postoperatif mortalite hızı daha yüksek değildir. Buna karşın hemiartroplasti ile komplikasyon yüzdeleri daha düşük, işlevsel sonuçlar daha iyi olduğu için ambulatuvar yaşlı hastaların intertrokanterik kırıklarının tedavisinde güvenle ilk tedavi seçeneği olabilir.

Anahtar Sözcükler: İntertrokanterik Kırıklar; Geriatri; Hemiartroplasti; Proksimal Femur Çivisi.

Introduction

Hip fracture in elderly patients with osteoporosis is a frequent injury, and constitutes a major source of morbidity and mortality. An estimated 1.66 million hip fractures occurred worldwide in 1990. This worldwide annual number is rising rapidly with an expected incidence of 6.26 million by the year 2050; the number of these fractures is on the rise due to increased life expectancy of the population and associated osteoporosis (1). The majority of hip fractures result from relatively low energy trauma due to combination of weaker reflexes to cushion the impact of a fall and bones weakened by the osteoporosis. Unstable intertrochanteric fracture in elderly patients are associated with a high rate of mortality (up to 20%) during the first postoperative year (2,3). The treatment of such unstable intertrochanteric fractures remains controversial, despite published reports of randomized trials and comparative studies (4-10). The traditional goal of the treatment is rigid internal fixation of the fragment and early mobilization (3).

We believe that postoperative early mobilization and patients' return to the premorbid daily activities should be the primary objectives of the treatment of such fractures. Thus, the time to return to daily activity levels before fracture is accepted as the most important criterion when evaluating results. The aim of this study was to identify the most appropriate method of treatment with regard to this criterion.

Materials and Method

The retrospective study included patients who had undergone surgery to treat intertrochanteric femoral fractures in the Division of Orthopaedics and Traumatology between January 2011 and December 2013. Because of the aim of this study, the ambulatory status of the patients was very important; thus, patients with associated fractures that may have significantly affected the functional outcome or systemic problems preventing their ambulation, patients that were non-ambulatory or ambulatory with a wheel chair before injury, patients who had spontaneous or non-traumatic fractures, and patients with psychiatric disorders and mental problems were excluded. All patients were independent community ambulators prior to trauma.

Patients whose fractures were classified as 31-B (femoral neck fractures) and 31-C (femoral head fractures) according to AO proximal femoral fracture classification were also excluded. Only patients with AO 31-A type (femur trochanteric region) fractures were included in this study.

A total of 136 patients were identified [mean age 76.67±5.3 years (range 58–98 years)]. Seventy-eight patients had AO 31-A1 type fractures; 40 of these patients were treated with bipolar hemiarthroplasty (BHA), 33 were treated with proximal femoral nail (PFN), and 5 were treated with dynamic hip screw (DHS). Forty patients had AO 31-A2 type fractures; 24 of these patients were treated with BHA, 7 were treated with PFN, 5 were treated with DHS, and 4 were treated with other plate-screw systems. Eighteen patients had AO 31-A3 type fractures; 2 of these patients were treated with BHA, 15 were treated with PFN, and 1 was treated with a plate-screw system. Patients who were treated with implants other than bipolar prosthesis or PFN were also excluded from the study.

The remaining patients were followed up with regular visits. Sixty-six patients who underwent BHA were compared with 55 patients who underwent PFN. At least 1 year of follow-up was required when the study was planned; therefore, the authors also attempted to contact patients who were operated at least 12 months previously but did not attend regular follow-up control visits. Eleven of the patients (16.66%) who had undergone BHA died within 1 year postoperatively, and 8 patients (12.12%) did not attend regular follow-up control visits or could not be contacted at their known addresses. Ten of the patients (18.18%) who had undergone PFN died within 1 year postoperatively and 6 patients (10.90%) did not attend regular follow-up control visits or could not be contacted at their known addresses. Therefore, the final evaluation compared 49 patients who had undergone BHA and 39 patients who had undergone PFN.

All surgical procedures were performed by surgical teams experienced in the application of hemiarthroplasty and PFN. The operations were performed as quickly as possible, and bleeding controls were used meticulously before wound closure. Acceptable closed reduction was achieved in all PFN cases.

The patients were mostly elderly (>75 years of age) in both groups. They had independent mobility before sustaining the fracture. Preoperative data included age, sex, fracture type, and preoperative comorbid conditions that may affect the final outcome. Perioperative data included time to surgery, operative time, amount of blood loss, and number of units of blood transfused. Postoperative data included time to full weight bearing, duration of hospital stay, and postoperative complications such as pulmonary problems, deep vein thrombosis (DVT), cardiac problems, infection (superficial and deep), pressure sores, fixation failure, varus displacement, protrusion, prosthetic dislocation, and mortality.

