

## A meta-analysis of outcomes in Colles fractures treated conservatively in elderly patients

Chirag R. Khandelwal<sup>1</sup>, RCS Khandelwal<sup>2,\*</sup>

<sup>1,2</sup>Consultant Orthopaedic Surgeon, Dept. of Orthopaedics, The Bone and Joint Clinic, Delhi

**\*Corresponding Author:**

Email: dr.rcsk@gmail.com

### Abstract

**Background:** Fractures of the distal end of radius or Colles' fracture was first described by Sir Abraham Colles in nineteenth century. It commonly occurs in the elderly people having osteoporosis. It is caused by fall on the outstretched hand. In Colles fracture, the fragments are usually displaced & impacted in elderly people because of fragile bone. In elderly patients with Colles fracture, there is always a lacuna created at the impacted site of fracture in the metaphyseal bone & this void at fracture site between the distal and proximal fragments results in collapse of the fracture fragments. This leads to mal union with gross functional impairment. Even then, these fractures are very well reduced and immobilized with plaster. However, these fractures are having predisposition to collapse due to formation of void especially in the elderly patients. These patients develop deformity if treated without any sort of surgical management for example internal fixation, external fixation, percutaneous pinning, with or without bone grafting.

**Results & Conclusion:** Our retrospective study of 100 Colles' fractures treated conservatively by closed reduction & plaster immobilizations showed all the cases of Colles' fractures had developed mal union & functional impairments ranging from minor to disabling activities of daily living.

**Keywords:** Colles' fracture; Distal radius fracture; Immobilization; Plaster.

### Introduction

Colles' fracture or fractures of the lower end of radius are extremely common fractures. They occur more frequently in older females than in males. Average age groups for these fractures are post-menopausal, due to fall or from low-velocity energy trivial trauma & most of them have osteoporosis. There are various surgical, non-surgical as well as conservative management available for treatment of these fractures. These include conservative management for example closed reduction & plaster immobilization or surgical options which includes internal fixation by locking plate or external fixator applications (ligamentotaxis), percutaneous pinning, and bone grafting. However, fracture displacement in elderly patients always resulted in functional impairment.

### Materials & Method

Retrospective study of 100 Colles' fracture or fractures of the distal radius was conducted. Patients with distal end radius fracture who came to hospital were included in the study. All distal end radius patients were treated conservatively with closed reduction and slab. Thereafter, patients were treated with closed reduction and plaster immobilization. X rays were taken pre and post reduction.

### Results

We have studied 100 patients of age above 50 having distal end radius fracture. Every patient is treated conservatively with closed reduction and casting. X rays were taken pre reduction, post reduction

and 2-3 weeks after reduction. In 95 patients anatomical reduction is not achieved, 3 patients have satisfactory reduction and 2 patients are able to maintain anatomical reduction. 2 patients who has achieved anatomical reduction have unsatisfactory wrist movement.

### Radiographic Images



**Fig. 1: A case of 55 years elderly female with distal radius fracture having dorsal and lateral displacement**



**Fig. 2:** X rays of the above patient after reduction and below elbow cast application



**Fig. 3:** A case of 45 years male with distal radius fracture having volar and radial displacement



**Fig. 4:** The above patient with x rays after reduction and plaster application

### Discussion

About 20% of the orthopedic emergencies are the distal end radius fracture patients. Mostly these patients are above 40-50yrs. These patients mostly have distal end radius fracture because of trivial trauma. Abraham Colles in 1814 first described this fracture. To achieve normal functioning of the wrist joint, anatomical

reduction of the distal end radius fracture is required. Many studies have been done on outcomes of distal end radius fracture and most studies show that anatomical reduction is not met with conservative management of distal end radius fracture. Some old patients who required high demanding activity have complete anatomical reduction which is most of the time not achieved in conservative management of distal end radius fracture. Also bone quality of these old age patients is very poor and most of the time conservative management often fails as there is collapse of the distal fragment in distal end radius fracture. Mal union is the most common complication of distal radius fractures treated conservatively given in a study carried by Jupiter and Fernandez. You can get almost 4000 articles on distal end radius. When we restrict our search to clinical trials around 615 papers were found distal end radius fracture. Out of which some are randomized control trail, non-randomized comparative trail, prospective comparative study and some case series. Some papers dealt with external fixation versus closed reduction and cast while some papers dealt with internal fixation with or without external fixation against closed reduction and casting. Azzopardi et al<sup>(1)</sup> performed a prospective, randomized study having fifty seven patients older than sixty years of age with Colles fractures to compare the results of immobilization in a forearm cast alone with that using additional, percutaneous Kirschner wire pinning. Patients treated by pinning had statistically significant improvement in radiological parameters at 1 year. In a prospective randomized study, Roumen et al compared external fixation with closed reduction and cast application for redisplaced Colles fracture in patients over 55 years. Patients treated with external fixator had significant better radiological results while the functional results did not show any difference.<sup>(2)</sup> Egol et al<sup>(3)</sup> retrospectively compared outcomes for patients over the age of 65 years with a displaced Colles fracture, who were treated surgically (plate fixation or external fixator) or non-surgically (cast fixation). At 24 weeks, patients who underwent surgery had better wrist extension than those treated non-surgically. Grip strength at the end of one year was significantly better in the operative group. No papers or any other study is sufficient enough to conclude that one kind of treatment is superior to other, but one thing is sure from every study we can get is operative treatment in any form is superior to closed reduction and casting treatment. There was insufficient data to perform a scientific meta-analysis because of the poor quality of the studies and lack of a uniform method of outcome assessment. Additionally, comparing the results of the case series showed that operative management was superior to conservative management with closed reduction and casting. Different methods of treatment which prevents deformity & functional impairment.

1. External fixator application (ligamentotaxis)

2. Percutaneous pinning,
3. Internal fixation by locking plate
4. Bone grafting.

### **Conclusion**

We conclude that none of our patients older than fifty years had satisfactory results found after conservative treatment for Colles fractures. Therefore, we can conclude that conservative management is not the best modality of treatment needed for distal radius. These results need to be re-inforced by a prospective study with an extended follow-up period.

### **References**

1. Azzopardi T, Ehrendorfer S, Coulton T, Abela M. Unstable extra-articular fractures of the distal radius: a prospective, randomised study of immobilization in a cast versus supplementary percutaneous pinning. *J Bone Joint Surg Br.* 2005;87(6):837–840. [PubMed]
2. Roumen RM, Hesp WL, Bruggink ED. Unstable Colles' fractures in elderly patients. A randomised trial of external fixation for redisplacement. *J Bone Joint Surg Br.* 1991;73(2):307–311. [PubMed]
3. Egol KA, Walsh M, Romo-Cardoso S, Dorsky S, Paksima N. Distal radial fractures in the elderly: operative compared with nonoperative treatment. *J Bone Joint Surg Am.* 2010;92(9):1851–1857. [PubMed]