

# Evaluation of Various Treatment Modalities of Femoral Head Fractures

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## ABSTRACT

**Introduction:** The injuries involving the femoral head fractures are relatively uncommon but for the prevention of post-sequel complications like osteoarthritis, the treatment of such kind of fractures is of utmost importance. Less than 20 % of the cases of posterior hip dislocations have been observed to be associated with fractures of femoral head. Several cases have been published in the literature ever since the first description of a femoral head fracture, no firm conclusions have been reached regarding optimal treatment. Hence; we compared the various treatment modalities available for the treatment of femoral head fractures.

**Material and methods:** The present study included 26 patients of femoral head fractures who reported in the department of Orthopedics and Traumatology of the institution from June 2002 to July 2012. The patients were classified in accordance with Pipkin's proposal. Surgical treatment was performed in all cases. Analysis of the post-surgical results was done by performing separate assessment for clinical and radiological features separately. For the follow up purposes, cases that underwent total primary hip arthroplasty.

**Results:** 75% were males and 25% were females out of total 26 patients. The mean age of the patients was 34.5 years and ranged from 18 to 60 years. 47 % of the total cases were of type 1 while type 2 contained 24 % of the individuals according to Pipkin classification. Type 3 and 4 contained 14 % and 15 % individuals respectively. 12 out of the 26 patients showed excellent result when evaluated both clinically and radiographically according to Thompson and Epstein criteria.

**Conclusion:** Surgical treatment should be followed while treating femoral head fractures. Different personalities are presented by femoral head fractures and therefore the treating clinician must have the proper understanding of the pattern of the fracture on the basis of which, they should do the treatment planning.

**Keywords:** Femoral, Fracture, Treatment

## INTRODUCTION

Although the injuries involving the femoral head fractures are relatively uncommon; for the prevention of post-sequel complications like osteoarthritis, the treatment of such kind of fractures is of utmost importance. Less than 20 % of the cases of posterior hip dislocations have been observed to be associated with fractures of femoral head.<sup>1-3</sup> In spite of publication of numerous case reports, ever since the first description of a femoral head fracture, no single point conclusion has been drawn in context to single line of treatment. Historically, poor functional outcomes have been found to be associated with these fracture patterns.<sup>4,5</sup> Hence; we compared the various treatment modalities available for the treatment of femoral head fractures.

## MATERIALS AND METHODS

In the department of Orthopedics and Traumatology of the institution, the present study was conducted and included all

the patients reporting from June 2002 to July 2012. In this study, cases of pressure fracture of the femoral head were not evaluated. A total of 26 patients were included for the present study. In relation to the side affected, 18 hips were on the right side and 8 on the left side. The etiology of the 26 fractures consisted of car accidental cause in 22 cases, train accident in 2 cases and falling from a height in 2 cases. Diagnosis of femoral head fractures was done by doing radiological assessment of all patients. Pipkin's classification protocol was used to classify patients in the present study.<sup>6</sup> Surgical treatment was performed in all cases. Treatment of 10 cases of type I fractures were managed by femoral head resection while internal fixation was used for treatment of type II fractures. Antero-lateral, lateral and posterior routes were used for assessing the lesions. Total hip arthroplasty was done in the other remaining cases since more than 2 months were already over ever since the time of trauma. Thompson and Epstein<sup>7</sup> criteria were used for analysis of the post-surgical results and were done by performing separate assessment for clinical and radiological features separately. Total hip arthroscopy was done in type three fracture patients. Follow-up of the cases was done upto 6 years. For the follow up purposes, cases that underwent total primary hip arthroplasty.

## RESULTS

Out of total 26 patients, 75% were males and 25% were females. The mean age of the patients was 34.5 years and ranged from 18 to 60 years. Table-1 shows the distribution of patient according to Pipkin classification. 47 % of the total cases were of type 1 while type 2 contained 24 % of the individuals. Type 3 and 4 contained 14 % and 15 % individuals respectively. Table-2 shows the distribution of patient according to the results. 12 out of the 26 patients showed excellent result when evaluated both clinically and radiographically according to Thompson and Epstein criteria.

