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Original Research Article

One-Year Functional Outcome and Patient Satisfaction Following Modular Bipolar Hemiarthroplasty for Intracapsular Fracture Neck of Femur: A Prospective Study

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Conflict of interest: Nil

Abstract

Background: Displaced intracapsular fracture neck of femur is a common injury in the elderly and is associated with significant morbidity. Modular bipolar hemiarthroplasty aims to provide early mobilization, pain relief, and improved functional recovery.

Methods: This prospective observational study included 20 elderly patients with displaced intracapsular fracture neck of femur who underwent modular bipolar hemiarthroplasty. Patients were followed for one year, and functional outcome was assessed using the Harris Hip Score (HHS). Postoperative complications, radiological outcomes, and patient satisfaction were also evaluated.

Results: The mean age was 65 years, with females accounting for 60% of patients. Trivial falls were the commonest mechanism of injury (70%), and transcervical fractures constituted 80% of cases. The mean HHS improved from 58.09 at 6 weeks to 85.68 at one year. At final follow-up, 35% of patients achieved excellent, 45% good, 10% fair, and 10% poor outcomes, with an overall good-to-excellent outcome rate of 80%. Limb shortening and superficial wound infection each occurred in 10% of patients. No prosthetic loosening, dislocation, acetabular erosion, or periprosthetic fractures were observed. Overall, 85% of patients were satisfied with the procedure.

Conclusion: Modular bipolar hemiarthroplasty is a safe and effective treatment for displaced intracapsular fracture neck of femur in elderly patients, providing satisfactory functional recovery, early mobilization, and a low complication rate.

Keywords: Intracapsular Fracture Neck of Femur; Bipolar Hemiarthroplasty; Harris Hip Score; Functional Outcome; Elderly.

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Introduction

Intracapsular fracture neck of femur is one of the most common osteoporotic fragility fractures encountered in the elderly and represents a major cause of morbidity, loss of independence, and mortality worldwide. The incidence of these fractures continues to increase with advancing life expectancy, the growing prevalence of osteoporosis, reduced muscle strength, impaired balance, visual deficits, and other age-related comorbidities. Epidemiological projections suggest that the global burden of hip fractures will continue to rise substantially over the coming decades, making their management an important public health challenge [1,2]. The primary objective in the management of displaced intracapsular femoral neck fractures is to restore the patient's pre-fracture functional status while minimizing complications, facilitating early mobilization, and reducing mortality [3]. Historically, internal fixation was considered the standard treatment; however, elderly patients with displaced fractures have demonstrated high rates of fixation failure, non-union, avascular necrosis of the femoral head, prolonged immobilization, and the need for revision surgery. Consequently, prosthetic replacement has become the preferred treatment modality for most active

elderly patients with displaced intracapsular fractures [4]. The introduction of hemiarthroplasty revolutionized the management of femoral neck fractures in elderly individuals. Initially, unipolar prostheses such as the Austin Moore and Thompson prostheses were widely used because of their technical simplicity and early pain relief. However, long-term complications including acetabular cartilage erosion, persistent groin pain, prosthetic loosening, and progressive protrusio acetabuli limited their functional outcomes, particularly among active elderly patients [5].

To overcome these limitations, Bateman introduced the bipolar hemiarthroplasty in 1974, incorporating an additional inner articulation between the prosthetic head and polyethylene liner. This dual-bearing mechanism was designed to reduce acetabular wear by distributing movement between the inner and outer articulations, thereby improving hip biomechanics, reducing pain, and delaying acetabular degeneration [6]. Subsequent development of modular bipolar prostheses further enhanced surgical flexibility by allowing independent selection of stem size, neck length, and bipolar head diameter, thereby improving restoration of limb length, soft tissue tension, hip stability, and facilitating future conversion to total hip arthroplasty when required [7,8].

