Central Peg Osteolysis in Anatomic Shoulder Arthroplasty: Associated Factors and Clinical Significance at Mean 7-Year Radiographic Follow-Up

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INTRODUCTION: Despite reliable short- and mid-term pain relief and functional improvement after anatomic total shoulder arthroplasty, polyethylene glenoid loosening after anatomic total shoulder arthroplasty is a common finding. A fluted central peg is a common design type in polyethylene glenoid components, but mid- and long-term radiographic results are infrequently reported. Therefore, the objectives of this study were: 1) to report mid-term radiographic findings with a fluted central peg component, 2) to determine factors associated with central peg osteolysis at mid-term follow-up, and 3) to compare patient-reported outcomes in those patients with and without central peg osteolysis.

METHODS: This study analyzed consecutive patients that had undergone anatomic total shoulder arthroplasty (TSA) performed with a fluted central peg glenoid polyethylene component with minimum 4-year radiographic follow-up. Demographic and patient characteristics were collected pre-operatively. Preoperative radiographic variables included Walch classification, glenoid retroversion, humeral glenoid alignment in the axial anterior-posterior plane (HGA-AP), and humeral scapular alignment in the axial anterior-posterior plane (HSA-AP). Postoperatively, glenoid component retroversion, HGA-AP, HSA-AP, humeral glenoid alignment in the coronal superior-inferior plane (HGA-SI), and central peg osteolysis. Central peg osteolysis was graded as 1 (central peg osteolysis), 2 (bone growth to edge of flanges), 3 (growth within flanges). VAS pain, Simple Shoulder Test (SST), and American Shoulder and Elbow Surgeons (ASES) scores were collected. Patients with grade 1 central peg osteolysis were compared to patients with grade 2 or 3.

RESULTS: A total of 109 patients were included in the study. The average was 65 ± 10 years, and 42% were male. The radiographic follow-up (minimum 4-year) was 6.8 ± 2.1 years. 24 patients (22%) were found to have CPO at latest follow-up. When comparing patients with and without CPO, age (p=0.935), sex (p=0.933), BMI (p=0.676) were similar. There were no significant differences in preoperative Walch classification (p=0.743), glenoid retroversion (p=0.607), HGA-AP (p=0.960), and HSA-AP (p=0.822). Postoperative component retroversion (p=0.773), HGA-AP (p=0.240), HSA-AP (p=0.292), HGA-SI (p=0.080) were also similar between groups. Preoperative VAS pain was higher in patients in the CPO group (CPO 7.4 ± 1.8 vs. No CPO 6.2 ± 2.0, p=0.023), but preoperative SST scores were similar (CPO 3.3 ± 2.4 vs No CPO 3.8 ± 2.6, p=0.438). Postoperative SST scores (CPO 9.3 ± 3.5 vs No CPO 9.2 ± 2.5, p=0.896), VAS pain (CPO 2.4 ± 3.4 vs. No CPO 1.6 ± 2.1, p=0.392), and ASES scores (CPO 81 ± 25 vs No CPO 85 ± 16, p=0.584) were similar between groups.

DISCUSSION AND CONCLUSION: At a mean of 7 years of radiographic follow-up, 22% of patients developed CPO. There were no patient demographic or radiographic characteristics (component retroversion, humeral-glenoid alignment) that associated with development of CPO. Patient-reported outcomes were similar between groups as well. At mid-term follow-up, the clinical significance of CPO is unclear.