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DETERMINANTS OF EARLY OUTCOME AFTER RADIAL HEAD ARTHROPLASTY: IMPACT OF MASON TYPE AND TRAUMA-TO-SURGERY INTERVAL IN PATIENTS TREATED VIA THE KOCHER APPROACH

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ABSTRACT

Background: Radial head arthroplasty is an important treatment for complex radial head and neck fractures that cannot be reconstructed reliably. However, early postoperative outcomes vary depending on several factors, including fracture severity and timing of surgical intervention. Understanding these determinants is essential for optimising functional recovery. This study evaluates the influence of Mason fracture type and trauma-to-surgery interval on early outcomes in patients undergoing radial head arthroplasty via the Kocher approach. The aim is to analyse the impact of Mason classification and trauma-to-surgery interval on early clinical and functional outcomes following radial head arthroplasty performed using the Kocher approach.

Materials and Methods: This prospective–retrospective observational study included 20 adult patients treated with uncemented press-fit titanium radial head arthroplasty at SSG Hospital, Vadodara. Patients aged >20 years with Mason Type II–IV fractures were included, while those with Mason Type I injuries, neurovascular compromise, compound fractures, or significant comorbidities were excluded. Detailed clinical and radiological evaluation, preoperative optimisation, and standardised surgical technique using the Kocher approach were followed in all cases. Outcomes were assessed using clinical examination, radiographs, and the Mayo Elbow Performance Score (MEPS) at scheduled follow-ups up to 6 months.

Results: The cohort demonstrated excellent or good functional outcomes in all patients. Mason Type III fractures constituted the majority and showed favourable outcomes, although slightly lower MEPS scores compared to Types II. Mason Type IV fractures produced only good—not excellent—results, reflecting greater injury complexity. Early surgery (0–7 days) was strongly associated with excellent outcomes (80%), whereas delayed surgery consistently yielded only good outcomes. Complications were minimal, with elbow stiffness noted in 20%, but without significant impact on overall MEPS categories. No cases of nerve injury, implant loosening, heterotopic ossification, or infection were observed.

Conclusion: Early functional outcomes after radial head arthroplasty depend significantly on fracture severity and the trauma-to-surgery interval. Higher Mason types correlate with reduced early function, and delaying surgery beyond one week diminishes the likelihood of excellent recovery. Prompt surgical intervention and accurate assessment of fracture severity are essential to optimise postoperative outcomes.

Keywords: Radial Head Arthroplasty, Mason Classification, Trauma-To-Surgery Interval, Kocher Approach, Elbow Fractures.

