

Surgical and Clinical Outcome of Bipolar Hemiarthroplasty Over Unipolar Hemiarthroplasty in Case of Fracture Neck of Femur in Elderly- Done in CBMCH,B and Private Clinics

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Abstract

Back ground: Whether bipolar hemiarthroplasty[BH] for displaced femoral neck fractures has benefit over unipolar hemiarthroplasty[UH] remains controversial. Intracapsular fracture neck femur mainly occur in elderly person. The prime goal of treatment is to return the patient to their pre-fracture functional status. The surgical treatment is the treatment of choice, hip replacement arthroplasty (hemi or total) is a viable choice in treatment option. In this clinical study 96 elderly patients (age 55-78 years) with a displaced intracapsular femoral neck fracture were treatment over a six year period (December 2009 to December 2015). All of them underwent hemiarthroplasty either bipolar or unipolar, after appropriate medical and anesthetic fitness. The patients were reevaluated at two weeks, six weeks, at six months postoperative and assessed using mainly Harris hip score (HHS) and visual analogue scale (vas) for evaluation of clinical and surgical outcome. Also x-ray done to seen erosion of acetabulum. The mean age of patients was 64.5 years and male female ratio 45.83% -54.17%. The mean HHS score was 83.5 for BH and 82.5 for UH at the end of the 6 months. The mean score on VAS scale was 4mm (mu) at 6 months for both BH and UH follow up visit. At the one year 03 cases of unipolar complications mild hip pain. No patients need revision surgery. Bipolar and unipolar hemiarthroplasty is the treatment of choice in elderly patient with displaced femoral neck fracture provides early ambulation, good functional outcome, pain free joint with minimal complications without the need for revision surgery. there is no significant differences between Bipolar and Unipolar arthroplasty surgically and clinically.

CBMJ 2016 January: Vol. 05 No. 01 P: 27-32

Key Words : *Fracture neck femur, elderly patient ,Bipolar hemiarthroplasty ,Unipolar hemiarthroplasty Harris hip score, visual analogue score, x-ray*

Introduction

The femoral neck is the commonest site of fractures in the elderly¹. Fall is the leading cause of injuries and hospital admissions in the elderly population². Femoral neck fractures account for over 90% of hip fractures, accruing in approximately equal proportion³. Proximal femoral neck fractures fall in to two groups: Extracapsular and intracapsular. Extracapsular one may be treated by closed reduction and internal fixation by dynamic hip screw (DHS) most patients presently with intracapsular fractured neck of femur are elderly and osteoporotic⁴. Femoral neck fractures have been considered 'unsolvable fractures' in the older era of orthopaedics⁵. Femoral neck fracture is a common fracture in senior patients, which can decrease mobility and increase mortality⁶. There are many options for these fractures

including internal fixation, hemiarthroplasty and total hip arthroplasty⁷.

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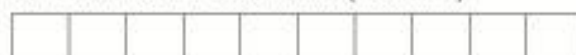
Among these procedures, hemiarthroplasty has become the most preferred treatment option⁸. There are two types of options, including Bipolar hemiarthroplasty (BH) and Unipolar hemiarthroplasty (UH), when using a hemiarthroplasty. Though non operative treatment of these fractures has been documented⁹ there are currently very few indications for the same (terminally ill, bed ridden and non ambulating patients) surgical treatment has been established as the gold standard, open reduction and internal fixation (ORIF) shown to have a high rate of revision surgery due to non union and avascular necrosis¹⁰ Hip replacement arthroplasty (partial or total) in emerging as the most viable treatment option¹¹⁻¹⁵. We evaluated the functional outcome in addition to surgical outcomes of Bipolar over Unipolar hemiarthroplasty in fracture neck of femur in these elderly patients.

Methods

Our study conducted in the department of Orthopaedics in Community Based Medical College Bangladesh, Winnerpar, Mymensingh and private clinics in Mymensingh. All Patients above 55 years undergoing hemiarthroplasty for fracture neck of femur during the period of december2009-december 2015 were studied. Patients with fracture neck of femur unfit for anaesthesia, refusal for consent, associated fractures or poly trauma fractures were excluded from this study. Patients medical records were reviewed for collecting pre, peri and post operative data. The patients were evaluated preoperatively, at six weeks, at six months postoperatively using Harris hip score (HHS), visual analogues scale (VAS) and x-ray for 03 cases of unipolar for outcomes. The HHS was developed for the assessment for the results of hip surgery and is intended to evaluate various hip disabilities and methods of treatment¹⁶ in an adult population. The original version was published 1969. The domains covered are pain, function, deformity and range of motion. The pain domain measures pain severity and its effect on activities and need for pain medication. The function domain consists of daily activities