Over the past two decades, modular bipolar hemiarthroplasty has become an increasingly preferred option for elderly patients with displaced intracapsular femoral neck fractures, particularly in developing countries such as India. Compared with total hip arthroplasty, bipolar hemiarthroplasty is technically less demanding, associated with shorter operative time, lower blood loss, reduced dislocation risk, and lower overall treatment costs while providing satisfactory pain relief and functional recovery in appropriately selected patients [8,9]. Although total hip arthroplasty may provide superior long-term functional outcomes in highly active elderly individuals, hemiarthroplasty remains the treatment of choice for the majority of elderly patients because it offers an optimal balance between mobility, stability, operative safety, and affordability [9].

Several studies have demonstrated that bipolar hemiarthroplasty provides superior clinical outcomes compared with unipolar prostheses, including reduced postoperative pain, greater range of hip motion, earlier ambulation, improved functional recovery, lower rates of acetabular erosion, and higher patient satisfaction [10,11].

Nevertheless, concerns remain regarding long-term inner-bearing motion, progressive acetabular degeneration, and functional deterioration over time, and evidence regarding patient-reported satisfaction and medium-term functional outcomes in the Indian population remains relatively limited [12]. Therefore, the present prospective study was undertaken to evaluate the one-year functional outcome and patient satisfaction following modular bipolar hemiarthroplasty in elderly patients with displaced intracapsular fracture neck of femur.

The study aims to assess postoperative functional recovery, pain relief, mobility, complications, and overall patient satisfaction, thereby contributing further evidence regarding the effectiveness of modular bipolar hemiarthroplasty as a treatment option in this patient population.

Materials and Methods

Study Design and Setting: This prospective observational study was conducted in the Department of Orthopaedics, Gulbarga Institute of Medical Sciences (GIMS), Kalaburagi, Karnataka, India,. A total of 20 consecutive patients with intracapsular fracture neck of femur undergoing modular bipolar hemiarthroplasty were included after obtaining informed written consent.

Study Population

Inclusion Criteria

- Patients aged 55–65 years with displaced intracapsular fracture neck of femur unsuitable for osteosynthesis.
- Failed internal fixation of fracture neck of femur.
- Patients aged >65 years with a radiologically normal acetabulum and unsuitable or unable to afford primary total hip arthroplasty.

Exclusion Criteria

- Age <55 years.
- Arthritic acetabular changes.
- Pathological fractures.
- Patients unwilling or medically unfit for surgery.

Preoperative Evaluation: All patients underwent detailed clinical examination, radiographic evaluation, and routine laboratory investigations. Medical comorbidities were optimized before surgery. High tibial skeletal traction (4–7 kg) was applied preoperatively. Written informed consent was obtained from all participants.

Surgical Technique: All surgeries were performed under spinal or epidural anaesthesia using the standard Moore's posterior approach. Following femoral head excision and canal preparation, the appropriate-sized modular bipolar prosthesis was implanted with 10°–15° anteversion. Cemented stems were used selectively in patients with osteoporosis or poor bone quality. The posterior capsule and short external rotators were meticulously repaired before wound closure.

Postoperative Care: Patients received intravenous cefuroxime prophylaxis for 5–7 days. Early rehabilitation included quadriceps and hip abduction exercises from the second postoperative day, followed by walker-assisted ambulation between postoperative days 3 and 7 with gradual progression to full weight bearing as tolerated.

Follow-up and Outcome Assessment: Patients were evaluated at 6 weeks, 3 months, 6 months, 9 months, and 1 year. Functional outcome was assessed using the Harris Hip Score (HHS), with final outcomes categorized as excellent (90–100), good (80–89), fair (70–79), or poor (<70). Pain was assessed using the Visual Analogue Scale (VAS), while radiographic assessment included prosthesis stability, stem subsidence, acetabular erosion, protrusio acetabuli, and loosening.

Statistical Analysis: Data were analysed using SPSS software. Continuous variables were expressed as mean ± standard deviation, while categorical variables were presented as frequencies and percentages. A p-value <0.05 was considered statistically significant.

