



E-ISSN: 2395-1958
P-ISSN: 2706-6630
IJOS 2020; 6(1): 307-311
© 2020 IJOS
www.orthopaper.com
Received: 06-11-2019
Accepted: 10-12-2019

Dr. Pala H Lakhnotra
Assistant Professor, Department
of Orthopedics, G.M.E.R.S.
Medical Hospital and College,
Junagadh, Gujarat, India

Dr. Mayur B Vania
Assistant Professor, Department
of Orthopedics, G.M.E.R.S.
Medical Hospital and College,
Junagadh, Gujarat, India

Uncemented bipolar hemiarthroplasty using Autologous bone graft from femoral head: A retrospective analysis of 60 cases

Dr. Pala H Lakhnotra and Dr. Mayur B Vania

DOI: <https://doi.org/10.22271/ortho.2020.v6.i1f.1879>

Abstract

One of the most common treatments of displaced fracture of femoral neck in elderly is bipolar hemiarthroplasty. About 60 patients under go bipolar hemiarthroplasty were assessed at least after 9 months post operative to assess outcome of our method of surgery. We use femoral head as auto graft to fill canal which work as space filler and later on expected it to incorporate in to bone and make prosthesis stable. Result of our study is slightly better than cemented group with significant low peri operative morbidity as well as very cost effective and in less operative time. Though un cemented modular bipolar is better than fixed implant in terms of restoration of perfect hip biomechanics but our method is cheap alternate option. Only relative contraindication of our method is very old neck femur with resorbed head and wider canal with osteoporosis. Because of retrospective nature of our study we got only those patient, which are suitable for this procedure which is limitation of our study. Further study by different group needed to confirm usefulness of this method.

Keywords: Neck femur fracture of hip, cemented bipolar hemiarthroplasty, un cemented bipolar hemiarthroplasty, femoral head graft

Introduction

Hip fracture has one of the major fractures encountered in routine orthopedic trauma practice especially in geriatric populations. Among them intracapsular femoral neck fracture occupied significant proportions and great challenge to treat because of anatomical disadvantage position as well osteoporosis. Goal of treatment is to mobilize patient as early as possible with minimum operative risk, so the main challenges in treatment are osteoporosis, anatomical disadvantage position, geriatric age related medical problems and anesthetic risk, blood loss. Among fixation method has role only in un displaced and relative strong bone, but most of time fixation is neither possible nor worthy in terms of outcome in this geriatric population, so replacement is main option to deal with this type of fracture. As acetabulum wall is usually good so only hemi replacement of stem is enough for optimum outcome as well as in Indian subcontinent average life expectancy was low so longevity of implant is usually not a issue. Other factor in favour of bipolar v/s THR is relative low risk of blood loss, less operative time in former group. Among unipolar and bipolar prosthesis, though unipolar has even shorter operative time and cost effective to bipolar, but has high complication rate of dislocation and acetabular wear. So till date bipolar is still implant of choice in most of cases in elderly fracture neck femur. And among cemented and uncemented bipolar uncemented is definitely winner in term of peri operative complication and loosening issue. Now among un cemented bipolar prosthesis modular bipolar prosthesis is better than fixed bipolar and only disadvantage of its cost specially in our region and old people with low life expectancy. Use of femoral head as allograft is well known in various study in various procedure as in acetabular defect, revision prosthesis procedure, lumbar body fusion etc. So to overcome the disadvantage of cementing and cost of modular bipolar we at our institute regularly using then femoral head graft as filler in canal, which first act as mechanical space filler and give press fit insertion of stem as in modular bipolar and then later on incorporate and remodel and fill the canal with bone.

Corresponding Author:
Dr. Mayur B Vania
Assistant Professor, Department
of Orthopedics, G.M.E.R.S.
Medical Hospital and College,
Junagadh, Gujarat, India

Material and Method

We analyzed data from operated case sheet record received from G.M.E.R.S. Medical College Junagadh orthopedic department operated from 1 January 2018 to 31 December 2018. All case operated in this duration for proximal femur fracture was shorted out. From those cases with examination of pre operative x-ray, we divide them in to extra capsular and intra capsular fracture. Among them patient with neck femur was separated on basis of pre operative x ray. Then detail of case sheet was examined and exclusion criteria was selected as below

1. Suspected pathological fracture or proven metastatic disease
2. Co morbid debilitating disease specially bed ridden patient.