INTRODUCTION

Radial head fractures are among the most frequent elbow injuries in adults and represent a key component of complex elbow trauma. The radial head is a critical secondary stabilizer of the elbow, contributing to resistance against valgus stress, axial loading, and rotational forces across the radiocapitellar joint.[1] When the radial head is disrupted, especially in the setting of ligamentous injury or associated fractures, the resulting instability can lead to pain, stiffness, loss of motion, and long-term functional impairment if not treated appropriately.[1] These considerations have made the management of radial head fractures a central topic in contemporary elbow surgery. Epidemiological studies have shown that radial head fractures are the commonest fractures around the elbow and often occur in active, working-age adults following a fall on the outstretched hand or other low-energy trauma.[2] Such fractures are not infrequently associated with injuries to the collateral ligaments, the coronoid process, or the distal radioulnar joint, and may form part of complex patterns such as terrible triad injuries or fracture-dislocations.[2] This spectrum—from isolated, minimally displaced fractures to highly unstable, multi-structure injuries—means that a single treatment strategy is rarely appropriate for all patients and underscores the importance of accurate classification and individualized decision-making. The Mason classification and its later modifications remain the cornerstone for describing radial head fractures and guiding management.[3] By stratifying fractures according to displacement, comminution, and the presence of elbow dislocation, the Mason–Johnston system helps distinguish stable patterns that may be treated conservatively from more complex injuries that require open reduction and internal fixation (ORIF) or radial head arthroplasty (RHA).[3] Higher Mason types, particularly comminuted fractures (Type III) and fracture-dislocations (Type IV), are associated with greater soft-tissue injury, a higher risk of instability, and a greater likelihood that the radial head will be irreparable.[3] In such settings, primary radial head replacement is increasingly chosen over ORIF in order to restore joint congruity and permit early motion. Radial head arthroplasty has therefore become an established option for unreconstructible fractures, with multiple clinical studies and systematic reviews showing that it can provide good to excellent pain relief, functional range of motion, and high rates of elbow stability.[4] However, the literature also indicates substantial variability in reported outcomes, complication rates, and revision rates, which may reflect differences in implant design, surgical technique, associated injuries, timing of surgery, and patient selection.[4] While overall results are favourable, not all patients achieve excellent functional scores, highlighting the need to understand which clinical and surgical factors most strongly influence outcome after RHA. Long-term data suggest that RHA can yield durable function, but also reveal potential late problems such as loosening, periprosthetic osteolysis, capitellar wear, and stiffness.[5] In a systematic review with a minimum 8-year follow-up, most patients treated with RHA for radial head fractures achieved satisfactory functional outcomes, yet non-negligible rates of complications and reoperations were reported.[5] Among the factors that may influence outcome, the severity of the initial injury and the delay from trauma to surgery are particularly important. More complex fracture patterns, such as higher Mason types and fracture-dislocations, typically involve greater soft-tissue disruption, more challenging reconstruction, and a higher risk of residual stiffness or instability.[1,2] Furthermore, delays in definitive management may allow progressive scarring, contracture, and heterotopic ossification to develop around the elbow, potentially compromising the benefits of arthroplasty. Studies on elbow fracture-dislocations have suggested that earlier operative treatment is associated with better functional scores, as measured by indices such as the Mayo Elbow Performance Index, whereas delayed intervention can be associated with reduced motion and less favourable results.[6] Although these data are not specific to radial head arthroplasty alone, they support the notion that timing is a critical determinant of early elbow outcome. Surgical exposure is another variable that may affect both complication rates and functional recovery. The Kocher approach, based on the interval between anconeus and extensor carpi ulnaris, is one of the most widely used lateral approaches to the radial head and is commonly employed for ORIF and prosthetic replacement.[1] Comparative work on lateral elbow approaches has shown that both the Kocher and Kaplan intervals can provide adequate visualization of the radial head, but differ in their relations to the lateral collateral ligament complex and to the so-called “safe zone” for hardware or implants.[7] A careful, standardized use of the Kocher approach may help minimize the risk of iatrogenic ligament injury and posterior interosseous nerve damage, thereby contributing to stable, pain-free motion after RHA.[7] Despite this, relatively few clinical studies have specifically examined outcomes of radial head arthroplasty performed exclusively through the Kocher approach.

MATERIALS AND METHODS

This prospective–retrospective observational study was conducted in the Department of Orthopaedics, SSG Hospital attached to Baroda Medical College, Vadodara, Gujarat, from June 2020 to December 2021. The study focused on identifying determinants of early postoperative outcome after radial head arthroplasty, with particular emphasis on the influence of fracture severity as per Mason classification and the trauma-to-surgery interval in

patients treated through the Kocher approach. Approval from the institutional ethics committee was obtained, and all patients provided written informed consent prior to enrolment. The primary outcome of interest was early functional status of the elbow, assessed using the Mayo Elbow Performance Score (MEPS) at predefined postoperative intervals.

The study included 20 consecutive adult patients with radial head and neck fractures who underwent radial head arthroplasty using an uncemented press-fit titanium prosthesis during the study period. The sample size of 20 patients constituted the entire cohort for this analysis and was not altered. Patients were admitted either via the outpatient orthopaedic department or emergency casualty. For each case, detailed demographic data (age, sex), occupation and activity level, mechanism of injury, and relevant medical and surgical history were recorded at the time of admission.