Results

A total of 20 elderly patients with displaced intracapsular fracture neck of femur underwent modular bipolar hemiarthroplasty and completed the one-year follow-up. The mean age of the study population was 65 years (range, 58–85 years). The majority of patients belonged to the 66–75 years age group (55%), followed by 76–85 years (25%) and 55–65 years (20%). Females constituted 60% of the study population, while males accounted for 40%. Left-sided fractures were more common (65%) than right-sided fractures (35%) (Table 1). The majority of fractures resulted from tripping or slipping (70%), whereas 30% occurred following road traffic accidents. Most patients presented within 72 hours of injury (55%), while the remaining patients presented after varying delays. Radiologically, transcervical fractures were the predominant fracture type (80%), followed by basicervical (15%) and subcapital fractures (5%) (Table 2).Among the associated medical comorbidities, diabetes mellitus and hypertension were the most common, each affecting 25% of patients, followed by COPD (20%), knee osteoarthritis (20%), and heart disease (10%). The majority of patients (60%) experienced an estimated intraoperative blood loss of <500 mL, while 25% lost 500–750 mL and 15% had blood loss exceeding 750 mL (Table 3, Figure 1).Perioperative complications were uncommon. Technical difficulty during prosthesis insertion was encountered in 25% of patients, while intraoperative hypotension and postoperative hypotension occurred in 10% and 5%, respectively. Early postoperative complications included limb shortening (10%) and superficial wound infection (10%). No patient developed late complications such as prosthetic loosening, dislocation, acetabular erosion, protrusio acetabuli, or periprosthetic fracture during the one-year follow-up.

The mean hospital stay was 16 days (range, 14–35 days) (Table 4, Figure 2).Functional recovery at one year was satisfactory. At final follow-up, 85% of patients reported only slight or occasional pain, 60% were able to ambulate independently without walking aids, while 40% required a cane or walker for long-distance walking. Seventy-five percent of patients could walk unlimited distances, and 90% were able to sit comfortably for one hour (Table 5).

The mean Harris Hip Score at one year was 85.68 ± 8.21. Overall, 7 patients (35%) achieved an excellent outcome, 9 (45%) achieved a good outcome, 2 (10%) had a fair outcome, and 2 (10%) had a poor outcome. Thus, 80% of patients achieved a good-to-excellent functional outcome following modular bipolar hemiarthroplasty (Table 6, Figure 3).

Table 1: Baseline Demographic and Clinical Characteristics of the Study Population (n = 20)

Variable	Category	Number (n)	Percentage (%)
Age group (years)	55–65	4	20.0
	66–75	11	55.0
	76–85	5	25.0
Sex	Male	8	40.0
	Female	12	60.0
Side involved	Right	7	35.0
	Left	13	65.0
Mean age (years)	65 (Range: 58–85)	—	—

Table 2: Injury and Fracture Characteristics (n = 20)

Variable	Category	Number (n)	Percentage (%)
Mode of injury	Tripping/Slipping	14	70.0
	Road traffic accident	6	30.0
Time to presentation	<24 hours	5	25.0
	24–72 hours	6	30.0
	72 hours–1 week	3	15.0
	1–3 weeks	3	15.0
	>3 weeks	3	15.0
Fracture type	Transcervical	16	80.0
	Basicervical	3	15.0
	Subcapital	1	5.0

Table 3: Associated Comorbidities and Operative Characteristics (n = 20)

Variable	Category	Number (n)	Percentage (%)
Comorbidities	Diabetes mellitus	5	25.0
	Hypertension	5	25.0
	COPD	4	20.0
	Knee osteoarthritis	4	20.0
	Heart disease	2	10.0
Estimated blood loss	<500 mL	12	60.0
	500–750 mL	5	25.0
	>750 mL	3	15.0