(stair use, using public transportation, sitting and managing shoes and socks) and gait (Limp, support needed and walking distance). Deformity takes into account hip flexion, adduction, internal rotation and extremity length discrepancy. Range of motion measures hip flexion, abduction, external and internal rotation and adduction. The HHS has maximum of 100 points (best possible outcomes) covering pain 44 points, function 47 points, range of motion 5 points and deformity 4 points. Function sub divided into activities of daily living (14 points) and gait (33) points. The higher the HHS, the less dysfunction. A total score of 70 is considered as poor result. 70-79 is considered fair, 80-89 is good and 90-100 is an excellent result¹⁶. Successful result is defined as a post operative increase in Harris hip score of 720 points + radiographically stable implant + no additional femoral reconstruction. VAS is a measurement instrument that tries to measure a characteristic or attitude that is belied to range across a continuum of values and cannot easily to direct measured¹⁷. It is often used in epidemiologic and clinical research to measure the intensity or frequency of various symptoms¹⁸. For example, the amount of pain that a patient feels ranges across a continuum from none to an extreme amount of pain using a ruler, the score is determined by measuring the distance (mm) on the 10 cm line providing a range based on the distribution of pain vas of scores from 0-100. Scores in post surgical patients who described their postoperative pain intensity as none, Mild moderate or severe, the following and points on the pain VAS have been recommended no pain (0-4mm) mild (5-44mm). Moderate (45-74mm) and severe pain (75-100)¹⁹.

. 0 1 2 3 4 5 6 7 8 9 10 cm(100mm)



Operative procedure

Hip was exposed by southern approach, capsulotomy done by 'H' or inverted 'T' shaped incision. After taking out the head of the femur, size of the prosthesis is selected

Table 03: Clinical and Surgical outcome of bipolar hemiarthroplasty over Unipolar hemiarthroplasty:

Traits	Bipolar	Unipolar
Pain	No significant pain at the end of six month	No significant pain at the end of six month
Deformity	Absent	Absent
Infection	Not observed	Only in one patient
Operation time (mean)	01 hour 17 min	01 hour 11 min
Blood loss	One unit approximately	One unit approximately
Blood transfusion	Not required postoperatively	Not required postoperatively
Hospital stay	2 weeks	2 weeks except one patient
Mortality	Nil	Nil
Reoperation	Not required	Not required
Dislocation	Did not occur	Did not occur

Table-04: HHS surgical mean-outcome at different visit:

Visit time	Bipolar	Unipolar
2 weeks	78	78
6 weeks	82	81
6 weeks	83.5	82.5

Table-05 : HHS surgical outcome at the end of six months.

Result	BP	UP	% BP	% UP
Excellent (90-100)	05	07	12.82	12.28
Good (80-89)	27	40	69.23	70.17
Fair (70-79)	07	10	17.95	17.54
Poor (< 70)	0	0	0	0

Table-06: VAS scale of bipolar and unipolar:

Visit time	Bipolar	Unipolar	Intensity of pain
2 weeks	58	60	Moderate (45-74mm)
6 weeks	38	40	Mild (5-44mm)
6 months	04	04	No pain (0-4mm)

Discussion

Intracapsular displaced fractures of the neck of femur is usually treated by arthroplasty either hemi (unipolar or bipolar) or total hip

replacement [in case of acetabular injury] . Total hip replacement may be done in some selective cases but in our hospital set up, we treat all the cases by hemi hip arthroplasty. We used Austin moor prosthesis. There are no significant difference between BH and UH with regard to operation time, blood loss, blood transfusion, hospital stay, mortality, re-operation, dislocation and complications bipolar. BH could not decrease acetabular erosion rate in the long term. However, the close reduction of bipolar head is more difficult than the unipolar prosthesis and BH typically requires open reduction^{20,21}. There was no significant difference in clinical outcomes between BH and UH²². Dipolar implant are more expensive than the unipolar implants^{23, 24}. Hence we use unipolar prosthesis more due to patient need. In our study all the patients under went hemiarthroplasty and the outcomes at the end of 6 months suggests that most of the patients showed good response both for BH and UH .only 03 unipolar patients complains pain at one year and x-ray done, found little erosion of acetabulum. Manage with analges and physiotherapy Female patients are more than that of male as women are especially at risk , because of a tendency for their bone to become increasingly fragile after the menopause in consequence of generalized osteoporosis²⁵. Postoperatively, breathing exercises and early mobilization important. Speed of recovery depends largely on how active the patient was before the fracture; after 2-4 months, further improvement is unlikely.