Eligibility criteria were defined to create a homogeneous cohort suitable for evaluating determinants of outcome. Patients older than 20 years with Mason type II, III, or IV radial head fractures, as well as isolated radial neck fractures without extension into the shaft, were included, provided they were medically fit for surgery and free of major systemic comorbidities likely to confound recovery. Exclusion criteria comprised Mason type I fractures, age less than 20 years, compound fractures, associated neurovascular injuries, multiple prior procedures on the same limb, and repeat trauma to the operated limb during the follow-up period.

For the purpose of analysing determinants of outcome, patients were later stratified according to Mason classification into groups representing increasing fracture severity (e.g., Mason type II vs type III/IV) based on preoperative imaging. In addition, the interval between injury and definitive surgery was recorded in days for each patient. Patients were categorised into an “early surgery” group and a “delayed surgery” group according to whether arthroplasty was performed within a predefined short trauma-to-surgery interval or beyond it. These groupings were used to explore associations between fracture type, timing of surgery, and early postoperative outcomes.

Clinical and Imaging Evaluation

At presentation, all patients underwent general examination including documentation of vital signs and primary trauma evaluation with attention to airway, breathing, and circulation. Associated injuries to the head, chest, abdomen, spine, and other extremities were systematically screened and managed according to advanced trauma life support protocols. Local examination of the affected elbow assessed swelling, deformity, skin condition, any open wounds, and functional impairment. Palpation was used to elicit tenderness and crepitus and to assess the range and quality of painful elbow movements. Neurovascular examination of the limb was performed in all patients by assessing radial artery pulsations, capillary refill, distal skin colour and temperature, and peripheral sensory status; none of the patients in this study had neurovascular compromise at presentation.

All patients underwent standard anteroposterior and lateral radiographs of the injured elbow. When necessary, three-dimensional computed tomography (3D CT) was obtained to define the number, size, and displacement of fracture fragments, articular comminution, and associated injuries. Fractures were classified using the Mason system, with recognition of its modifications for associated soft-tissue and bony injuries. Following initial assessment, an above-elbow plaster of Paris slab and sling were applied to provide temporary immobilisation until surgery.

Preoperative Assessment and Preparation

All patients underwent routine pre-anaesthetic evaluation, including detailed systemic examination and review of comorbid conditions. Laboratory investigations comprised complete hemogram, random blood sugar, blood urea, serum creatinine, serum bilirubin, serum electrolytes, viral markers (HIV, HBsAg, HCV), electrocardiogram, and chest radiograph. Two-dimensional echocardiography was performed in older patients and those with known or suspected cardiac disease. After obtaining clearance from the anaesthesiologist and physician, written informed consent was taken from each patient and their relatives.

The operative limb was shaved and prepared with povidone-iodine scrub. Perioperative analgesia was provided using intravenous paracetamol, and prophylactic intravenous ceftriaxone was administered 12 hours before surgery and again 1 hour before skin incision. All required implant sizes for the uncemented press-fit titanium radial head prosthesis and necessary instruments were checked and sterilised before the procedure.

Anaesthesia, Position, and Kocher Approach

All operations were performed under regional anaesthesia, typically supraclavicular or axillary block, with the application of a pneumatic tourniquet to the upper arm. Patients were positioned supine on the operating table. The affected limb was placed across the chest or on a side arm board in pronation to improve access to the lateral elbow and provide protection to the posterior interosseous nerve.

A standard Kocher approach was used in all patients to maintain uniformity for analysis. A curved posterolateral skin incision was made from the posterior aspect of the lateral epicondyle, extending distally along the posterior border of the ulna. The interval between anconeus and extensor carpi ulnaris was developed as the internervous plane. The proximal origin of anconeus was partially detached, and the muscles were retracted to expose the lateral capsule and annular ligament. The forearm was kept in pronation during deeper dissection to move the posterior interosseous nerve anteriorly and away from the operative field. After capsulotomy, the radial head, capitellum, and annular ligament were visualised. When necessary, the annular ligament was divided to allow adequate exposure of the radial head

and neck for prosthetic insertion, while care was taken to preserve the lateral ulnar collateral ligament complex whenever possible.

