

**Journal Club:** Kingston Hospital NHS Trust 2<sup>nd</sup> December 2012

**Organisers:** Mr Tony Antonios and Mr Harry Li.

**Attendees:** Mr T Antonios, Mr H Li, Mr J Windley, Mr D Matthews, Mr R Mansouri, Mr C Jones, and Dr P Vo.

**Paper suggested by:** Mr Khalid Sharif.

**Souder CD, Brennan ML, Brennan KL et al.**

The rate of contralateral proximal femoral fracture following closed reduction and percutaneous pinning compared with arthroplasty for the treatment of femoral neck fractures.

*J Bone Joint Surg [Am]* 2012;94:418-25.

### **Summary:**

#### **Introduction**

Contralateral hip fractures have been reported to occur in as many as 11.8% of patients after surgical fixation of the initial fracture. It is unknown if this rate is similar among patients managed with different surgical approaches.

#### **Hypothesis**

There is a significant difference in contralateral hip fracture rate following initial treatment dependent on whether the patient received arthroplasty or close reduction and percutaneous pinning. Variables such as smoking, diabetes, age, sex and bisphosphonate use may affect fracture rates.

#### **Population**

- 1238 patient records were identified and reviewed.
- Exclusion criteria: malignant disease; age <50; high energy fracture (results from fall other than from standing or sitting height); initial treatment of proximal femoral fracture other than closed reduction and percutaneous pinning or arthroplasty.
- 1177 patients satisfied the above criteria between 1999 and 2008 and their electronic medical records and radiography were reviewed.
  - Female 906, Male 271. Mean age 79.96 years. (50–102).

#### **Methods**

1. Retrospective comparative study performed at a single institution between 1999 and 2008
2. Ethical approval sought and was granted

3. All patient were managed by orthopaedic senior staff surgeons within the same healthcare system
4. Treatment was based on fracture patterns identified by radiographs and by experienced surgeons
5. The displacement was evaluated on the lateral view
6. The stability was evaluated using Garden's classification:
  - Garden Types I/II: considered stable, therefore had closed reduction and percutaneous pinning
  - Garden Type III: partially displaced and easily reduced was treated as stable fracture configuration, i.e. as per type I/II
  - Displaced Garden III and Garden IV were regarded as unstable and treated with hemiarthroplasty
7. Definition of a proximal femoral fracture included femoral neck, intertrochanteric or subtrochanteric fractures. However, only femoral neck fractures as the primary injury were included in this study.
8. Rehabilitation
  - In hospital – full weight bearing and unrestricted hip movement managed by physiotherapy
10. Discharging arrangement
  - Nursing homes
  - Skilled nursing facilities
  - Rehabilitation centre with continuation of physiotherapy
  - Home with physiotherapy
  - Occupational therapy was provided on individual basis

### **Statistical Analysis**

- T-test for continuous variables
- Chi-square for categorical variables
- Multivariate logistic regression analyses were performed to assess whether the following factors can affect the rate of contralateral fracture:
  - smoking, use of bisphosphonate, age, sex and presence of diabetes

### **Results**

Four hundred and ninety five patients underwent closed reduction and percutaneous pinning (Male 131: Female 364, mean age 77.98) and 682 patient underwent hip arthroplasty or total hip replacement (Male 140: Female 542, mean age 81.4).

The rate of contralateral fracture in total study population was 7.5%. For closed reduction and percutaneous pinning approach, the rate of contralateral fracture was 10.1% compare to 5.57% in the arthorplasty group ( $p=0.0035$ ).

Those who underwent arthroplasty were older, most likely to be smokers and predominantly females. However, those who sustained a contralateral fracture showed no difference in age groups, smoking status, bisphosphonate use or presence of diabetes. Finally, the average duration of time from initial fracture to the contralateral fracture was similar in both groups (1 – 85 months).

### **Critique:**

#### **Strengths**

- Large population
- Novel idea
- Clear inclusion and exclusion criteria
- Authors recognised some valid limitations
- Controversial topic that promotes discussion
- Published in prestigious journal

#### **Weaknesses**

- No clear objectives or hypothesis in the abstract or the introduction
- The null hypothesis has not been applied correctly and no clear questions were posed
- The author's used the lateral hip radiographs to judge fracture displacement despite the fact that Garden's classification only applied in the anterior-posterior (AP) views of the hip
- Treatment option of Grade III fractures was subjective to the surgeon reviewing the films.
- The authors excluded intratrochanteric and subtrochanteric fractures in the initial group but included them in the subsequent contralateral fractures. This has likely skewed the results and affected the statistical analysis
- Despite the high mean age of patients, there was no mention of any morbidity or mortality data. The paper failed to clarify the period of follow up for the patients included in this study and whether any patient was lost to follow up.
- The rehab planning is similar in both initial groups (pinning versus arthorplasty) despite well known and documented difference in the literature in post operative management. In this study, patients were asked to fully weight bear as soon as pain allowed even if they underwent closed reduction and percutaneous pinning (cannulated screws).
- The authors failed to clarify the surgical approaches used in these operations, such as anterior-lateral approach or others, which could affect patients gait and subsequently, their risk of future falls and contralateral hip fractures.
- The presentation of subsequent contralateral fractures had been documented it to be anywhere between 1-85 months after surgery without any clear explanation to the type of fall or intra- and post-operative complications that could affect this figure.

### **Summary and application to clinical practice**

The authors did identify that patients had a reduced risk of contralateral hip fractures with hip arthroplasty compared to closed reduction and percutaneous pinning. However, no clear explanation or rigorous statistical analysis was applied to identify the cause.

We identified several weaknesses in this paper making it very difficult to draw any useful clinical applications. The paper compares two very different methods of treating two very different fracture configurations. This does not affect our choice in clinical practice except for those which are regarded as Type III fractures.

We recommend that any future work in this field should focus on a clear null hypothesis. One can look at the rate of subsequent contralateral hip fractures in Garden's III classification patient group in which the authors suggested that either closed reduction and percutaneous pinning or arthroplasty were used over a defined follow up period to see there is an advantage of using one procedure over the other.