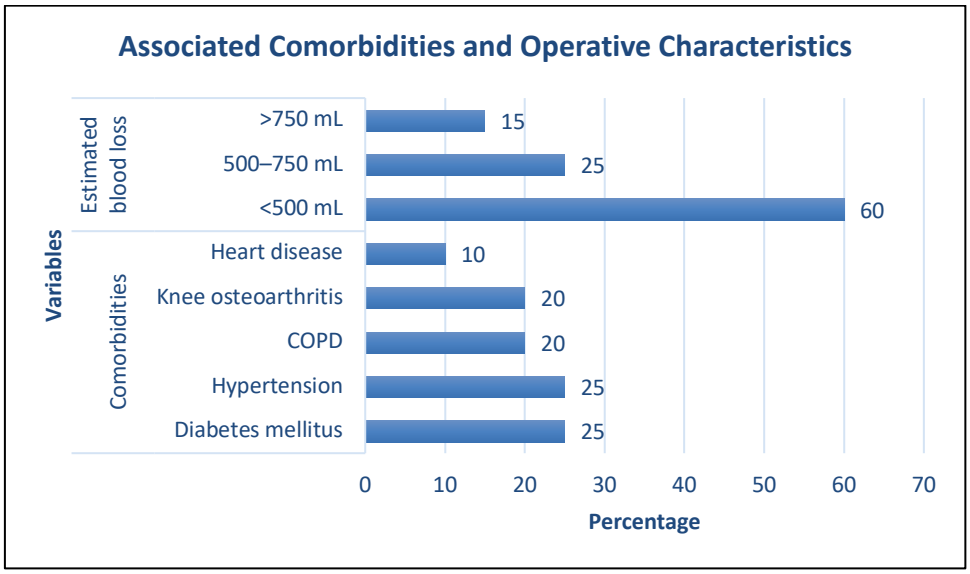

Figure 1: Associated Comorbidities and Operative Characteristics (n = 20)

Table 4: Postoperative Complications (n = 20)

Variable	Category	Number (n)	Percentage (%)
Perioperative complications	Technical difficulty	5	25.0
	Intraoperative hypotension	2	10.0
	Postoperative hypotension	1	5.0
Early postoperative complications	Limb shortening	2	10.0
	Superficial wound infection	2	10.0
Late postoperative complications	Prosthetic loosening	0	0.0
	Dislocation	0	0.0
	Acetabular erosion	0	0.0
	Protrusio acetabuli	0	0.0
	Periprosthetic fracture	0	0.0
Mean hospital stay (days)	16 (Range: 14–35)	—	—