Prosthesis Selection and Implantation Technique

Loose and non-viable fracture fragments of the radial head were excised, and the radial neck was cut at the junction of the head and neck or at the fracture level using an oscillating saw. The excised radial head fragments were reconstructed on the back table to estimate the native articular diameter and thickness and to ensure complete fragment removal. These measurements informed selection of the appropriate modular titanium radial head component. Particular attention was paid to avoiding oversizing and over-lengthening of the construct to prevent radiocapitellar overstuffing, capitellar wear, and postoperative stiffness or pain.

The radial medullary canal was reamed sequentially using intramedullary reamers until cortical resistance was encountered. The stem size was chosen to match the final reamer size, with slight undersizing when a smooth stem was used to optimise tracking. In all cases, an uncemented press-fit titanium stem with a modular head was used. Trial components were inserted and the elbow was taken through flexion–extension and pronation–supination under fluoroscopic guidance to assess radiocapitellar congruity, restoration of the proximal radioulnar joint level, and joint stability. The goal was to situate the prosthetic articular surface at or marginally proximal to the lateral edge of the coronoid articular surface, thereby approximating the anatomical level of the native radial head. Once the optimal configuration was confirmed, the definitive prosthesis was assembled and impacted to achieve a firm press-fit. After implantation, elbow stability was reassessed in multiple planes. If instability or stiffness was encountered, the size or thickness of the prosthetic components was reconsidered to achieve a more satisfactory reconstruction.

Closure, Postoperative Management, and Rehabilitation

Following insertion of the definitive implant, the annular ligament and any associated soft-tissue structures were repaired. The capsule, muscle layers, and fascia were closed in layers, followed by subcutaneous closure with absorbable sutures and skin closure with non-absorbable sutures. A sterile dressing and soft padded crepe bandage were applied. Immediate postoperative anteroposterior and lateral radiographs of the elbow were obtained to confirm prosthesis position and joint congruity. The limb was kept elevated, and patients were encouraged to initiate active finger, wrist, and shoulder movements early. Intravenous antibiotics and analgesics were administered as per institutional protocol. In the absence of ligament reconstructions or other contraindications, gentle active elbow mobilisation was started from the first postoperative day in a soft dressing.

The wound was inspected on the second postoperative day and dressings were changed accordingly. Sutures were usually removed around the 15th postoperative day. Patients were discharged with instructions to use an arm sling for comfort and to perform a structured home-based rehabilitation programme emphasising progressive active range-of-motion exercises of the elbow, wrist, and fingers, while avoiding lifting heavy weights or subjecting the operated limb to excessive strain in the early postoperative period.

Follow-up Schedule and Outcome Assessment

Patients were followed at 4 weeks, 6 weeks, 12 weeks, and 6 months after surgery. At each visit, a detailed clinical evaluation was performed, including assessment of pain, elbow range of motion (flexion, extension, pronation, and supination), and ability to return to routine activities and work. Radiographs at follow-up visits were reviewed for implant position, radiocapitellar alignment, evidence of loosening, periprosthetic changes, heterotopic ossification, or other complications.

Early functional outcome was quantified at each follow-up using the Mayo Elbow Performance Score (MEPS), which incorporates pain, range of motion, stability, and function in activities of daily living. Based on MEPS, outcomes were classified as excellent, good, fair, or poor. For the purpose of determining prognostic factors, early MEPS and range-of-motion data were compared across subgroups defined by Mason fracture type and trauma-to-surgery interval. This allowed evaluation of the relative impact of fracture severity and timing of surgery on early clinical and functional recovery following radial head arthroplasty performed via the Kocher approach.

RESULTS

[Table 1] Demographic Characteristics

The study population consists of 20 individuals, distributed across four age groups. The majority of participants fall within the 31–40 years age range (50%), making it the largest group, followed by the 41–50 years group (25%), and the 19–30 years group (20%). Only 5% of participants were older adults aged 51–62 years. This indicates that the sample is predominantly composed of younger and middle-aged adults, with very few elderly individuals. Gender distribution shows a strong male predominance, with 16 males (80%) and 4 females (20%). This imbalance suggests either higher incidence of the injury in males or greater representation of males in the study.

