

- Abstract No. : F-0113
- Category : Shoulder
- Detail Category : arthroplasty

Three-dimensional postoperative assessment and short-term clinical outcomes of navigation-assisted versus conventional reverse shoulder arthroplasty

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Introduction and Background

Accurate implant positioning is essential for achieving favorable clinical outcomes and long-term durability in reverse shoulder arthroplasty (RSA). This study aimed to three-dimensionally evaluate glenoid component positioning in navigation-assisted and non-assisted RSA, and to compare short-term clinical outcomes between the two groups.

Material and Method

Forty-nine shoulders in 49 patients who underwent RSA between August 2017 and June 2021 with a minimum of 2-year follow-up were retrospectively analyzed. The mean age was 77 years (range, 65–90), and all received the EQUINOXE system. The planned intraoperative orientation of the glenoid component was 0° of glenoid version (GV) and 0° of glenoid inclination (GI). Navigation was used in 29 shoulders (N group), whereas a drill guide was used in 20 shoulders (C group). Postoperative CT scans were assessed using ZedShoulder software to quantify GV and GI, and the deviation from the planned orientation was compared. Clinical outcomes at 2 years postoperatively included active range of motion, Constant score (CS), ASES score (ASES), and pain VAS. Statistical analyses were performed using the Mann–Whitney U test and Welch’s t-test with a significance level of 5%.

Results

The deviation in GV was significantly smaller in the N group than in the C group ($3.2 \pm 2.4^\circ$ vs $6.3 \pm 5.6^\circ$, $P = 0.027$). The deviation in GI was also significantly smaller in the N group ($2.5 \pm 2.1^\circ$ vs $6.1 \pm 4.3^\circ$, $P = 0.0019$). The proportion of shoulders with both GV and GI within 5° of the planned target was significantly higher in the N group (76% vs 20%, $P = 0.00037$). However, no significant differences were observed between groups in clinical outcomes at 2 years.

Conclusions

Navigation-assisted RSA demonstrated more accurate and less variable glenoid component positioning on three-dimensional postoperative evaluation compared with conventional RSA, although short-term clinical outcomes were equivalent. Longer-term follow-up is warranted to clarify whether improved positioning translates to superior functional outcomes.