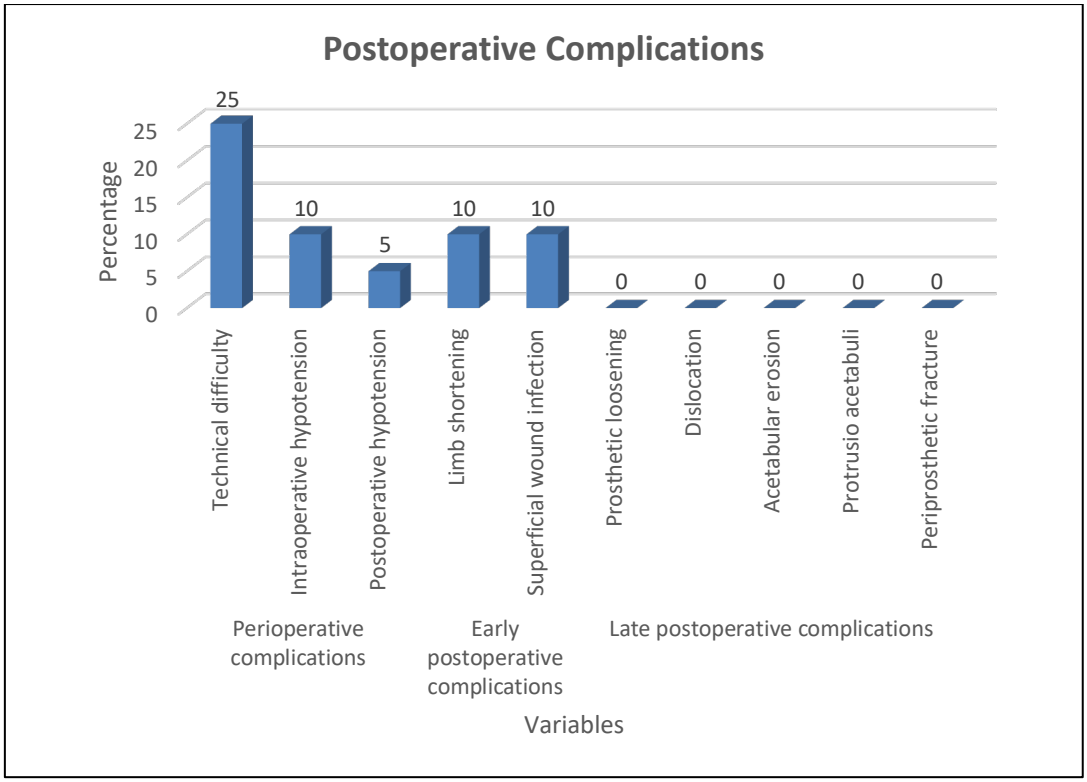

Figure 2: Postoperative Complications (n = 20)

Table 5: Functional Recovery at One-Year Follow-up (n = 20)

Variable	Category	Number (n)	Percentage (%)
Pain	Slight/occasional	17	85.0
	Mild	2	10.0
	Moderate	1	5.0
Walking support	Independent	12	60.0
	Cane/Walker	8	40.0
Walking distance	Unlimited	15	75.0
	Approximately 1000 m	3	15.0
	Approximately 500 m	2	10.0
Sitting comfortably (1 hour)	Yes	18	90.0
	No	2	10.0

Table 6: Harris Hip Score and Clinical Outcome (n = 20)

Variable	Category	Number (n)	Percentage (%)
Final Harris Hip Score	Excellent (90–100)	7	35.0
	Good (80–89)	9	45.0
	Fair (70–79)	2	10.0
	Poor (<70)	2	10.0
Overall outcome	Good/Excellent	16	80.0
	Fair/Poor	4	20.0
Mean Harris Hip Score	85.68 ± 8.21	—	—

