

Clinical And Radiological Evaluation of Fully Hydroxyapatite Coated Uncemented Stems in Hip Arthroplasty

Dr. Sandesh Reddy Yaratapalli¹, Dr. M.R.Thirunthaiyan²,
Prof. R. Dorai Kumar³

¹(Department Of Orthopaedics, Sri Ramachandra University, India)

²(Department Of Orthopaedics, Sri Ramachandra University, India)

Abstract: To assess the functional and radiological outcome of fully hydroxyapatite coated stems in hip arthroplasty. Prospective and retrospective study. Follow up 6wks,3mths,6mths,1year & then yearly. Minimum follow up of 6 months. Total No. of cases in the study : 31 patients (32 hips). All cases were done using STANDERD CORAIL stem. Mean age – 60.31years (19years to 94years). In our study all hips were operated through posterior approach. Clinical evaluation with Harris hip score (Modified) and radiological evaluation with plain x-ray pelvis with both hips and proximal femur - AP view and x-ray of the operated hip - AP view and Lateral view was done for all patients at regular intervals. The 32 hips were evaluated both clinically and radiologically. There were 3 cases with vertical subsidence. Mean Pre-operative HHS : 24.3333 (12 cases). Mean Post-operative HHS : 91.6563. There were 2 cases of limb lengthening. There was no significant changes in clinical outcomes with minimal varus/valgus stems in our study. HA coated stems give excellent results in short term follow-up. Following hip arthroplasty with HA coated stem there is no clinically significant anterior thigh pain. Long-term follow-up is required to assess the incidence of Heterotopic Ossification with this stem. Intra-operative fissures and post-operative fractures are not related to them stem design, but can be avoided with careful and less aggressive reaming of the femoral canal.

Keywords: Corail stem, Hydroxyapatite(HA), Harris hip score (Modified), Heterotopic Ossification

I. Introduction

Aim Of The Study

To assess the functional and radiological outcome of fully hydroxyapatite coated stems in hip arthroplasty.

II. Materials And Methods

- Prospective and retrospective study
- Follow up 6wks,3mths,6mths,1year & then yearly
- Minimum follow up of 6 months
- Total No. of hip arthroplasties done between 2007 march and 2011 march – 44 cases (46 hips).
- Total No. of cases which met inclusion criteria – 42 cases (44 hips)
- 9 cases were lost to follow-up (Including one bilateral hip)
- 2 patients died during follow-up
- Total No. of cases in the study : 31 patients (32 hips)

3.1: Inclusion criteria

- All Total hip / Bipolar Arthroplasty with fully Hydroxyapatite coated stems

3.2: Exclusion criteria

- All cemented and partially hydroxyapatite coated stems
- Revision THR

3.3: Implant Design

- All cases were done using STANDERD CORAIL stem.
- Details:
 - Fully coated with 150Um layer of hydroxyapatite
 - Stem material - forged titanium
 - Straight stem with thin distal tip
 - Neck angle 135, 12/14 morse taper & progressive offset
 - Quadrangular cross section.

3.4: pre-operative clinical assesment

- Preoperatively the patients were evaluated using the Harris hip score (Except in NOF #)
- The general condition of the patient including his physical and mental status, general medical condition and ability to withstand surgery is considered
- Trendelenberg test to access the abductor osseomuscular mechanism was noted

3.5: pre-operative investigations

- The complete blood count, ASO, CRP, RA Factor, throat swabs, urine analysis, chest x-ray and multi channel ECG were done as a routine.

3.6: Preoperative radiographic assessment

- X ray Pelvis with both hips AP view
- X ray of affected hip AP and Lat view
- Preoperative planning should include the use of plastic overlap templates supplied by the prosthesis manufacturers.

3.7: Surgical Approach

- In our study all hips were operated through posterior approach.