## DISCUSSION

Hip position at the time of impact determines if the hip dislocates with or without fracturing the head and/or acetabulum. Dashboard is the most frequent cause of hip fracture<sup>8</sup>, in which the generally unrestrained driver or passenger hits his knee on the dashboard during a collision with the force of the impact being transmitted along the axis of the femur.<sup>9</sup> The association

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Classification	Definition	Percentage of cases
Type 1	Fragment caudal to fovea	47
Type 2	Fragment cephalic to fovea	24
Type 3	Association of type 1 and type 2 with femoral neck fractures	14
Type 4	Association of type 1 or type 2 with acetabular fracture	15

**Table-1:** Distribution of patients according to Pipkin classification

Patient	Pipkin classification	Clinical/Radiographic results
1	1	Good/Good
2	1	Excellent/ Excellent
3	2	Regular/ Regular
4	3	PTA
5	3	PTA
6	1	Good/Good
7	1	Excellent/ Excellent
8	4	Poor/Poor
9	2	Excellent/ Excellent
10	1	Excellent/ Excellent
11	4	PTA
12	2	Excellent/ Excellent
13	1	Excellent/ Excellent
14	1	Good/Good
15	1	Excellent/ Excellent
16	2	Regular/ Regular
17	3	PTA
18	3	PTA
19	1	Good/Good
20	1	Excellent/ Excellent
21	4	Poor/Poor
22	2	Excellent/ Excellent
23	1	Excellent/ Excellent
24	4	PTA
25	2	Excellent/ Excellent
26	1	Excellent/ Excellent

PTA: Primary total arthroplasty

**Table-2:** Patient distribution according to results

of femoral head fractures with hip dislocations has been reported to range from 4–17%.<sup>10-20</sup> Although still uncommon, the increase in high-speed traffic accidents and the improved resuscitation of the patients have resulted in a growing number of these fractures. Treatment protocols for femoral head fractures are difficult to establish because of their limited incidence and the different outcome classifications used in the literature. A review of the literature by Brumback et al<sup>21</sup> 15 years ago resulted in a total of 144 reported Pipkin cases. However, because of the lack of illustrations, radiographs, descriptions and follow-up, only 78 (54%) of these could be used in their analysis of outcomes. More recently, a similar difficulties encountered in the German review of literature.<sup>22</sup> In most of the published cases, posterior dislocation of hip joint is common in which femoral head fracture was occurred. Only a single case report is published in the literature which quotes fracture without hip dislocation<sup>23</sup> Along with some cases of dislocation of anterior hip portion.<sup>24-27</sup> The largest sample of the latter was reported by DeLee et al, consisting of 13 patients.<sup>28</sup> According to other authors, in cases of doubt, computed tomography should be

performed for deciding both diagnosis and treatment planning. Lack of uniform criteria for classifying the femoral head fractures, small number of sample size in the reported studies creates lots of difficulties while making comparison of different results of various studies.<sup>23,30</sup> In making the final analysis on the treatment, according to, Hougaard and Thomsen, cases which were painless and with absence of abnormal hip movements were categorized under good results.<sup>31</sup> Thompson and Epstein used the criteria which analyzed the clinical and radiographic factors separately. Keeping in view the results seen in our study, non-surgical mode of treatment should be followed while doing reduction in cases of hip dislocation. Greenwald and Haynes<sup>32</sup> demonstrated different approaches for treating type I and type II lesion of the fracture of femur. Results of treatment of a huge series of cases were reviewed by Kloen et al who highlighted the posterior hip dislocation cases. From the results, they concluded that better visualization and ability to internally fix these fractures could potentially improve the outcome. They also introduced a modified, anterolateral approach to femoral head fractures based on a digastrics trochanteric osteotomy.<sup>33</sup>

## CONCLUSION

From the above the results, it can be concluded that surgical treatment should be followed while treating femoral head fractures. Different personalities are presented by femoral head fractures and therefore the treating clinician must have the proper understanding of the pattern of the fracture on the basis of which, they should do the treatment planning.

## REFERENCES

- Hougaard K, Thomsen PR. Traumatic posterior fractured location of the hip with fracture of the femoral head. *J Bone Joint Surg Am.* 1988;70:233–9.
- Roeder LF, DeLee JC. Femoral head fractures associated with posterior hip dislocation. *Clin Orthop Relat Res.* 1980;147:121–30.
- Sahin V, Karakas ES, Aksu S, et al. Traumatic dislocation and fracture-dislocation of the hip. A long-term follow-up study. *J Trauma.* 2003;54:520–9.
- Birkett J. Description of a dislocation of the head of the femur complicated with its fracture. With remarks. *Med Chir Trans.* 1869;52:133.
- Epstein HC, Wiss DA, Cozen L. Posterior fracture dislocation of the hip with fractures of the femoral head. *Clin Orthop Relat Res.* 1985;201:9–17.
- Pipkin G. Treatment of grade IV fracture-dislocation of the hip. *J Bone Joint Surg Am.* 1957;39:1027–42.
- Thompson VP, Epstein HC. Traumatic dislocation of the hip; a survey of two hundred and four cases covering a period of twenty-one years. *J Bone Joint Surg Am.* 1951;33:746–78.
- Funsten RV, Kinser P, Frankel CJ. Dashboard dislocation of the hip: a report of twenty cases of traumatic dislocation. *J Bone Joint Surg.* 1938;20:124–32.
- Davis JB. Simultaneous femoral head fracture and traumatic hip dislocation. *Am J Surg.* 1950;80:893.
- Armstrong JR. Traumatic dislocation of the hip joint. Review of one hundred and one dislocations. *J Bone Joint Surg Br.* 1948;30:430–45.
- Butler JE. Pipkin type-II fractures of the femoral head. *J Bone Joint Surg Am.* 1981;63:1292–6.
- Epstein HC. Posterior fracture-dislocations of the hip. Long-