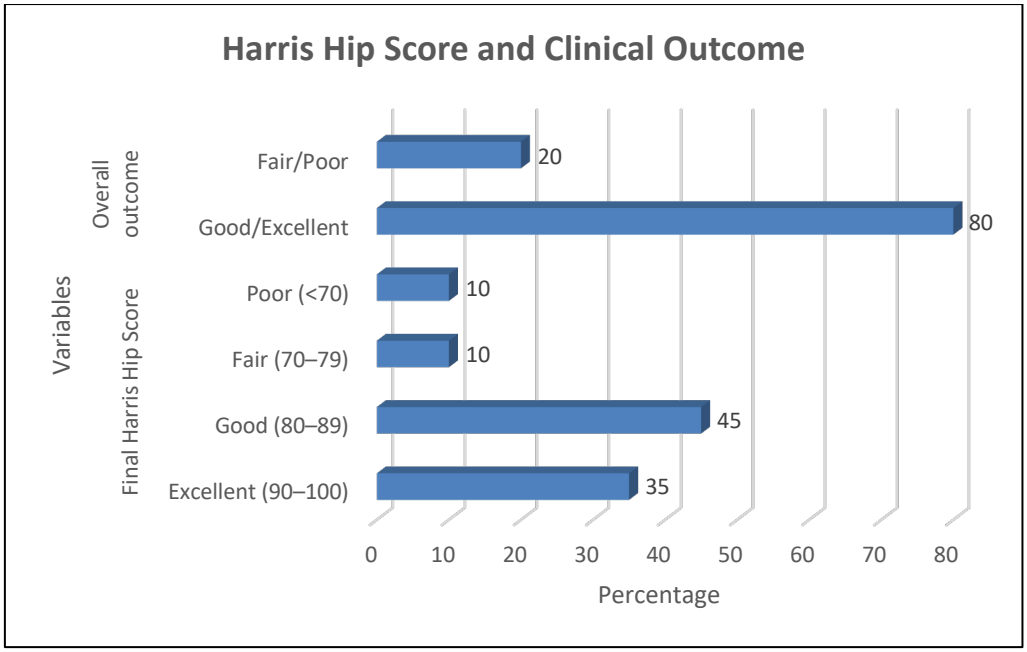

Figure 3: Harris Hip Score and Clinical Outcome (n = 20)

Discussion

The primary objective of hemiarthroplasty for displaced intracapsular fracture neck of femur in elderly patients is to achieve early mobilization, pain relief, and restoration of pre-fracture function while minimizing postoperative complications [3,4]. In the present study, modular bipolar hemiarthroplasty provided satisfactory functional outcomes, with 80% of patients achieving excellent or good Harris Hip Scores at one year.

The mean age of the study population was 65 years (range, 58–85 years), with females constituting 60% of patients. These findings are consistent with the known epidemiology of femoral neck fractures, which predominantly affect elderly osteoporotic women following low-energy trauma [1,2]. Similarly, 70% of fractures resulted from trivial falls, reflecting the fragility nature of these injuries in the elderly population.

Transcervical fractures accounted for 80% of cases and represented the commonest fracture pattern. Diabetes mellitus and hypertension were the most frequent comorbidities (25% each), followed by COPD (20%). Previous studies by Koval et al. and Bath have similarly reported that associated medical comorbidities significantly influence postoperative rehabilitation and functional recovery [13,14]. All patients underwent modular bipolar hemiarthroplasty using the posterior (Moore's) approach under regional anaesthesia. Despite concerns regarding higher dislocation rates with this approach, no postoperative dislocations occurred, likely because of meticulous repair of the posterior capsule and short external rotators, as also reported by LaBelle et al. and Bath [14,15]. Most patients (60%) had an intraoperative blood loss of <500 mL, and surgeries were completed within approximately 90–120 minutes, comparable to findings reported by Haidukewych et al. and Drinker et al. [16,17]. Early mobilization was achieved in most patients within the first 72 postoperative hours, facilitating satisfactory recovery.

Postoperative complications were minimal. Limb shortening and superficial wound infection each occurred in 10% of patients and were managed successfully without long-term sequelae. No cases of prosthetic loosening, dislocation, acetabular erosion, protrusio acetabuli, or periprosthetic fracture were observed during follow-up. Nottage et al. similarly reported a low infection rate following bipolar hemiarthroplasty [18].

The mean hospital stay was 16 days, which is shorter than the 21 days reported by Lestrange and 23 days reported by Drinker and Murray [17]. Functional recovery improved progressively, with the mean Harris Hip Score increasing from 58.09 at 6 weeks to 85.68 at one year. Overall, 35% of patients achieved excellent, 45% good, 10% fair, and 10% poor outcomes, with 80% demonstrating good-to-excellent functional results, comparable to previous bipolar hemiarthroplasty studies.

Patient satisfaction was high, with 85% of patients reporting being very or fairly satisfied with the procedure. However, subjective satisfaction did not always correlate with the Harris Hip Score. The present study is limited by its small sample size and one-year follow-up, which preclude assessment of long-term implant survival and acetabular wear. Larger studies with longer follow-up are needed to confirm the long-term effectiveness of modular bipolar hemiarthroplasty.

Conclusion

Modular bipolar hemiarthroplasty provided satisfactory functional outcomes, with 80% of elderly patients achieving good-to-excellent Harris Hip Scores at one-year follow-up.

