Concentric versus eccentric humeral tray options in reverse total shoulder arthroplasty: Comparison with short-term functional and radiological outcomes

YOUNGKI MIN¹, Seok Won Lee, Hyeon Jang Jeong¹, Dongho Lee¹, Hyungki Cho¹, Kyu Ho Lee¹, Joo Han Oh¹ ¹Seoul National University Bundang Hospital

INTRODUCTION: Recently, a medialized offset eccentric humeral tray was introduced to overcome the complications based on excessive humeral lateralization after reverse total shoulder arthroplasty (RTSA). However, the functional outcomes of eccentric trays compared to conventional concentric trays are still insufficiently validated. Therefore, this study aimed to compare the functional outcomes of RTSA between medialized offset eccentric and conventional concentric humeral trays.

METHODS:

We retrospectively reviewed 182 patients who underwent RTSA between September 2017 and March 2022 with a single type of lateralized glenoid, lateralized humerus RTSA with adjustable tray options. Since the eccentric tray became available for use in December 2019, patients before (early period) and after this date (late period) were divided into four groups based on the study period and humeral tray options; Groups EE (early period, appropriate for eccentric tray but not applied), EC (early period, concentric tray), LE (late period, eccentric tray), and LC (late period, concentric tray). Tray options were selected by the senior author based on clinical symptoms, including eccentric for pseudoparalysis and concentric for positive external rotation lag sign, and several radiological parameters (eccentric for critical shoulder angle lea than 32° and eccentric fir center to acromial distanace more than 1.4cm). Functional and radiological outcomes were compared between four groups.

RESULTS:

Compared to group EE, group LE exhibited improvements in forward flexion (LE vs. EE 144.2° \pm 8.8 vs. 134.3° \pm 14.1, p < 0.001) and acromiohumeral distance (38.0 \pm 4.0 mm vs. 29.0 \pm 5.0 mm, p < 0.001), along with reduced humerus lateralization (15.0 \pm 4.0 mm vs. 19.0 \pm 5.0 mm, p = 0.001). Meanwhile, the functional and radiological outcomes of group LC were not different from those of group EC (all p. > 0.05). Notably, subacromial erosion was exclusively observed in group EE (5.4%, 2/37).

DISCUSSION AND CONCLUSION:

To achieve favorable outcomes and avoid postoperative complications, the mediolateral offset of the humeral tray for lateralized RTSA should be selected based on a comprehensive consideration of clinical symptoms and anatomical characteristics of individual patients.