Then patient profile checked put for statistical analysis and then going through case and following point noted for study. Patient pre operative risk, type of anesthesia, operative method, operative type, postoperative analgesic and blood transfusion, antibiotic coverage, total hospitalization stay, discharging condition. Then all patient were contacted called them for final follow up examination. We strictly call patient only after 9 month of duration. During follow up we check their discharge card note and follow up examination note and serial x ray and then took last final x ray and examined them using below mentioned form. Form above method we short out total 108 cases and out of them 23 were died. So, 85 were called for inquire but only 60 was came at different interval.

Technique used in this patient

Operative note in all cases show standard protocol of operative method described as below; Patient was given anesthesia and shifted to simple table and lateral decubitus position and patient tied to support for stable position. Uninjured leg was flexed and injured leg was put straight and local site prepared with antiseptic solution and

allow drying. Then proper draping done and modified poster lateral approach was used. Skin s/c cut and then tensor fascia lata was cut and proximally gluteus medius splitted and then fat pad over rotater was identified and swiped posteriorly and then rotater tied with non absorbable suture and cut from its insertion and retracted with charleys retractor. Capsule identified and T shaped incision put and head removed. Entry taken from pyriform fossa and reaming done with 8 mm reamer. Appropriate broach was inserted in desired ante version fashion and hammer till mark and if necessary higher size was used. Extracted head was sized and then cartilage was removed from entire head and bone graft was morselized using nibbler and then antibiotic powder was mixed. Then restrictor was introduced to desired level and grafts was pressed in canal and fill the whole canal by punching specially in proximal region. In some case when graft was insufficient some cortical graft form excised neck was used and put on proximal part to give added stability. Then again entry taken and final prosthesis was introduced and reduction done and stability as well as implant position was checked under iitv. Rotater tied and wound closed and sterile dressing applied and shifted to ward.

Form used to assess in follow up final visit

- Name
- Age/Sex
- IPD No
- Date of admission
- Date of operation
- Date of discharge
- Date of final follow up
- Duration since discharge to follow up in months
- Partial wt bearing time since operation as per follow up card sheet
- Full weight bearing since operation as per follow up card sheet

Table 1: Harris Hip Score

Pain	None or ignore it	+44
	Slight, occasional, no compromise in activity	+40
	Mild pain, no effect on average activity, rarely moderate pain with unusual activity, may take analgesic	+30
	Marked pain, serious limitation of activities	+10
	Totally disabled, crippled, pain in bed	+0
Limp	none	+11
	slight	+8
	Moderate	+5
support	none	+11
	Cane for long walk	+7
	Cane most of time	+5
	One crutch	+3
	Two canes	+2
	Two crutches or not able to walk	+0
Distance walked	unlimited	+11
	Six block	+8
	Two or three blocks	+5
	Indoors only	+2
	Bed and chair only	+0
Sitting	Comfortably in ordinary chair for one hour	+5
	On a high chair for 30 minutes	+3
	Unable to sit comfortably in any chair	+0
Enter public transportation	yes	1
	no	0
stairs	Normally without using a rail	+4
	Normally using a railing	+2
	In any manner	+1

	Unable to do stairs	+0
Put on sock and shoes	With ease	+4
	With difficulty	+2
	Unable	+0
Absence of deformity (all yes=4,lessthan 4=0)	Less than 30 fixed flexion contracture	
	Less than 10 fixed abduction	
	Less than 0 fixed internal rotation	
	Limb length discrepancy less than 3.2 cm	

Range of motion (*indicate normal)

- Flexion (140)
- Abduction (40)
- Adduction (40)
- External rotation (40)
- Internal rotation (40)
- Scoring guide
- Range of motion score:-
- Total range of motion
- 211-300= 5 point
- 161-210=4 point
- 101-160 point = 3 point
- 61-100 = 2 point
- 31-60 = 1 point
- 0-30 = 0 point

Range of motion score:-
 Total Harris hip score: range of motion point + summation of point
 The maximum score possible is 100. Results can be interpreted with the following: <70 = poor result; 70-80 = fair, 80-90 = good, and 90-100 = excellent

Observation and discussion

Our retrospective analysis of patient admitted in orthopedic department in January to December 2018 was suggest following observation

Table 2: Age incidence

AGE	Male hip	Female hip
40-49	2	5
50-59	2	5
60-69	6	10
70-79	10	10
80 and above	5	5

Incidence of fracture increase with age due to osteoporosis and low bone mass as well decrease balance and eye sight will also lead to trivial trauma. So it is primarily a low velocity injury

