Factors Associated with Reoperation after Silicone Proximal Interphalangeal (PIP) Joint Arthroplasty

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Background: Joint diseases, such as inflammatory (IO), primary degenerative (DO) and posttraumatic osteoarthritis (TO) often affect the proximal interphalangeal (PIP) joints, impairing hand function. To preserve function along with pain relief, arthroplasty can be performed. Reported reoperation rates range from 0% to 26% and complications, such as implant breakage (0–30%), dislocation (6–16%) and stiffness (4–20%) are often described. However, factors associated with reoperation are rarely reported. Therefore, the aim of this study was to identify factors associated with reoperation after silicone PIP arthroplasty.

Materials and Methods: We retrospectively identified patients that underwent PIP silicone arthroplasty using Current Procedural Terminology and International Classification of Diseases procedure codes. We included all adult patients that underwent primary PIP arthroplasty at one of our hospitals in the Northeastern United States between 2002 and 2016. After patient verification through manual chart review we included 91 patients that underwent 114 PIP arthroplasties. Digits operated included 14 (12%) index, 41 (36%) middle, 38 (33%) ring and 21 (18%) small fingers. The most common preoperative diagnosis was TO in 35 (39%) patients, DO in 32 (35%) patients and 23 (25%) with IO. We evaluated the patient-, treatment- and radiographic parameters related factors associated with unplanned reoperation of the same PIP joint. All explanatory variables with a p-value <0.10 in bivariate analysis were included in a multivariable exact logistic regression.

Results: A reoperation was performed in 16 (14%) of the fingers, in 16 (18%) of the patients, at a median of 0.46 years (IQR: 0.38–0.90). Indications for reoperation were stiffness (n=12, 75%), implant breakage (n=2, 13%), Boutonniere deformity (n=1, 6.3%) and collateral ligament rupture (n=1, 6.3%). Reoperations included tenolysis (n=5, 46%), revision arthroplasty (n=4, 25%), collateral ligament reconstruction (n=3, 19%), arthrodesis (n=1, 6.3%), amputation (n=1, 6.3%), excision of heterotopic bone (n=1, 6.3%) and capsulectomy (n=1, 6.3%). In multivariable analysis post-traumatic osteoarthritis (Odds ratio: 14.6, p=0.0055) and PIP silicone arthroplasty of the index finger (Odd ratio:16.6, p=0.012) were independently associated with reoperation. We failed to find an association between radiographic joint incongruency, bone erosion or implant breakage with reoperation.

Conclusion: The reoperation rate after silicone PIP arthroplasty was 14% and mostly occur within 12 months after index surgery. The leading cause for reoperation was joint stiffness. The association of post-traumatic osteoarthritis and arthroplasty of the index finger with reoperation suggest that silicone PIP arthroplasty for the index finger should be approached with caution.