The procedure facilitated early mobilization, effective pain relief, and a low incidence of postoperative complications. These findings support modular bipolar hemiarthroplasty as a safe and effective treatment for displaced intracapsular fracture neck of femur in elderly patients.

Limitation

The study was limited by its small sample size and relatively short one-year follow-up, which precluded assessment of long-term implant survival and acetabular wear. Larger multicentric studies with longer follow-up are required to validate these findings.

References

1. Schmidt AH, Swiontkowski MF. Femoral neck fractures. Orthop Clin North Am. 2002;33(1):97-111.
2. Leighton RK. Fractures of the neck of the femur. In: Bucholz RW, Heckman JD, Court-Brown CM, editors. Rockwood and Green's Fractures in Adults. 6th ed. Philadelphia: Lippincott Williams & Wilkins; 2006. p. 1753-1791.
3. Swiontkowski MF. Intracapsular fractures of the hip. J Bone Joint Surg Am. 1994;76:129-138.
4. Iorio R, Healy WL, Lemos DW, Appleby D, Lucchesi C, Saleh KJ, et al. Displaced femoral neck fractures in the elderly: outcomes and cost effectiveness. Clin Orthop Relat Res. 2001;383:229-242.
5. Bhandari M, Devereaux PJ, Swiontkowski MF, Tornetta P III, Obremskey W, Koval KJ, et al. Internal fixation compared with arthroplasty for displaced fractures of the femoral neck. J Bone Joint Surg Am. 2003;85:1673-1681.
6. Iorio R, Schwartz B, Macaulay W, Teeney SM, Healy WL, York S. Surgical treatment of displaced femoral neck fractures in the elderly: a survey of the American Association of Hip and Knee Surgeons. J Arthroplasty. 2006;21(8):1124-1133.
7. Zofka P. Bipolar hip hemiarthroplasty. Acta Chir Orthop Traumatol Cech. 2007;74(2):99-104.
8. Agarwala S, Bhagwat A. Charnley-Hastings bipolar modular replacement option for intracapsular fracture neck of femur. Indian J Orthop. 2006;40(3):157-159.
9. Marya SK, Thukral R, Hasan R, Tripathi M. Cementless bipolar hemiarthroplasty in femoral neck fractures in elderly. Indian J Orthop. 2011;45:236-242.
10. Ozturkmen Y, Karamehmetoglu M, Canikli oglu M, Ince Y, Azboy I. Cementless hemiar throplasty for fracture neck of femur in elderly patients. Indian J Orthop. 2008;42:56-60.
11. Malhotra R, Arya R, Bhan S. Bipolar hemiarthroplasty in femoral neck fractures. Archives of Orthopaedic and Trauma Surgery 1995; 114(2): 79-82.
12. Sud A, Sood LK. Bipolar hip replacement for displaced fracture neck of femur in elderly patients. Indian Journal of Orthopaedics 1998;32:270-271.
13. Koval KJ, Zuckerman JD. Functional recovery after fracture of the hip. J Bone Joint Surg Am. 1994;76:751-766.
14. Bath R. Problems in the treatment of femoral neck fractures. Proc R Soc Med. 1975;68:1120-1128.
15. LaBelle LW, Colwill JC, Swanson AB. Bateman bipolar hip arthroplasty for femoral neck fractures: a five- to ten-year follow-up study. Clin Orthop Relat Res. 1990;251:20-25.
16. Haidukewych GJ, Israel TA, Berry DJ. Long-term survivorship of cemented bipolar hemiarthroplasty for fracture of the femoral neck. Clin Orthop Relat Res. 2002;403:118-126.
17. Drinker H, Murray WR. The universal proximal femoral endoprosthesis: a short-term comparison with conventional hemiarthroplasty. J Bone Joint Surg Am. 1979;61A:1167-1174.
18. Nottage WM, McMaster WC. Comparison of bipolar implants with fixed-neck prosthesis in femoral neck fractures. Clin Orthop Relat Res. 1990;251:38-44.