CASE REPORT

Sixty-nine-year follow-up of a McKee radial head arthroplasty

Paul M. Robinson, FRCS (Tr&Orth)*, Peter Chapman, FRCS (Orth)

Department of Trauma and Orthopaedics, Norfolk and Norwich University Hospitals NHS Foundation Trust, Norwich, UK

Radial head arthroplasty has developed into a reliable treatment of degenerative joint disease, comminuted radial head fractures, and complex elbow and forearm injuries. We report a previously unknown radial head implant, designed and implanted by Kenneth McKee in 1944, in what we believe to be the longest follow-up report of any radial head prosthesis.

Case

An 89-year-old woman presented to the emergency department in April 2013 after falling and sustaining injuries to her left shoulder and elbow. On examination, the elbow was bruised and painful, with minor soft tissue swelling. There was a well-healed surgical scar on the lateral aspect of the elbow. Radiographs revealed a fracture of the left proximal humerus and degenerative changes in the left elbow with a radial head prosthesis in situ (Fig. 1). The prosthesis appeared loose with some fragmentation. The patient was managed conservatively with a broad-arm sling and advice to mobilize the elbow as her pain allowed. The elbow pain subsequently settled.

On further questioning in the fracture clinic, it transpired that at the age of 20 years, the patient had fallen from a bicycle during the Second World War, in 1944, suffering a closed fracture of the left radial head. The elbow was not dislocated. She was seen at the Norfolk and Norwich Hospital on the following day, where the diagnosis was confirmed with radiographs. The patient was operated on 1 day later by the orthopedic surgeon Mr. Kenneth McKee, who implanted an “experimental” radial head prosthesis that he himself had designed. The patient made an uneventful recovery and states that she had no further problems with the elbow.

The patient recalled experiencing a brief episode of pain in the elbow in 1973, and a radiograph of the elbow was performed in July of the same year (Fig. 2). She saw Mr. McKee at the time and on his advice went on holiday as planned and “swam every day in the sea.” Each day, her elbow symptoms improved, and by the end of the holiday, the pain had resolved completely. She had no further discomfort from the elbow until her fall almost 40 years later.

The patient was reviewed in our clinic in September 2013, at which time the elbow was asymptomatic and her discomfort had resolved. On examination of the elbow, there was 30° of fixed flexion, and she could flex the elbow up to 140°. She had full pronation, and she lacked the last 50° of supination. All of these movements were pain free. She had 150° of elevation of the ipsilateral shoulder. The patient was still living independently and mobilizing with the use of a frame. Her Disabilities of the Arm, Shoulder, and Hand (DASH) score was 32, and her Oxford elbow score was 47. She was discharged from the clinic at that time.

Discussion

There are few long-term follow-up studies of radial head arthroplasty. A systematic review of the literature found 21 level IV studies, none of which performed survivorship analysis.8 One of the studies with the longest follow-up is that of Harrington et al,3 which described 20 patients who
had undergone titanium radial head arthroplasty for fractures associated with elbow instability. The mean follow-up was 12.1 years, ranging from 6 to 29 years.

Historically, the indication for a radial head “cap” was to prevent heterotopic ossification. Speed published the earliest account of radial head arthroplasty in 1941. The indication gradually changed, and Carr and Howard were the first to discuss arthroplasty in the context of elbow stability. A variety of materials have been used with varying degrees of success. These include metals (copper, Vitallium, cobalt chromium, and titanium), acrylic resin, silicone rubber, and pyrocarbon.

G. K. McKee CBE was appointed consultant orthopaedic surgeon at the Norfolk and Norwich Hospital in 1939. He worked with an engineering firm in Norwich designing implants that would later evolve into the pioneering McKee-Farrar total hip replacement. However, little is known about the other implants that he designed and used in clinical practice. He is known to have designed and implanted prostheses for other joints, including a total elbow replacement.

We were previously unaware of the existence of the radial head prosthesis described in this report, and we do not know how many were actually implanted. Unfortunately, there are no other records of the implant in existence because of its age and the loss of medical records from that era. We hypothesize that the radial head prosthesis was made from the metal alloy Vitallium, as this was the material of the McKee-Farrar total hip replacement. At the time of surgery, Mr. McKee informed the patient that this was an experimental procedure and he was unable to predict the outcome. Although the procedure was clinically successful, the radiographic appearances are those of a failing prosthesis, with loosening and migration of the implant. However, it is recognized that radiographic degenerative change is not always clinically apparent in some individuals.

**Conclusion**

We have reported a 69-year clinical and radiologic follow-up of a previously unknown radial head prosthesis. Clinically, the implant was successful; however, it showed radiologic signs of failure.

**Disclaimer**

The authors, their immediate families, and any research foundation with which they are affiliated have not received any financial payments or other benefits from any commercial entity related to the subject of this article.
References