3.8: Surgical Technique

Neck Resection

- Proximal compaction before broaching
- No distal reaming = Cancellous bone is preserved
- Progressive broaching until complete stability is achieved
- Calcar milling
- Trial reduction with trial neck segment
- Definitive implant insertion
- Femoral head impaction
- Final reduction

3.9: Post-operative Evaluation

- Clinical evaluation with Harris hip score (Modified) and radiological evaluation with plain x-ray pelvis with both hips and proximal femur - AP view and x-ray of the operated hip - AP view and Lateral view was done for all patients at regular intervals.

3.10: Clinical Evaluation

- Harris Hip Score (Modified)
- Incidence of Anterior Thigh Pain was noted

IV: Results

4.1: Clinical Evaluation

There was NO clinically significant anterior thigh pain

4.2: Harris hip score [MODIFIED]

84.375%	27cases	Excellent
12.5%	4 cases	Good
0%	0	Fair
3.125%	1 case	Poor

4.3: Radiological Evaluation

a) stem position:

varus: 18.75%

center: 12.5%

valgus: 68.75%

b) Vertical subsidence:

- There were 3 cases with vertical subsidence

Subsidence	Patient name
3mm	Sar
2mm	Mal
5mm	Mee

V: Discussion

5.1: Harris hip score

- Mean Pre-operative HHS : 24.3333 (12 cases)
- Mean Post-operative HHS : 91.6563

5.2: Limb length discrepancy

- There were 2 cases of limb lengthening
- Corrected using heel rise
- Harris hip score was good in both the cases

5.3: Stem Position

- There was no significant changes in clinical outcomes with minimal varus/valgus stems in our study.

5.4: Heterotopic Ossification

- Although the use of a “bone friendly” material like Hydroxyapatite theoretically increases the incidence of heterotopic ossification, there were no cases with heterotopic ossification in our study.
- Incidence of HO with HA coated stem was lower when compared to other types of uncemented stems, but long term follow-up is required to assess the true incidence.
 - * Brooker AF, Bowerman JW, Robinson RA, Riley LH Jr. Ectopic ossification following total hip replacement: incidence and method of classification. J Bone Joint Surg (Am] 1973;55-A:1629-32.
 - **Ahrengart L. Periarticular heterotopicossificationafter total hip arthroplasty: risk factors and consequences. Clin Orthop 1991;263:49-58.

5.5: Dislocation

- Patient compliance was an issue
- Dementia / activity restricted to indoors
- Reviewed 3 months post-operatively with a dislocated hip
- X-ray: High riding femoral component
- Intra-operatively femoral stem was stable with good osteointegration
- Osteotomy was done to remove the femoral stem
- Excision arthroplasty was done

5.6: Intra-operative fissure

- All 4 cases of intra-operative fissure was managed with cerclage wiring
- Weight bearing was delayed to 6 weeks
- Intra-operative fissure can be avoided with less aggressive reaming

VI: Tables

84.375%	27cases	Excellent
12.5%	4 cases	Good
0%	0	Fair
3.125%	1 case	Poor

Table 1: showing harris hip scores in percentage

Subsidence	Patient name
3mm	Sar
2mm	Mal
5mm	Mee

Table 2: showing the vertical incidence in 3 cases

No: of cases	BONE REACTIONS
3	Endosteal bone apposition
2	Bone – reactive lines
nil	Periosteal bone reaction
nil	Pedestial formation
nil	Calcar resorption
nil	Polyethylene wear
nil	osteoporosis
nil	Heterotopic bone formation

Table 3: showing bone reaction

OUR STUDY	JEAN PIERRE VIDALALIN	HARRIS HIP SCORE
84.3%	0%	EXCELLENT
12.5%	80%	GOOD
0%	15%	FAIR
3.1%	6%	POOR
91.6	85.1	MEAN

Table 4: showing various harris hip scores

LENGTHENING	PATIENT DETAILS
1.5cm	Ram 73yrs/m #NOF Rt THR
1cm	Dan 58yrs/F AVN hip Lt THR

Table 5: showing limb length discrepancy

VII: FIGURES

Case 1 - Excellent Result

- Pt name: Muth
- Age/sex: 24yrs/ Male
- Diagnosis: B/L AVN hip
- Procedure: B/L THR
- Pre & post op HHS:
 - Right hip: 23/96
 - Left hip: 23/95
- Follow-up: 22 months