[Table 2] Age Group vs Result (MEPS Category)

Most individuals across all age groups achieved an Excellent outcome on the MEPS scale. The 31–40 years group contributed the largest share of excellent results (55%), reflecting both their higher representation and possibly better functional recovery. The 19–30 years group also showed favorable outcomes, with 10% excellent results. In the 41–50 years age group, 15% had excellent

outcomes but also contributed to the "Good" category with 10% of the total. Only one participant above 50 years (51–62 years) demonstrated a Good result, with no excellent outcomes in this age range. Importantly, there were no Fair or Poor outcomes in any age group. Overall, 80% of all participants achieved excellent recovery and 20% achieved good recovery, indicating generally positive functional results across age categories.

[Table 3] Gender vs Result (MEPS Category)

When outcomes are compared by gender, both males and females predominantly achieved Excellent results. Among males, 65% had excellent outcomes, while females contributed 15% to this category. Similarly, for the "Good" category, 15% were males and 5% were females. No participant from either gender showed fair or poor recovery. These findings indicate that both genders experienced favorable outcomes, with a slightly higher proportion of excellent results among males. However, this difference is likely influenced by the unequal gender distribution (males = 80%, females = 20%).

[Table 4] Mode of Injury vs Result (MEPS Category)

The analysis based on mechanism of injury shows similar recovery trends. Most participants sustained injuries due to fall down (80%), while only 20% were injured in road traffic accidents (RTA). Among those injured from falls, 65% showed excellent recovery and 15% showed good recovery. For RTA patients, 15% achieved excellent results and 5% achieved good outcomes. The absence of fair or poor outcomes across both injury mechanisms indicates that the mode of injury did not adversely affect final functional results, although patients with fall injuries were more commonly represented and thus accounted for most excellent outcomes.

[Table 5] Fracture Type vs Result (MEPS Category)

This table reveals notable differences in MEPS outcomes based on fracture type. Mason Type 3 fractures (comminuted) formed the largest group (65%), and these patients showed the highest proportion of excellent outcomes (60%). Mason Type 2 (displaced) fractures also had favorable results, with 20% excellent and 5% good outcomes. However, Mason Type 4 fractures (fracture-dislocation), though few in number (10%), did not achieve any excellent outcomes; instead, they contributed fully to the "Good" category (10%). This suggests that fracture-dislocation injuries are more severe, and while they still yield acceptable results, their recovery tends to be less optimal compared to Type 2 or Type 3 fractures. No fair or poor outcomes were observed across fracture types.

[Table 6] Trauma–Surgery Interval vs Result (MEPS Category)

The timing between trauma and surgery shows a strong association with functional outcomes. Patients who underwent surgery within 0–7 days had the best results, with 80% achieving excellent outcomes and only 5% falling into the good category. Conversely, those with delayed surgery (8–14 days and 15–21 days) showed no excellent outcomes and contributed entirely to the good category (10% and 5%, respectively). This pattern suggests that early surgical intervention (within one week) is associated with significantly better functional recovery, whereas delaying surgery tends to reduce the likelihood of achieving an excellent outcome, though still avoiding poor results.

[Table 7] Complications vs Result (MEPS Category)

Complication analysis shows that most participants experienced no complications (80%), and among them, 75% achieved excellent recovery, with only 20% showing good results. Among those with complications, elbow stiffness was the only one recorded, affecting 20% of participants. Of these, one patient still achieved an excellent outcome (5%), while three had good outcomes (15%). No cases of PIN palsy, heterotopic ossification, capitohumeral arthritis, implant loosening, or infection were reported. Importantly, even those who developed complications did not have fair or poor MEPS outcomes, indicating that complications were mild and manageable, and did not dramatically impair functional results.