Walia et al²⁶ reported The superiority of total hip replacement in terms of Control of pain, however they also highlighted certain drawbacks of total hip replacement (THR) arthroplasty in elderly patients such as instability, impaired reflexes, cognitive impairment, higher dislocation rates. it is also hypothesized that BH with lower acetabular erosion rate will produce a less painful arthroplasty and improve hip function and quality of life^{27, 28} Hence we follow up the patients up to 6 months and one year. If we want to see acetabular erosion more it will take times for few years.

Zhiwei Jia, Fan Ding et al²⁹ reported BH for displaced femoral neck fractures could not have benefit over UH in terms of surgical information and postoperative results complications. BH may achieve similar or better outcomes compared with UH with respect to clinical outcomes. However, BH is associated with higher cost and could not decrease the incidence of acetabular erosion in long term. In our study no significant complications were seen in postoperative period Except one case of deep infection necessitating one episode of debridement and three weeks parenteral antibiotics, two instances of thigh pain and two patients developed superficial bed sore (which healed without sequelae) No history of dislocation of any patient and no patient required revision surgery. The limitation of present study is the short duration of follow up. There is scope for improvement in results as well as increase in complications with a longer follow up. Community Based medical college hospital, Bangladesh is a private Medical College in Bangladesh. We operated most cases in our hospital and also in private clinics. Number of patients were not satisfactory for a six years period. We excluded the patients who came terminally ill patients, bedridden and non ambulatory patients. We also excluded the patients who were unfit for anesthesia & refused operative treatment.

Conclusion

Intracapsular fractures of the proximal femur account a major share of fractures in the elderly. The prime goal of treatment is to return the patients to their pre-fracture functional status. Hemi hip arthroplasty is the gold standard surgical treatment opinion for intracapsular displaced femoral neck fracture. The mean HHS score was 83.5 (good) for BH and 82.5(good) forUP. VAS scale for both BH and UH was 04mm (No pain) at 6 months. Female are more sufferer than male due to senile as well as postmenopausal osteoporosis. We observed a significant change in HHS and VAS at the end of six months. Good scores are observed in all the patients. Hemiarthroplasty [BH and UH] for

neck of femur in elderly does provide early ambulation, good functional outcome, pain free joint with minimal complications without the need for revision surgery. Finally we found surgically and clinically there is no significant differences between Bipolar over Unipolar hemiarthroplasty.

Reference

1. Louis solomon, David warwick, selvadurai Nayagam et al. *Injuries of the hip and femur, Apley's system, of orthopaedics and fracture* 9th edition, 2010; 28: 843-873.
2. Alexander BH, Rivara FP, Wolfe ME. The Cost and frequency of hospitalization for fall related injuries in older persons. *AMJ Public Health*, 1992; 82: 1020-23.
3. Dahl E. Mortality and life expectancy after hip fractures, *Acta orthop scand*, 1980; 51(1): 163-70.
4. Norman's Williams, Christopher J.K. Bulstrode, P, Ronan O' Connell *Extremity trauma, Bailey and love's short practice of surgery* 26th edition, 2013; 29: 364-400.
5. Barnes R, Brown JT, Garden RS, Nicoll EA. Subcapital fractures of the femur : A Prospective review. *J Bone joint surg Br*, 1976; 58: 2-24 (PubMed).
6. Bhandari M, Devereaux PJ, Tornetta P 3rd, et al. Operative Management of displaced femoral neck fractures in elderly patients. An international survey. *J Bone Joint surg. (AM)*, 2005; 87-A: 2122-30.
7. Iorio R, Schwartz B, Macaulay W, Teeney S.M, 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: 1124-33. View Article PubMed.
8. Crossman PT, Khan RJ, MacDowell A, Gardner AC, Reddy NS, Keene GS. A survey of the treatment of displaced intracapsular femoral neck fractures in the UK. *Injury*, 2002; 33: 383-6. View Article PubMed.
9. Holmberg S, Kalen R, Thorngren KG. Treatment and out come of femoral neck fractures: An analysis of 2418 patients admitted from their own homes. *Clin orthop Relat Res*, 1987; 218: 42- 52 (Pub Med.)
10. van Vugt AB, Oosterwijk WM, Goris RJ. Osteosynthesis versus endoprostheses. in the treatment of instable intracapsular hip fractures in the elderly : A randomize clinical trial. *Arch orthop trauma surg*, 1993; 113: 39-45 (PubMed).
11. Davison JN, Calder SJ, Anderson GH, Ward G, Jagger C, Harper WM, et al. Treatment for displaced intracapsular fractures of the proximal femur: A prospective, randomized trial in patients aged 65 to 79 years. *J. Bone joint surg BR*, 2001; 83: 206-12 (PubMed).
12. Rogmark C, Carlsson A, Johnell O, Sembo I, A prospective randomized trial of internal fixation versus arthroplasty for displaced fracture of the neck of the femur: Functional outcome for 450 patients at two years, *J Bone joint surg BR*, 2002; 84: 183-8 (PubMed).

