



CEMENTED VERSUS UNCEMENTED HEMIARTHROPLASTY FOR DISPLACED INTRACAPSULAR FEMORAL NECK FRACTURES IN THE INDIAN POPULATION: A NARRATIVE REVIEW OF EVIDENCE AND CONTEXTUAL CONSIDERATIONS

Dr Anil Prakash

Professor & Head of Department

Dr Dheeraj L. Bhoi*

Assistant Professor*Corresponding Author

Dr Jayesh Baldaniya

Junior Resident

ABSTRACT

Displaced intracapsular femoral neck fractures in the elderly are a growing public-health challenge in India, driven by demographic ageing, high rates of osteoporosis, and frequent low-energy falls. Hemiarthroplasty remains the mainstay of treatment for most low-demand patients. The choice between cemented and uncemented femoral stems continues to generate debate. International randomised trials and meta-analyses generally favour cemented fixation for better early pain relief, lower rates of periprosthetic fracture and revision, and comparable mortality, albeit at the cost of longer operative time and greater blood loss. Indian comparative series, though limited by smaller sample sizes and shorter follow-up, largely mirror these findings while highlighting practical constraints unique to the subcontinent: widespread osteoporosis, variable bone quality assessment, cost sensitivity, limited access to modern cementless implants, and high rates of out-of-pocket expenditure. This review synthesises global level-I evidence with available Indian data and discusses patient selection, surgical technique, and health-system factors that should guide decision-making in the Indian context. Cemented bipolar hemiarthroplasty appears preferable for the majority of osteoporotic elderly patients, whereas carefully selected uncemented stems may be considered in higher-risk individuals with adequate bone stock when cement-related cardiopulmonary risk is judged prohibitive.

KEYWORDS : Hemiarthroplasty; femoral neck fracture; cemented; uncemented; India; osteoporosis; elderly

1. INTRODUCTION

Hip fractures constitute a major orthopaedic and public-health burden worldwide. Projections indicate a substantial rise in absolute numbers, particularly in Asia. In India the combination of a rapidly expanding elderly population, high prevalence of osteopenia and osteoporosis, and frequent indoor falls produces a large and growing caseload of displaced intracapsular femoral neck fractures.(1) One-year mortality after hip fracture remains elevated (approximately five times that of age- and sex-matched controls in Indian cohorts), and functional recovery is often incomplete.(2)

For most elderly, low-demand patients, hemiarthroplasty is preferred over internal fixation or total hip arthroplasty because it allows immediate weight-bearing and avoids the higher dislocation and revision rates associated with total hip replacement in this demographic. The principal technical decision is whether to cement the femoral stem.(3) Cemented fixation provides immediate mechanical stability in osteoporotic bone but carries theoretical risks of bone-cement implantation syndrome (BCIS), longer operative time, and greater blood loss. Uncemented stems avoid cement-related cardiopulmonary effects and are quicker to insert, yet they are associated with higher rates of intraoperative and postoperative periprosthetic fracture, subsidence, and early thigh pain, especially in poor-quality bone.(4)

International guidelines (NICE, AAOS) currently recommend cemented fixation for the majority of patients.(5) Whether these recommendations translate directly to the Indian population—characterised by earlier-onset osteoporosis, different body-mass indices, resource constraints, and predominance of bipolar rather than modular unipolar designs—requires careful appraisal.(6) This narrative review examines the comparative evidence and places it in the Indian clinical and economic context.

2. Epidemiology and Indian Context

Indian data indicate crude hip-fracture incidence rates of approximately 105–159 per 100 000 persons aged ≥50 years, intermediate between Western and some East-Asian figures. Fractures occur at a younger mean age than in many high-income countries, and the male:female ratio is closer to unity

than the marked female predominance seen in Europe and North America.(7) Low-energy falls account for the large majority of injuries in those over 60 years. Osteoporosis is highly prevalent; community-based densitometry studies report osteopenia or osteoporosis in roughly two-thirds of adults, with even higher rates among postmenopausal women and those aged ≥60 years.(8)

Most patients present to public or semi-public hospitals, pay out-of-pocket for implants, and have limited access to prolonged institutional rehabilitation. Cost-effective, locally manufactured bipolar prostheses predominate. These epidemiological and health-system realities influence both the choice of implant and the relative weighting of early function, implant-related complications, and perioperative risk.(9)