Table 1: Demographic Characteristics

Parameter	Category	Frequency	Percentage
Age Group	19–30	4	20%
	31–40	10	50%
	41–50	5	25%
	51–62	1	5%
	Total	20	100%
Gender	Male	16	80%
	Female	4	20%
	Total	20	100%

Table 2: Age Group vs Result (MEPS Category)

Result	19–30	31–40	41–50	51–62	Total
Excellent	2 (10%)	11 (55%)	3 (15%)	0	16 (80%)
Good	0	1 (5%)	2 (10%)	1 (5%)	4 (20%)
Fair	0	0	0	0	0
Poor	0	0	0	0	0
Total	2 (10%)	12 (60%)	5 (25%)	1 (5%)	20 (100%)

Table 3: Gender vs Result (MEPS Category)

Result	Male	Female	Total
Excellent	13 (65%)	3 (15%)	16 (80%)
Good	3 (15%)	1 (5%)	4 (20%)
Fair	0	0	0
Poor	0	0	0
Total	16 (80%)	4 (20%)	20 (100%)

Table 4: Mode of Injury vs Result (MEPS Category)

Result	Fall Down	RTA	Total
Excellent	13 (65%)	3 (15%)	16
Good	3 (15%)	1 (5%)	4 (20%)
Fair	0	0	0
Poor	0	0	0
Total	16 (80%)	4 (20%)	20 (100%)

Table 5: Fracture Type vs Result (MEPS Category)

Result	Mason 2 (displaced)	Mason 3 (communited)	Mason 4 (fr dislocation)	Total
Excellent	4 (20%)	12 (60%)	0	16 (80%)
Good	1 (5%)	1 (5%)	2 (10%)	4 (20%)
Fair	0	0	0	0
Poor	0	0	0	0
Total	5 (25%)	13 (65%)	2 (10%)	20 (100%)

Table 6: Trauma–Surgery Interval vs Result (MEPS Category)

Result	0–7 days	8–14 days	15–21 days	Total
Excellent	16 (80%)	0	0	16 (80%)
Good	1 (5%)	2 (10%)	1 (5%)	4 (20%)
Fair	0	0	0	0
Poor	0	0	0	0
Total	17 (85%)	2 (10%)	1 (5%)	20 (100%)

Table 7: Complications vs Result (MEPS Category)

Result	Elbow Stiffness	PIN Palsy	Heterotopic Calcification	Capitohumeral Arthritis	Implant Loosening	Infection	No Complication	Total
Excellent	1 (5%)	0	0	0	0	0	15 (75%)	16 (80%)
Good	3 (15%)	0	0	0	0	0	1 (20%)	4 (20%)
Fair	0	0	0	0	0	0	0	0
Poor	0	0	0	0	0	0	0	0
Total	4 (20%)	0	0	0	0	0	16 (80%)	20(100%)

DISCUSSION

The present study evaluated determinants of early outcome after radial head arthroplasty with particular focus on Mason type and trauma-to-surgery interval in 20 patients treated through the Kocher approach. Overall, the cohort was relatively young and predominantly male, with 50% of patients in the 31–40-year age group and 80% being male. This pattern mirrors the epidemiology of radial head fractures reported in larger studies, where Swensen et al. (2019) described a mean patient age in the mid-40s and a predominance of active, working-age adults sustaining these injuries, often following low-energy falls.[8]

Functional outcomes in this study were excellent overall, with 80% of patients achieving an excellent Mayo Elbow Performance Score (MEPS) and the remaining 20% classified as good at 6-month follow-up. No fair or poor outcomes were observed. These results compare favourably with those reported by Kadam et al. (2017), who evaluated 18 patients with isolated radial head fractures treated with radial head replacement and found 72.2% excellent, 16.6% good and 11.1% fair outcomes with a mean MEPS of 88.3 at final follow-up.[9]

Although follow-up in the present study was limited to the short term (6 months), the high rate of excellent and good outcomes is in line with mid- to long-term studies of modular metallic radial head prostheses. Marsh et al. (2016) reported on 55 patients treated acutely with smooth-stem modular implants, showing a mean MEPS of 91 after a mean 8-year follow-up and sustained good or excellent function in the majority of patients.[10]

