Does the polyethylene glenoid fixation design change the rate of revision of anatomic shoulder arthroplasty?

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¹Australian Orthopaedic Association National Joint, ²AOANJRR, ³St. John of God Hospital/Deakin University INTRODUCTION:

We compare the rate revision of 3 polyethylene glenoid fixation designs in anatomic total shoulder arthroplasty (aTSA) for osteoarthritis (OA).

METHODS: A large national arthroplasty registry identified three cohort groups of polyethylene glenoid fixation designs (glenoid types) of aTSA, cemented all polyethylene glenoids (CPG), polyethylene glenoids with modified central pegs (MCPG) and non-modular metal backed glenoids (NMBG) undertaken for OA between 1st January 2008 and 31st December 2022. The cumulative percent revision (CPR) was determined using Kaplan-Meier estimates of survivorship and hazard ratios (HR) from Cox proportional hazard models adjusted for age, gender, humeral head size, humeral fixation, polyethylene type, primary type (stemmed or stemless), and mean surgeon volume. Possible interactions between the type of glenoid and patient and prosthesis factors were also examined. From 1 January 2017 sub-analysis captured additional patient demographics including ASA score, BMI and glenoid morphology. RESULTS:

Of 8,765 aTSA the CPR at 7 years for CPG (n=5,115) was 5.1%(95% confidence interval (CI)4.3, 5.9), 4.0%(95%CI 2.9, 5.6) for MCPG (n=1,927) and 7.6%(95%CI 6.0, 9.6) for NMBG(n=1,723). Comparing aTSA with MCPG, both CPG and NMBG revision rates were increased (MCPG vs CPG HR=0.66(95%CI 0.45, 0.96),p=0.032, NMBG vs MCPG 6 months+ HR=1.60(95%CI 1.01, 2.55),p=0.046 by multivariable adjustment). CPG had a lower revision risk compared to NMBG similarly adjusted (NMBG vs CPG) HR=1.41(1.06, 1.88),p=0.019. Glenoid type (CPG, MCPG, NMBG)p=0.002 and age (p=0.012) was associated with revision rates, but gender, primary type, (on sub-analysis) ASA, BMI and glenoid morphology did not.

DISCUSSION AND CONCLUSION:

aTSA undertaken with MCPG had a lower rate of revision than with other glenoid implants. Increasing age reinforced this difference. The polyethylene glenoid fixation design utilised in aTSA was a significant predictor of revision.