X-rays



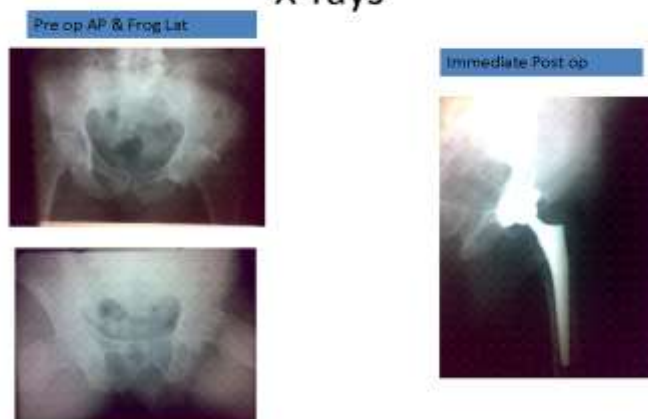
X - rays



Clinical Photos



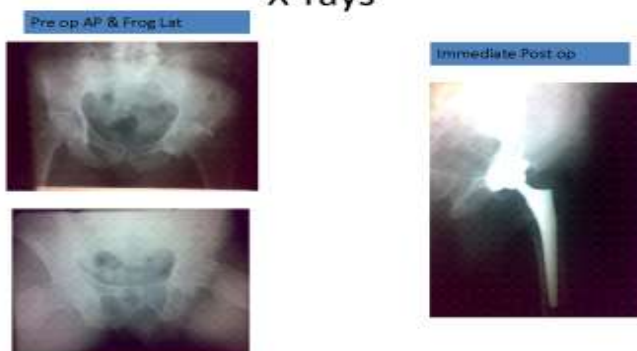
X-rays



Case 2 – Excellent Hip

- Pt name: Kes
- Age/sex: 58yrs/M
- Diagnosis: Chronic arthritis Lt hip
- Procedure: THR Lt
- Pre & post op HHS: 31 / 94
- Follow-up: 52 months

X-rays



X - Rays



X - Rays



Clinical Photos

POST OP HHS: 94



Case 3 – Excellent Result

- Pt name: Balk
- Age/sex: 62years/Male
- Diagnosis: AVN Left hip
- Procedure: Left THR
- Pre & post op HHS: 22/94
- Follow –up: 32 months

X-rays



X - rays



32 mths post op following Lt THR
Intraop calcar # - cerclage wiring done

Clinical Photos



Case 5 – Good Result

- Pt name: Bab
- Age/sex: 79 years/Male
- Diagnosis: # Neck of Femur Left hip
- Procedure: Left Bipolar
- Pre & post op HHS: NA/87
- Follow –up: 52 months

X-rays



X - rays



Clinical Photos

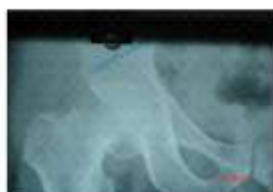


Case 5 – Poor Result

- Pt name: Shan
- Age/sex: 60years/ Male
- Diagnosis: Fracture NOF
- Procedure: THR
- Pre & post op HHS: NA/49
- Complication: Dislocation

X - rays

#NOF Rt hip



Immediate post operative



On 20 th POD, patient tried to lie prone and dislocated his Prosthetic Hip joint.



Closed reduction attempted but not successful hence Open reduction done



Abduction splinting post Open reduction.

X-rays



3 mths post op Rt THR With dislocated hip



Post op Rt hip Extension arthroplasty

VIII: Conclusion

HA coated stems give excellent results in short term follow-up.

- Following hip arthroplasty with HA coated stem there is no clinically significant anterior thigh pain.
- Long-term follow-up is required to assess the incidence of Heterotopic Ossification with this stem.
- Intra-operative fissures and post-operative fractures are not related to them stem design, but can be avoided with careful and less aggressive reaming of the femoral canal.