Table 3: Mode of injury

Sex	RTA	Domestic injury
Male	5	20
Female	2	33

Table 4: Sex incidence

Sex	No of patient	percentage
Male	25	42
female	35	58

Female are e more prone to this fracture mostly due to osteoporosis and low bone quality

Table 5: Side of limb

	right	left
Male	15	10
Female	20	15
Total	35	25

Table 6: Grade of anesthesia

Grade	No. of patient	Percentage
I	0	0
II	3	5
III	37	61.5
IV	20	33.5

Table 7: Type of anesthesia

Type of anesthesia	
Spinal	39
Epidural	13
General	8
Local + sedation	0

Most of patients were operated under grade 3 in spinal anesthesia

Table 8: Blood transfusion due to blood loss intra operative

Blood transfusion	No of patient	percentage
0	45	75
1	10	16.6
2	5	8.4

This shows significant less blood loss intra operatively

Table 9: Duration of hospitalization

No of days	No of patient	percentage
0-3	25	41.67
4-6	30	50
7-10	5	8.33

Most of patient can be discharged within 5 day show less hospitalization and reduced cost and complications

Table 10: Patient re assessment timing since operation

Time since operation	No of patient	percentage
9 month	5	8.33
10 month	25	41.67
11 month	15	25
12 month	15	25

In this study we do last assessment between 9 to 12 month since operation because it is maximum time to remodel the bone graft

Table 11: Timing of partial wt bearing

weeks	No of patient	percentage
<1 week	40	66.67
2-3week	10	16.67
3-4 weeks	7	11.67
>4week	3	5

Most of patient able to do partial wt bear within week

Table 12: Timing of full weight bearing

weeks	No. of patient	percentage
<1wks	35	58.3
2-3 wks	14	23.3
3-4wks	6	10
>4 wks	5	8.4

Most of patient able to do full wt bearing around 2 weeks suggestive of soft tissue healing period

Table 13: Supportive aid on follow up

Supportive AID	No. of patient	percentage
None	45	75
With cane	10	16.67
With walker	5	8.33

Most of patient able to walk without support or with cane directly proportional early wt bearing and implant stability

Table 14: Pain at final follows up

Pain severity	No of patient	percentage
None	30	50
Slight	14	23.3
mild	10	16.67
moderate	5	8.33
marked	1	1.67

Most patients at final follow up show minor pain

Table 15: Limb length discrepancy (LLD)

L.L.D.	No of patient	percentage
No L.L.D (<cm)	50	83.3
1-2 cm	6	10
>2 cm	4	6.7

Limb length discrepancy is related to fixed size prosthesis

Table 16: Harris hip score

HHS	Result	patient	percentage
100-90	excellent	40	66.67
90-80	good	12	20
80-70	fair	5	8.3
<70	poor	3	5

Table 17: Radiological sign of loosening of stem

	Total hip	percentage
No radiolucency	50	83.3
1mm	8	13.3
1-2 mm	2	3.4

Table 18: Radiological sign of change in position of stem (varus)

	Total hip	percentage
No change	54	90
Slight change	5	8.3
Significant change	1	1.7

Summary and conclusion

The treatment of femoral neck fractures in elderly has always been controversial. Scanning the literature shows various views on the treatments, some advocate internal fixation and others prosthetic replacement, whether unipolar or bipolar. Overall trend has fallen in favour of bipolar hemiarthroplasty due to early ambulation of elderly patient and less failure rate as compared to internal fixation. Internal fixation has very high rate of failure and reoperation. Unipolar prosthesis is known for acetabular erosion and loosening while THR is associate with increase blood loss, longer duration of surgery and cost. Cemented bipolar is Associate with peri operative mortality. While uncemented modular bipolar is not cost effective. So in our setup fixed bipolar with using femoral head as auto graft solve all above problem and cost effective also and give press fit stable stem and which in long run work well. Result of our series is slightly better than cemented bipolar studies with added advantage of cost effectiveness and very less peri operative mortality and easy revision surgery if needed

We conclude that uncemented bipolar hemiarthroplasty is a good method to manage displaced femoral neck fractures in elderly. And when canal is wide allograft from femoral head is enough to convert fixed bipolar in press fit prosthesis

Though as fixed bipolar stem surface is not porous coated possibility of bone ingrowth is negligible, as well as resorbed head give very less graft especially in severe osteoporotic wide canal, and in this case cemented bipolar is only option available. But in majority of case our method works well and once master and good team work done operative time will be very less