13. Soreide O, Mölster A, Raugstad TS. Internal fixation versus primary prosthetic replacement in acute femoral neck fractures: A prospective, randomized clinical study. *Br J surg.* 1979; 66: 56-60.
14. Sikorski JM, Barrington R. Internal fixation versus hemiarthroplasty for the displaced sub capital fracture of the femur. A prospective randomized Study. *J Bone joint surg. Br.* 1981; 63: 357-61 (PubMed).
15. Parker MJ, Pryor GA. Internal fixation or arthroplasty for displaced cervical hip fractures in the elderly: A randomized Controlled trial of 208; *acta orthop Scand.* 2000; 71: 440-6 (PubMed)
16. Harris WH. Traumatic arthritis of the hip after dislocation and acetabular fractures: Treatment by mold arthroplasty. An end- result study using a new method of result evaluation. *J Bone joint surg. Am.* 1969 Jun; 51(4). 737-55.
17. D. Gould et al. Visual Analogue scale (VAS). *Journal of clinical Nursing* 2001; 10: 697-706.
18. Dauphin AP et al. Bias and Precision in visual analogue scale: A randomized controlled trial. *American Journal of Epidemiology* 1999; 150 (10) : 1117-1127.
19. Aun C, Lam, YM, Collect B. Evaluation of the use of visual analogue scale in Chinese patients. *Pain* 1986; 25 : 215-21.
20. Georgiou G, Siapkara A, Dimitrakopoulou A, Provelengios S, Dounis E. Dissociation of biupolar hemiarthroplasty of the hip after dislocation. A report of five different cases and review of literature. *Injury.* 2006; 37:162-8. View Article PubMed.
21. Sierra RJ, Schleck CD, Cabanela ME. Dislocation of bipolar hemiarthroplasty : rate, contributing factors and outcome. *Clin orthop relat Res* 2006; 442:230-8. View Article PubMed.
22. Parker MJ, Gurusamy KS, Azegami S. Arthroplasties (with and without bone cement) for proximal femoral fractures in adults. *Cochrane Database syst. rev.* 2010; 6: CB 001706 (PubMed)
23. Cornell CN, Levine D O Doherty J, Lyden J. Unipolar versus bipolar hemiarthroplasty for the treatment of femoral neck fractures in the elderly. *clin orthop relat Rcs.* 1998; 348: 67-71. View Article PubMed.
24. Stoffel KK, Nivbrant B, Headford J, Nicholls RL, Yates PJ. Does a bipolar hemiprosthesi offer advantages for elderly patients with neck of femur fracture? A clinical trial with 261 patients. *ANZ J Surg.* 2013; 83: 249-54 View Article PubMed.
25. David L, Hamblen A, Hamish R.W. Simpson et al. pelvis and hip, Adam's out bone of fracture including joint injuries 12th edition, 2007; 14 : 211-37.
26. Walla JPS, Sansanwal D, Walla SK, singh S, gupta AC, Role of Primary bipolar orthoplasty or total hip orthoplasty for the treatment of intertorchnateric fracture femur in elderly. *Pb Journal of orthopaedics,* 2011 ; 12 [1];5-6
27. Bhattacharyya T, Koval KJ. Unipolar versus bipolar hemiarthroplasty for femor. neck fractures: is there a difference? *J Orthop trauma.* 2009; 23:426-7. View article PubMed
28. Gilbert MS, Capozzi J. Unipolar or bipolar prosthesis for the displace intracapsular hip fracture? An unanswered question. *Clin Orthop Relat Res.* 1998;358:81-5. View article PubMed
29. Zhiwei Jia, Fan Ding et al. Unipolar versus bipolar hemiarthroplasty for displace femoral neck fractures: a systematic review and metaanalysis of randomized controlled trials. *Journal of Orthopaedic surgery and research.* 2015;10:8. doi:10.1186/s13018-015-0165-0. View article BioMed Central.