In the hemiarthroplasty group, the operations were performed using the posterolateral approach in a lateral decubitus position. Meticulous care was taken to preserve the integrity of the greater trochanter, abductor muscles, all vascularized bone fragments, and to maintain the leg length and femoral neck off-set. The greater trochanter was reduced and stabilized using tension band technique, cerclage cables, or heavy sutures when needed.

In the internal fixation group, the operations were performed under flouroscopy in a supine position. The aim was to obtain closed reduction in an optimum position with the correct angle between the femoral neck and shaft or a slight valgus position. Distraction of the fragments, varus position, or lateral displacement of the shaft was avoided. Antirotation nails, which are highly recommended for unstable fractures, were used if necessary. They are used to enhance the stability of the fixation and lower the mechanical implant-associated complication rates (9,11).

The independent samples T test for equality of means was used for statistical analysis; p values <0.05 were considered to be significant.

Results

All patients had unilateral closed intertrochanteric fractures. The fractures were due to traffic accident in 2 patients (4.1%) in the hemiarthroplasty group and in 3 patients (7.7%) in the PFN group. The remaining patients sustained fractures of the hip after falling from a low height.

In the hemiarthroplasty group, the average age at operation was 80.61± 6.55 years (range 68–98 years). There were 21 men (42.8%) and 28 women (57.2%). Fracture classification was AO 31-A1 in 32 (65.3%) patients, AO 31-A2 in 15 patients (30.6%), and AO 31-A3 in 2 (4.1%) patients.

The patients underwent surgery in an average of 4.14±1.93 days (range 0–8 days) after the fracture. The average time for duration of the surgery was 52.82±10.57 min (range 42–69 min), total perioperative blood loss was an average of 590.12±115.04 mL (range 350–720 mL), and the amount of blood transfused was an average of 1.10±0.66 units (range 0–2 units).

The mean postoperative time to weight bearing was 2.21±0.52 days (range 1–3 days), and the mean postoperative hospital stay was 3.22±0.44 days (range 2–5 days). The mean time to return to the premorbid daily activity was 6.24±2.12 weeks (range 4–11 weeks).

The total complication rate was 22.4%. There were 3 patients with <0.5 cm protrusion of the femoral stem, 2 patients with delayed union of the greater trochanter, 3 patients with shortening of the limb by >1 cm, 1 patient with a deep wound infection (which was surgically debrided and subsequently healed), and 2 patients with superficial wound infections. No revision surgery was necessary except one surgical debridement.

The mean Harris score at the last follow-up visit was 85.79±7.14 (excellent in 15 (31%) patients, good in 22 (45%) patients, fair in 10 (20%) patients, and poor in 2 (20%) patients). The mean Postel Merle D'Aubigne (PMA) score (modified by Charnley) at the last follow-up visit was 14.10±1.74 (range 8–17), mean pain score 5.1, motion 4.8, and gait 4.3.

In the PFN group, the average age at operation was 77.59±5.58 years (range 58–94 years). There were 16 men (41.0%) and 23 women (59.0%). Fracture classification was AO 31-A.1 in 25 (64.1%) patients, AO 31-A.2 in 4 patients (10.3%), and AO 31-A.3 in 10 (25.6%) patients.

The patients underwent the operation in an average of 3.95±1.86 days (range 0–7 days) after the fracture. The mean duration of the surgery was 82.53±20.71 min (range 49–110 min), the mean total perioperative blood loss was 390.15±89.28 mL (range 100–510 mL), and the mean amount of blood transfused was 0.77±0.21 units (range 0–2 units).

Postoperative weight bearing time was a mean 2.75±0.86 days (range, 1–4 days), postoperative hospital stay was average 3.51±1.22 days (range 1–5 days). The average time to return to the pre-fractured daily activity was 8.54±2.73 weeks (range, 5–12 weeks).

The total complication rate was 28.2%. There were 4 patients with secondary varus displacement <10°, 3 patients with delayed union of the intertrochanteric fracture, 2 patients with trochanteric tip calcification, and 2 patients with superficial wound infection. All healed in acceptable measures without revision.

Harris score at the last follow-up visit was 81.28±7.75 [excellent in 7 (18%) patients, good in 15 (38%) patients, fair in 12 (31%) patients, and poor in 5 (12%) patients]. The mean PMA score at the last follow-up visit was 12.21±2.03 (range 5–16), pain score 4.1, motion 4.3, and gait 3.8.