- term follow-up. *J Bone Joint Surg Am.* 1974;56:1103–27.
13. Dreinhöfer KE, Schwarzkopf SR, Haas NP, Tscherne H. Femurkopffluxationsfrakturen. Langzeitergebnisse der konservativen und operativen Therapie. *Unfallchirurg.* 1996;99:400–9.
  14. Epstein HC. Posterior fracture-dislocations of the hip. *J Bone Joint Surg Am.* 1961;43:1079–98.
  15. Hougaard K, Thomsen PB. Traumatic posterior fracture-dislocation of the hip with fracture of the femoral head or neck, or both. *J Bone Joint Surg Am.* 1988;70:233–9.
  16. Jukkala-Partio K, Partio EK, Hirvensalo E, Rokkanen P. Absorbable fixation of femoral head fractures. A prospective study of six cases. *Ann Chir Gynaecol.* 1998;87:44–8.
  17. Kelly RP, Yarbrough SH. Posterior fracture-dislocation of the femoral head with retained medial head fragment. *J Trauma.* 1971;11:97–108.
  18. Lang-Stevenson A, Getty CJM. The Pipkin fracture-dislocation of the hip. *Injury.* 1987;18:264–9.
  19. Roeder LF, DeLee JC. Femoral head fractures associated with posterior hip dislocations. *Clin Orthop.* 1980;147:121–30.
  20. Weigand H, Schweikert C-H, Strube H-D. Die traumatische Hüftluxation mit Hüftkopfkalottenfraktur. *Unfallheilkunde.* 1978;81:377–89.
  21. Brumback RJ, Kenzora JE, Levitt LE, Burgess AR, Poka A. Fractures of the femoral head. In: *The Hip Society, ed. Proceeding of the Hip Society, 1986.* St. Louis: Mosby. 1987:181–206.
  22. Nast-Kolb D, Ruchholtz S, Schweiberer L. Behandlung von Pipkin- Frakturen. *Orthopäde.* 1997;26:360–7.
  23. Van der Werken C, Blankensteijn JD. Fracture of the femoral head without dislocation. A case report. *Acta Orthop Scand.* 1987;58:173-4.
  24. Scham SM, Fry LR. Traumatic anterior dislocation of the hip with fracture of the femoral head. A case report. *Clin Orthop Relat Res.* 1969;62:133-5.
  25. Mowery C, Gershuni DH. Fracture dislocation of the femoral head treated by open reduction and internal fixation. *J Trauma.* 1986;26:1041-4.
  26. Richards BS, Howe DJ. Anterior perineal dislocation of the hip with fracture of the femoral head. A case report. *Clin Orthop Relat Res.* 1988;228:194-201.
  27. Terahata N, Matsui H, Makiyama N. Bilateral anterior dislocation of the hips. A case report. *Int Orthop.* 1996;20:125-6.
  28. DeLee JC, Evans JA, Thomas J. Anterior dislocation of the hip and associated femoral-head fractures. *J Bone Joint Surg Am.* 1980;62:960-4.
  29. Ordway CB, Xeller CF. Transverse computerized axial tomography of patients with posterior dislocation of the hip. *J Trauma.* 1984;24:76-9.
  30. Stewart MJ, Milford LW. Fracture-dislocation of the hip; an end-result study. *J Bone Joint Surg Am.* 1954;36:315-42.
  31. Hougaard K, Thomsen PB. Traumatic posterior fracture-dislocation of the hip with fracture of the femoral head or neck, or both. *J Bone Joint Surg Am.* 1988;70:233-9.
  32. Greenwald AS, Haynes DW. Weight-bearing areas in the human hip joint. *J Bone Joint Surg Br.* 1972;54:157-63.
  33. Kloen P, Siebenrock KA, Raaymakers ELFB, Marti RK, Ganz R. Femoral Head Fractures Revisited. *European Journal of Trauma.* 2002;4:221-233.

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