References

- Efficient use of a limited resource: A comparison of femoral head allograft preparation methods Timothy Marshall, Jason Chow, Brahman Sivakumar.
- A cost-effective method for femoral head allograft procurement for spinal arthrodesis: an alternative to commercially available allograft. Brown DA¹, Mallory GW, Higgins DM, Abdulaziz M, Huddleston PM, Nassr A, Fogelson JL, Clarke MJ.
- Early results of whole femoral head allograft with articular cartilage for acetabular impaction grafting in revision hip replacements Sivaraman Subramanian, Kaushik D Jain, [...], and John Hodgkins.
- Assessing functional outcome using modified Harris hip score in patients undergoing total hip replacement Dr. Lokesh Gupta, Dr. Mukand Lal, Dr. Vineet Aggarwal and Dr. Lakshya Prateek Rathor DOI: <https://doi.org/10.22271/ortho.2018.v4>
- Schreurs BW, Busch VJ, Welten ML, Verdonschot N, Slooff TJ, Gardeniers JW. Acetabular reconstruction with impaction bone-grafting and a cemented cup in patients younger than fifty years old. J Bone Joint Surg Am. 2004; 86:2385-92.
- Schreurs BW, Bolder SB, Gardeniers JW, Verdonschot N, Slooff TJ, Veth RP. Acetabular revision with impacted morsellised cancellous bone grafting and a cemented cup. A 15- to 20-year follow-up. J Bone Joint Surgery Br. 2004; 86:492-7.
- Ornstein E, Franzen H, Johnsson R, Stefansdottir A, Sundberg M, Tägil M. Five year follow up of socket movements and loosening after revision with impacted Morselised allograft bone and cement. J Arthroplasty. 2006; 21:975-84.

8. D'Antonio JA, Capello WN, Borden LS, Bargar WL, Bierbaum BF *et al.* Classification and management of acetabular abnormalities in total hip arthroplasty. *Clin Orthop.* 1989; 243:126-37.
9. Hodkinson JP, Shelley P, Wroblewski BM. The correlation between the Roentgenographic appearance and operative findings at the bone–cement junction of the socket in Charnley low friction arthroplasties. *Clin Orthop.* 1988; 228:105-9.
10. Gie GA, Linder L, Ling RS, Simon JP, Slooff TJJ, Timperly AJ. Impacted cancellous allografts and cement for revision total hip arthroplasty. *J Bone Joint Surg Br.* 1993; 75:14-21.
11. Slooff TJ, Huiskes R, Van Horn J, Lemmens AJ. Bone grafting in total hip replacement for acetabular protrusion. *Acta Orthop Scand.* 1984; 55:593-6.
12. Toms AD, Barker RL, Jones RS, Kuiper JH. Impaction bone grafting in revision joint replacement surgery. *J Bone Joint Surg Am.* 2004; 86:2050-60.
13. Bavadekar A, Cornu O, Godts B, Delloye C, Van Tomme J, Banse X. Stiffness and compactness of morselized grafts during impaction. An *in vitro* study with human femoral heads. *Acta Orthop Scand.* 2001; 72:470-6.
14. Brewster NT, Gillespie WJ, Howie CR, Madabhushi SPG, Usmani AS, Fairbairn DR. Mechanical considerations in impaction bone grafting. *J Bone Joint Surg Br.* 1999; 81:118-24.
15. Giesen EB, Lamerigts NM, Verdonshot N, Buma P, Schreurs BW, Huiskes R. Mechanical characteristics of impacted morsellised bone grafts used in revision total hip arthroplasty. *J Bone Joint Surg Br.* 1999; 81:1052-7.
16. Verdonshot N, Schreurs B, van Unen J, Slooff T, Huiskes R. Cup stability after acetabulum reconstruction with Morsellized grafts is less surgical dependent when larger grafts are used. *Trans Orthop Res Soc.* 1999; 24:867.
17. Tagil M, Aspenberg P. Impaction of cancellous bone grafts impairs osteoconduction in titanium chambers. *Clin Orthop.* 1998; 352:231-8.
18. Pratt JN, Griffon DJ, Dunlop DG, Smith N, Howie CR. Impaction grafting with morsellised allograft and tricalcium phosphate-hydroxyapatite: incorporation within ovine metaphyseal bone defects. *Biomaterials.* 2002; 23:3309-17.
19. Galea G, Kopman D, Graham BJ. Supply and demand of bone allograft for revision hip surgery in Scotland. *J Bone Joint Surg. Br.* 1998; 80:595-9.