Bipolar hemiarthroplasty was cemented in four patients (8.1%), because the implant did not appear to be rigidly fixed. Three of these patients had calcar replacement and 1 had a collar in the femoral stem. Forty-five (91.8%) of the patients

Table 1— Complications (number of patients).

	Protrusion	Delayed Union	Limb Shortening	Displacement	Deep wo. inf.	Superf. wo. inf	Troch Tip Calc.
BHA	3	2	3	-	1	2	-
PFN	-	3	-	4	-	2	2

had undergone cementless hemiartroplasty, while 29 (64.4%) of these implants had a collar with 4/5 porous coating, 13 (26.6%) had 1/3 porous and/or HA coating, and 4 (8.9%) had calcar replacement. Proximal femoral nails were applied through the trochanteric tip in all but 3 cases, in which fossa piriformis was used. The type of implant was selected by the surgeon performing the operation in all cases.

All patients received standard postoperative care, including low-molecular-weight heparin for DVT prophylaxis and antibiotics for infection prophylaxis. Twenty-two patients with hemiarthroplasty (45%) stayed an average of 2.1 days in the intensive care unit postoperatively and 19 patients with PFN implantation (49%) stayed 2.3 days in the intensive care unit postoperatively as requested by the anesthesiologist. The accompanying systemic diseases were similar in both groups.

Radiological evaluations were made in standard anteroposterior and lateral x-rays. In the PFN group, union of the fracture, loss of reduction, implant migration, varus displacement, and cut-out of the screw were assessed; in the BHA group, loosening of the stem, protrusion, dislocation, and stem ingrowth to the femur was assessed.

In the BHA group, 11 patients (16.66%) died within 1 year postoperatively and 8 patients (12.12%) did not attend regular follow-up control visits. In the PFN group, 10 patients (18.18%) died within 1 year postoperatively and 6 patients (10.90%) did not attend regular follow-up control visits. We have no reliable data about the cause of death of these patients; therefore, we cannot determine how many (perhaps none) have died because of surgical complications. Finally, 49 patients with BHA and 39 patients with PFN were compared for the evaluation of this study.

Discussion

The management of unstable osteoporotic intertrochanteric fractures in the elderly is challenging because of difficult anatomical reduction, poor bone quality, and sometimes, a need to protect the fracture from the stress of weight bearing. Internal fixation in these cases usually involves prolonged bed rest or limited ambulation to prevent implant failure secondary to osteoporosis. This might result in higher chances of complications such as pulmonary embolism, DVT, pneumonia, and decubitus ulcer. The mechanism of injury is mostly trivial trauma for intertrochanteric femoral fractures. Low energy trauma (fall < 1 m) caused 53% of all fractures in patients ≥50 years of age. In patients >75 years of age, low energy trauma caused >80% of all fractures (2). Most of these patients are osteoporotic, with a low level of bone mineral density; after sustaining a fracture, the mortality risks are extremely elevated even in the best peroperative and postoperative conditions (3).

Stable fractures can be easily treated with osteosynthesis with predictable results. However, the management of unstable intertrochanteric (AO 31-A2.2 and 2.3 type) fractures is a challenge because of the difficulty in obtaining anatomical reduction. In the past, fixed nail-plate devices used for the fixation of these fractures had higher rates of cut-out and fracture displacement. In addition, a period of restricted mobilization is suggested in elderly patients with unstable osteoporotic fractures, which may cause complications such as atelectasis, bed sores, pneumonia, and DVT (1,3). Therefore, early and full weight bearing is very important, and requires a very stable and rigid fixation. There are several studies comparing different types of internal fixation devices such as DHS, proximal femoral plate, gamma nail for intertrochanteric femoral fractures, and almost all state the superiority of PFN in the stability of fixation, healing time, Harris hip score, and total complication rate in the treatment of these fractures (5-13).

In elderly patients, the aim must be early mobilization to prevent complications and facilitate the patient's returning to premorbid status as quickly as possible to prevent mortality.

There was no difference between the average age of the patients in the two groups (80.61 vs 77.59, p=0.06). The sex distribution in our study is different from almost all studies reported about intertrochanteric fractures. In other studies, female patients represent approximately 80% of the included patients, while they represent approximately 58% of our population. This likely resulted from the exclusion of non-ambulatory, multiple-fractured patients with systemic diseases, the majority of whom were women.

