



E-ISSN: 2395-1958  
P-ISSN: 2706-6630  
IJOS 2020; 6(2): 538-540  
© 2020 IJOS  
[www.orthopaper.com](http://www.orthopaper.com)  
Received: 04-02-2020  
Accepted: 07-03-2020

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## Retrospective observation of complications of radial head replacement

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**DOI:** <https://doi.org/10.22271/ortho.2020.v6.i2i.2093>

### Abstract

**Background:** We wanted to evaluate the complications with the use of Indian radial head prosthesis

**Methods:** Data from our institute was studied for outcomes with the use of radial head replacement and its complications.

**Results:** We observed radiocapitellar overstuffing in 2 out of 4 patients. The range of flexion was restricted in one of these patients.

**Conclusion:** Overstuffing of the radiocapitellar joint may result in pain and restriction of elbow movements.

**Keywords:** Radial head prosthesis, overstuffing, elbow pain

### Introduction

Comminuted radial fractures represent challenging problems to treating physicians. 2 part radial head fractures can be treated by internal fixation if they are displaced or alternatively they can be conserved. However, comminuted fractures either needs to be replaced by a prosthesis or needs to be treated by excision arthroplasty <sup>[1, 2]</sup>. Excision arthroplasty has been practiced with good clinical outcomes, however long term studies have reported complications like proximal radial migration and distal radioulnar pain<sup>3</sup>. Hence radial head replacement has been proposed as an alternative form of treatment <sup>[2]</sup>. Whereas radial head prosthesis restores normal joint mechanics and stability of the elbow joint, there have been some concerns reported with their use <sup>[4]</sup>. Some problems encountered are capitellar cartilage erosions and degeneration of the cartilage <sup>[5]</sup>. Due to stiffness of the metal implant and due to non-anatomic design of prosthesis the contact mechanics of radio-capitellar joint also altered <sup>[6]</sup>. The majority of prosthesis used nowadays is metallic in nature and non-anatomic in design <sup>[7]</sup>. Some of the Indian prosthetic radial head is monoblock in design. Most of the Indian radial head prosthesis in use are circular in shape and have shallow depth. Our purpose of this study was to analyse the complications with the use of radial head prosthesis in radial head fracture

### Material and methods

We retrospectively evaluated our patients with radial head fractures who underwent conservative management or surgical interventions between August 2015- August 2018.

The patients with radial head prosthesis were further evaluated radiologically and clinically. We evaluated the range of elbow flexion, extension, pronation and supination. X-Rays were studied to evaluate the implant position of the radial head prosthesis. Overstuffing was diagnosed if the prosthesis was not aligned with the lateral border of the sigmoid notch on the AP Xray.

### Radial head prosthesis

Monoblock radial head prosthesis of an Indian company was used to replace the comminuted fractures of the radial head (Figure 1). The design of the available prosthesis comprises of a shallow dish depth (1 mm) and a circular shape.

They are available in both cemented and uncemented form. The diameters of the radial head available are 16, 18 and 20 mm. The sizes of the stem available are 4, 5 and 6 mm.

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## Results

Data of 9 patients were available in our records. Two patients were managed via conservative methods. Two patients underwent ORIF with plating, and 4 patients had undergone radial head replacement with radial head prosthesis. One patient had undergone radial head excision.

## Patient demographics

The average age group in our study was 44 years (25 -55 years) We had 6 male and 3 female patients. There were 6 type II, [2] type III and 1 type I radial head fractures according to Mason classification. The average follow up period in our study was 10 months (8 months -36 months).

We observed overstuffing with radial head replacement on radiological analysis in 2 out of 4 patients (Figure 2 a,b). One patient with overstuffing had restriction of elbow flexion to 90°. Both patients with overstuffing had a painful elbow

## Discussion

Our study was done to identify the complications associated with surgical treatment of the radial head fractures. Overstuffing of the joint with radial head prosthesis was observed in two of our patients. This resulted in elbow stiffness and pain. Overstuffing has been reported as a likely complication with the radial head prosthesis<sup>8</sup>. This malpositioning may lead to a restriction of elbow range of movements as was noticed in our patients<sup>[8]</sup>. The radial head should be aligned with the lateral border of lesser sigmoid notch<sup>[9]</sup>. The radial head prosthesis of Indian companies is available as mono block components where the sizes of head and stem are limited. Sometimes, this may not allow the surgeon to put in the correct matching size of the prosthesis and as a result, the height of implantation is not correctly maintained and prosthesis may remain proud. A malposition of the prosthesis of more than [2] mm in the vertical plane may lead to alteration of the elbow joint kinematics<sup>[10, 11]</sup>. It may also lead to an increase in the joint contact pressures. This may lead to erosion of the capitellum cartilage<sup>5</sup>. Clinically there may be loss of movements and pain<sup>[11]</sup>. In the long-term, osteoarthritis may also be observed in such cases<sup>4</sup>. The treatment of overstuffing may be removal of the prosthesis<sup>[11]</sup>. To avoid overstuffing, following guidelines have been proposed: The medial and lateral ulno-humeral joint line should be symmetrically maintained<sup>[12, 13]</sup>. There should be avoidance of contact between capitellum and radial head in elbow flexion of 90°. The sizing of the radial head should be done either based on contralateral radial head or by the diameter of the resected radial head<sup>[14]</sup>. Some surgeons have also recommended intraoperative radiological evaluation of the relation between the proximal articular surface of the radial head prosthesis and the lesser sigmoid notch<sup>[15]</sup>. Radial head prosthesis were initially designed to be used a spacer. Silicon prosthesis were used in the initial period which gave rise to problems of instability<sup>[16]</sup>. Metallic prosthesis have replaced the silicon prosthesis as they are found to confer better stability<sup>[7]</sup>. The stiffness of the metal has been also responsible for increasing joint contact stresses in the radiocapitellar joint. The other complications reported with radial head prosthesis are painful loosening, instability, neurological injury, cartilage damage, radial head disassembly and osteoarthritis<sup>[12]</sup>. Van riet *et al.* have also shown that osteopenia of the capitellum may predispose to osteoarthritis<sup>5</sup>. Mayo clinic study reported painful loosening as the most common cause of loosening<sup>4</sup>. They reported overstuffing in<sup>[10]</sup> of their patients and hyperpression on the

capitellum in all patients with overstuffing. Schnetzke *et al.* stated that oversizing was present in 50% and capitellar erosion in 20% of their patients<sup>[11]</sup>.

The main limitation with our study is the less number of patients and a retrospective nature of the study.

## Conclusion

To conclude, overstuffing may lead to a painful elbow. Radiological evaluation intraoperatively may be considered to check the implant position, in order to avoid any overstuffing. 56 year old male operated with the radial head replacement with follow up after 1 month



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36 year old female came with undisplaced fracture was managed by conservative management with above elbow cast for 6 weeks hen followed up and started on physiotherapy

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