

Synthetic Mesh Improves Shoulder Function After Intraarticular Resection and Prosthetic
Replacement of Proximal Humerus

Xiaodong Tang MD, Wei Guo MD, PhD, Rongli Yang MD, Shun Tang MD, Tao Ji MD

Peking University People's Hospital

Abstract

Background Shoulder function often is limited after tumor resection and endoprosthetic replacement of the proximal humerus. This is partly attributable to the inability to reliably reattach rotator cuff tendons to the prosthesis and achieve adequate shoulder capsule repair with a metallic prosthesis. An option to attain these goals is to use synthetic mesh for the reconstruction, although the value of this method has not been well documented in the literature.

Questions/purposes We asked whether patients who had shoulder reconstruction using synthetic mesh had (1) better shoulder function; (2) improved ROM compared with shoulder reconstructions without mesh; and (3) more stable joints compared with those in patients with similar resections who had reconstructions without synthetic mesh.

Methods During a 5-year period, we performed 41 intraarticular resections with endoprosthetic reconstructions for malignancies in the proximal humerus meeting specified criteria to generate similarity in the study groups. Twelve patients (29%) were lost to followup before 24 months, leaving 29 patients available for review at a mean of 45 months (range, 24–70 months). This retrospective study compared 14 patients with soft tissue reconstruction that included synthetic mesh with 15 patients with soft tissue reconstruction without the use of synthetic mesh. The choice was made during consultation between the patient and surgeon, after reviewing the perceived advantages and

disadvantages of each approach. A tumor band (ligament advanced reinforcement system) was used as synthetic mesh and wrapped around the prosthesis of the proximal humerus for soft tissue reconstruction in the reconstruction-with-mesh group. Study endpoints included the Musculoskeletal Tumor Society (MSTS) function scores, American Shoulder and Elbow Surgeons (ASES) score, shoulder ROM, and proximal migration of the humeral prosthesis.

Results The mean MSTS score for patients without synthetic mesh reconstruction was 20 ± 3 points (66%), whereas for patients with synthetic mesh reconstruction, the mean score was 24 ± 2 points (79%; $p = 0.001$). Patients with synthetic mesh reconstruction had a higher mean total ASES score (85 ± 1.1 points versus 72 ± 1.7 points; $p = 0.025$), and better function for activities of daily living. They also had better ROM on mean active forward flexion ($p = 0.020$), abduction ($p < 0.001$), and external rotation ($p < 0.001$) than patients without synthetic mesh reconstruction. Proximal migration of the prosthesis was observed in five of 15 of patients in the group without synthetic mesh reconstruction and in none of those treated with synthetic mesh ($p = 0.042$).

Conclusions Patients with intraarticular resection and endoprosthetic replacement of the proximal humerus with reconstruction that included synthetic mesh had better shoulder function and ROM, and more stable joints than patients who had reconstruction without synthetic mesh. This result supports prior observations by others and it remains to be shown whether use of the ligament advanced reconstruction system is superior to other types of mesh or other types of reconstructions. Further investigation is needed but our results indicate that using mesh should be considered for patients with tumor resection and endoprosthetic replacement of the proximal humerus.

Level of Evidence Level III, therapeutic study.