The fracture distribution was mostly AO 31-A1 in both groups (65.2% vs 64.1%) and appeared highly comparable (p=0.38); it is almost always the most challenging problem to compare the same type of fractures in orthopedic studies. AO 31-A2 fractures were the second most common type (30.6%) in BHA patients, while 31-A3 was the second most common type (25.6%) in PFN patients.

The average time to surgery from admission was 4.14 and 3.95 days, respectively (p=0.32); thus, this factor cannot differently effect the mortality rate in both groups. This delay resulted from the policy of the anesthesiology division. They asked for a "ready" intensive care unit bed according to the patient's American Society of Anesthesiologists (ASA) criteria and physical condition; therefore, there was typically a wait for an available bed preoperatively.

The average duration of surgery was shorter in BHA patients compared with PFN patients (52.82 min vs 82.53 min) and the difference was significant (p=0.0001). The same difference was noted by several authors (5-7,14-18). The perioperative blood loss (blood lost during surgery plus postoperative surgical drainage) was significantly less (p<0.005) in the PFN group (590.12 mL vs 390.15 mL), which was also congruent with the literature as internal fixation was almost always achieved with closed intramedullary nailing (5,15-20). Kim et al. reported longer surgery time and more bleeding with cemented calcar replacement arthroplasty (21). Blood loss in the BHA group in our study may also be altered because of cementless hemiarthroplasty. However, units of blood transfused (1.10 units vs 0.77 units respectively) were significantly different (p=0.036) although we did not prefer blood transfusion if the hemoglobin value was ≥9 g/dL.

Postoperative hospital stay (3.22 vs 3.51 days) and postoperative weight bearing time (mean 2 days in both groups) were not different (p=0.31). Patients were encouraged to walk from the first postoperative day in both groups unless there was any doubt about the rigidity of the fixation.

The mean follow-up time was similar in both groups (16 months for BHA and 17 months for PFN).

The total complication rate was lower with BHA (22.4% vs 28.2%). Dong et al. reported significantly lower complication rates with PFN (5). Almost all other authors reported lower complication rates with hemiarthroplasty (4,10,13,18). Geiger compared dislocation rates with internal fixation and hemiarthroplasty and found 12% to 0% rates, respectively (10). Hohendorff observed a 31.7% complication rate with PFN (13). In our study, there were only a small number of mechanical complications in the BHA group, although we largely preferred cementless fixation. This is believed to be due to the ambulatory and less osteoporotic status of the patients. Femoral cortexes were thick enough to rigidly hold the femoral stems. There were 3 patients with <0.5 cm protrusion of the femoral stem, 2 patients with delayed union of the greater trochanter, 3 patients with shortening of the limb >1 cm, 1 patient with a deep wound infection (which was surgically debrided), and 2 patients with superficial wound infections. Highly experienced surgical teams aiming real "rigid" fixation probably lowered mechanical complication rates with arthroplastic procedures.

Mechanical complications are reported more with osteosynthesis (4,10,14-16,18-20). In the PFN group, there were 4 patients with secondary varus displacement <10°, 3 patients with delayed union, 2 patients with trochanteric tip calcification, and 2 patients with superficial wound infections. Although the total complication rate was significantly higher than the BHA group, it was still lower than expected for locked intramedullary nailing systems; e.g., "cut-out of lag screws" did not occur (12,13).

In our series, no pressure sores were observed in either group. Because most of the patients were out of their beds on the second day postoperatively and the recumbancy time was minimal, there were also no symptomatic chest complications or DVT findings in our series. Haentjens et al. showed a significant reduction in the incidence of pneumonia and pressure sores in those undergoing prosthetic replacement because their implant group had delayed weight bearing due to the rigidity of fixation (16).

Eleven of the patients (16.66%) who underwent BHA died within 1 year postoperatively, and 8 patients (12.12%) did not attend regular follow-up control visits or could not be contacted at their known address. Ten of the patients (18.18%) who underwent PFN died within 1 year postoperatively, and 6 patients (10.90%) did not attend regular follow-up control visits or could not be contacted at their known address. The difference in mortality rates was not significant (p=0.058). Because we do not know the fate of the patients who missed their control visits at 1 year postoperatively, 19 patients (38.7%) with BHA and 16 patients (41.0%) with PFN may be considered as "lost," the difference of which is still not significant (p=0.34). Kim et al. found a doubled 1-year mortality rate with arthroplasty and stated that there was no surgical benefit (21). Many other authors found no significant difference between these two groups in terms of mortality rate in the first year (4,10,14,21,22).