3. Summary of Global Evidence

Multiple randomised controlled trials and successive meta-analyses have compared cemented and uncemented hemiarthroplasty. Key consistent findings include:

- Functional scores (Harris Hip Score, pain scores) favour cemented stems in the first 3–12 months; differences often diminish thereafter.(10)
- Periprosthetic fracture, subsidence, and re-operation rates are significantly higher with uncemented stems.(11)
- Operative time and intraoperative blood loss are greater with cementing.(12–15)
- Mortality at 30 days and one year is generally comparable; some large observational datasets suggest a small early mortality increase with cement that is offset by lower later revision-related morbidity.(16–18)
- Modern polished tapered cemented stems and contemporary cementing techniques have reduced the incidence of severe BCIS.(19)

Recent large registry analyses and network meta-analyses continue to support cemented fixation as the default strategy for elderly patients with displaced femoral neck fractures.

4. Indian Comparative Studies

Several single-centre prospective and retrospective series from India have examined the same question. Typical

findings are:

- Cemented bipolar hemiarthroplasty yields higher Harris Hip Scores and lower visual-analogue pain scores at 6–12 months.(20-22)
- Uncemented procedures are shorter and associated with less blood loss.(23)
- Early thigh pain and radiographic subsidence occur more frequently after uncemented fixation.(24-26)
- Overall complication and mortality rates are similar in small cohorts, although periprosthetic fractures trend higher with uncemented stems.(27)
- Functional outcomes with both techniques are generally good when performed by experienced surgeons using bipolar implants.(28-30)

Limitations of the Indian literature include modest sample sizes (commonly 50–120 patients), short follow-up (often ≤12–24 months), heterogeneity of implant design and cementing technique, and infrequent use of modern cementless stems with proven long-term osteointegration.(31-34) Nevertheless, the direction of effect is consistent with global evidence.

5. Special Considerations for the Indian Population

Bone quality. Widespread osteoporosis and the frequent use of radiographic indices (e.g., Singh index) rather than dual-energy X-ray absorptiometry mean that many patients have Dorr type C femora. Immediate stability is therefore critical; cemented fixation reliably achieves this.(35-38)

Cardiopulmonary risk. BCIS remains a concern, particularly in patients with limited cardiac reserve. Careful anaesthetic management, thorough lavage, and modern cementing technique mitigate risk.(39-42) In the highest-risk patients an uncemented stem may still be chosen after shared decision-making.

Cost and implant availability. Locally manufactured cemented bipolar prostheses are substantially cheaper than imported modern cementless stems. Given that most patients bear the cost themselves, economic considerations favour cemented implants of proven design.(43-45)

Surgical expertise and volume. Many centres perform high volumes of bipolar hemiarthroplasty. Familiarity with a standardised cemented technique may outweigh theoretical advantages of less familiar cementless systems.(46-50)

Rehabilitation environment. Early pain-free mobilisation is especially valuable when formal physiotherapy resources are limited and patients return quickly to home environments that may still contain fall hazards(51,52)

6. Practical Recommendations

1. Cemented bipolar hemiarthroplasty should be the default choice for most elderly Indian patients with displaced intracapsular fractures and osteoporotic bone.
2. Uncemented fixation may be considered in selected patients with adequate bone stock (higher Singh index / Dorr A or B), significant cardiopulmonary comorbidity, or when operative time must be minimised.
3. Standardised modern cementing technique (thorough lavage, retrograde filling, pressurisation) and appropriate anaesthetic vigilance are mandatory.
4. Preoperative assessment of bone quality, medical optimisation, and early surgery (ideally within 24–48 h) remain more important determinants of outcome than the fixation method alone.
5. Larger multicentre Indian randomised trials with longer follow-up, standardised implants, and economic analyses are needed to refine these recommendations.

7. CONCLUSION

Current evidence, both global and Indian, supports cemented hemiarthroplasty as the preferred fixation method for the majority of elderly patients with displaced femoral neck fractures. The technique provides superior early pain relief and lower implant-related complications at an acceptable incremental cost in operative time and blood loss. In the Indian setting—characterised by high osteoporosis prevalence, cost constraints, and limited rehabilitation infrastructure—cemented bipolar hemiarthroplasty offers a pragmatic, effective, and evidence-aligned solution. Individualised decision-making remains essential for patients at the extremes of medical risk or bone quality

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