Reverse Total Shoulder Arthroplasty for Acute Proximal Humerus Fractures: Is Delay Associated with an Increased Rate of Reoperation?

Ujash Sheth[1], Jimmy Tat, Michael Paterson[2], Deva Thiruchelvam, Diane Nam
[1]Sunnybrook Health Sciences Centre, University of Toronto, [2]ICES

INTRODUCTION:

There has been an exponential increase in the use of reverse total shoulder arthroplasty (RTSA) for the treatment of proximal humerus fracture (PHFs) in the United States. The use of RTSA as a salvage procedure following failed internal fixation and hemiarthroplasty for PHFs has also been on the rise. There is now emerging evidence that performing a RTSA acutely may result in superior clinical outcomes when compared to RTSA as a salvage procedure following failed management of a PHF. Studies have found acute RTSA to be associated with higher tuberosity healing rates, greater range of motion, and superior functional outcomes compared to treatment with secondary RTSA after initial management with internal fixation. However, there is a lack of consensus regarding optimal timing to perform an acute RTSA for PHF before the risk of complications and reoperation rise, with the current literature varying between 2-, 4- and 6- weeks.

METHODS:

A population-based study was performed utilizing administrative healthcare data from Ontario, Canada. All adults, 50 years of age and older in our geographical health region of over 14 million people who sustained a PHF between April 1, 2004 and March 31, 2019 were identified. The patients were followed for subsequent RTSA within one year of the PHF. To ensure that none of the RTSAs in the delayed treatment were salvage procedures for other failed operative treatments, patients who underwent prior operative treatment before RTSA, including open reduction internal fixation (ORIF) and hemiarthroplasty, were excluded from this study. Other exclusion criteria included polytrauma patients, open fractures, non-Ontario residents, and an invalid or missing identifier (i.e., record number). The primary outcome of the study was reoperation at two years following RTSA. A risk-adjusted, restricted cubic spline was used to model the probability of reoperation according to the time elapsed between injury and RTSA to identify a critical time point at which the risk of complication (and subsequent reoperation) significantly increased.

RESULTS:

A total of 914 patients with a mean age of 72.5 (range, 50-98) underwent RTSA for PHF during the study period. The majority of patients were female (82.2%). The mean time from fracture to surgery was 45.7 days (range, 0-357). The rate of reoperation in this cohort was 5.1%. The odds of reoperation increased with a delay to RTSA greater than 28 days, at which point, the odds of reoperation continued to rise until it plateaued at 100 days post-fracture (Figure 1). Among the 687 patients who underwent RTSA 28 days after PHF the odds of reoperation at 2-years were found to be significantly higher than the patients undergoing RTSA within 28 days of injury (OR 1.95; 95% CI, 1.06-3.59, $P = 0.03$).

DISCUSSION AND CONCLUSION:

Among patients undergoing RTSA for acute PHFs, a delay to surgery greater than 28 days is associated with a greater odds of reoperation at two-years. In order to realize the reported benefits associated with acute RTSA in the fracture setting, a critical threshold of 28 days may be utilized to define higher risk when counselling patients and evaluating the risk-benefit profile during the shared decision-making process regarding treatment of acute PHFs.