Functional results were evaluated using Harris and Postel Merle d'Aubigne (modified by Charnley) scores. Both functional evaluation scores were significantly better in the arthrop-

lasty group. The Harris hip score at the last follow-up control visit was significantly higher (p=0.004) in the BHA group (85.79 vs 81.28, respectively). The hip score was found to be 75% excellent to good in the BHA group, while it was 56% excellent to good in the PFN group. Hohendorff et al. found unsatisfactory functional results with PFN in elderly patients, observing normal ambulation in only 33.8% of patients and only 64.6% free of pain (13). Dong et al. reported better Harris scores with hemiarthroplasty, and Sancheti et al. reported 71% excellent to good fair (91% excellent to fair) functional results with hemiarthroplasty in osteoporotic fractures (AO 31-A2.2 and A-2.3) with a mean patient age of 77.1 years (1,5). In a study of primary bipolar hemiarthroplasty for unstable intertrochanteric fractures in 37 elderly patients, Rodop et al. observed 17 (45%) excellent and 14 (37%) good results after 12 months according to the Harris hip-scoring system (23). In a comparative study investigating cone hemiarthroplasty versus internal fixation, Kayali et al. reached the conclusion that the functional results of both hemiarthroplasty and internal fixation groups were similar. Hemiarthroplasty patients were allowed full weight bearing significantly earlier than the internal fixation patients (24). Broos et al. concluded that the operative time, blood loss, and mortality rates were comparable between the two groups, with a slightly higher percentage (73% vs 63%) of those receiving prosthesis considered to be pain free (25). Kim et al. compared the calcar replacement prosthesis with intramedullary nailing in a prospective study involving two groups of 29 patients. They did not find any significant difference concerning the functional outcomes (21). Sinno et al. found significantly higher Harris hip scores (80.35 vs 68.17) in patients who underwent hemiartroplasty than internal fixation (18).

The mean PMA score at the last follow-up control visit was significantly better (p=0.0001) in the BHA group (14.10 vs 12.21, respectively). Bonnevialle et al. also reported better PMA and Parker scores with arthroplasty at the last follow-up control visit (14).

The mean time to return to the premorbid daily activity was 6.24±2.12 weeks and 8.54±2.73 weeks in the BHA and PFN groups, respectively; this difference was significant (p<0.001). It was challenging to determine the exact time of the patient's return to daily activities before fracture; thus, we asked for help from the relatives. Sinno et al. reported that the time to independent full weight bearing and return to the prefracture level of activity was significantly earlier in patients who underwent bipolar arthroplasty (1.26±0.68 weeks) compared with the internal fixation group (9.6±2.28 weeks; p<0.0001) (18). We believe that this is the most important criteria to evaluate results with elderly patients because there is no standard assessing value for individuals with various activity levels. The baseline should be the patient's premorbid daily activity level. The results showed that elderly patients had better functional results with hemiarthroplasty in intertrochanteric fractures because they could more quickly "go back" to their lives despite having more blood loss during surgical procedure. This may also be the main reason of lower complication rates with BHA.

Conclusion

The typical attitude in trochanteric fracture is internal fixation, because it spares head vitality and osteogenesis ensures repair as long as the osteosynthesis assembly is secure: a large majority of traumatologists adopt this option. Because of the rate of mechanical failure and the necessary caution in resuming weight bearing, several authors recommended hip arthroplasty (16,19,20,22). However, when newer implants such as PFN are used, these problems are minimized and early weight bearing is possible.

The present study showed better results with hemiarthroplasty than with intramedullary locked nailing in unstable trochanteric fracture in patients >75 years of age, in terms of associated complications, functional scores, and time to re-

Table 2— Evaluation of the Results

	BHA	PFN	p
Age (years)	80.61±6.55	77.59±5.58	0.06
Fracture Distribution (AO 31-A1)	65.2 %	64.1 %	0.38
Duration of Surgery (minutes)	52.82±10.57	82.53±20.71	0.0001
Perioperative Blood Loss (mL)	590.12±115.04	390.15±89.28	0.0001
Harris Score at the last visit	85.79±7.14	81.28±7.21	0.004
Modified PMA Score at the last visit	14.10±1.75	12.21±2.03	0.0001
Return to Premorbid Activities (weeks)	6.24±2.12	8.54±2.73	0.004

turn to the prefracture daily activity. It can be emphasized that hemiarthroplasty was not associated with greater postoperative mortality than osteosynthesis and can safely be the first choice of treatment for such fractures among ambulatory elderly patients.

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