The influence of fracture pattern on outcome was a key focus of this study. In our cohort, Mason Type 3 fractures (comminuted) still achieved excellent outcomes in 12 of 13 patients, with only one patient graded as good, whereas Mason Type 2 fractures produced 4 excellent and 1 good result. In contrast, both patients with Mason Type 4 fracture-dislocations achieved only good, but not excellent, MEPS scores. This trend is consistent with the short-term study of Mason Type 3 and 4 fractures treated by radial head arthroplasty reported by Ganai et al. (2021), who found that most patients attained excellent or good MEPS scores, but more complex

injury patterns were associated with slightly lower functional grades and occasional fair outcomes.[11]

Timing of surgery emerged as another important determinant of result. In the present study, 17 patients (85%) underwent surgery within 7 days of trauma; 16 of these achieved excellent outcomes and one had a good outcome. In contrast, all three patients operated after one week (2 between 8–14 days and 1 between 15–21 days) had only good results, with none reaching the excellent category. Although numbers are small, this pattern suggests that delaying arthroplasty beyond the first week may reduce the probability of an excellent MEPS, possibly due to increasing soft-tissue scarring and stiffness. Our findings align with the prospective uncemented prosthesis study by Shankar et al. (2021), who treated acute Mason Type III fractures and reported 83.3% excellent, 13.3% good and 3.3% fair outcomes at 24 weeks, emphasizing early surgery and mobilization as key contributors to favourable recovery.[12]

The relationship between trauma-to-surgery interval and outcome is further supported by long-term data. Chen et al. (2018) studied 32 patients undergoing modular metal radial head replacement with a mean follow-up of 8.9 years and found that 26 patients achieved good or excellent MEPS results (mean MEPS 83.4). Importantly, they demonstrated significantly better functional scores when radial head replacement was performed as the primary procedure for acute fractures compared with delayed salvage after failed fixation or prolonged conservative treatment.[13]

All patients in this study were treated through the Kocher approach, and postoperative elbow stability was restored in 100% of cases, with no clinical instability at final follow-up. Our arc of motion was also favourable, with 80% of patients achieving >100° of flexion–extension arc and the remainder between 50° and 100°. These stability and motion profiles are comparable to those described by Doornberg et al. (2007), who evaluated 27 patients with traumatic elbow instability treated with modular metal radial head arthroplasty and reported restoration of stability in all elbows, a mean flexion arc of approximately 111°–137°, and good or excellent MEPS results in 22 of 27 patients.[14]

The complication profile in the current study was favourable: elbow stiffness was the only complication, occurring in 4 patients (20%), all of whom improved with physiotherapy; there were no cases of PIN palsy, heterotopic ossification, capitellar arthritis, implant loosening, or infection. These findings compare well with other studies of uncemented metallic radial head prostheses. In a prospective Indian study of uncemented metal radial head arthroplasty for Mason Type III fractures, Shankar et al. (2021) reported elbow stiffness in 16.7%, PIN palsy in 3.3% and heterotopic ossification in 6.7%, alongside an excellent–good rate of 96.6% at 24 weeks.[12]

Finally, when considering more complex injury patterns such as terrible triad injuries, our results limited to isolated radial head and neck fractures and fracture-dislocations represent a relatively favourable scenario. Mazhar et al. (2018) compared radial head resection with prosthetic arthroplasty in 44 terrible triad injuries and found no significant difference in mean MEPS between groups, with stable elbows at final follow-up but a notable incidence of radiographic osteoarthritis and heterotopic ossification in both cohorts.[15]

CONCLUSION

In this study, early outcomes after radial head arthroplasty were influenced primarily by fracture severity and the timing of surgical intervention. Patients with higher Mason types had comparatively reduced early functional scores, highlighting the impact of fracture complexity. A shorter trauma-to-surgery interval was associated with better early recovery and fewer postoperative limitations. Overall, timely surgical management and accurate assessment of fracture type are key determinants of optimal early outcomes following radial head arthroplasty using the Kocher approach.

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