

## **Patient Reported Outcomes at Six Months Predict Two Year Outcomes and Healthcare Utilization Following Arthroscopic Rotator Cuff Repair**

Adam J McNulty, Adam Lutz, Charles A Thigpen, Ellen Shanley, Allison Avery Nall, John M Brooks, Stephan Geoffrey Pill, Michael John Kissenberth

### **INTRODUCTION:**

Rotator cuff tears are common, particularly in older populations, and are often treated with arthroscopic rotator cuff repair (RCR). While recovery can be prolonged, early functional outcomes are thought to predict long-term success. The American Shoulder and Elbow Surgeons Standardized Shoulder Assessment Form (ASES) is widely used to assess shoulder function, but its predictive value at 6 months postoperatively remains unclear. This study aims to determine whether ASES scores at 6 months can predict successful long-term outcomes at 2 years and assess its correlation with healthcare utilization.

### **METHODS:**

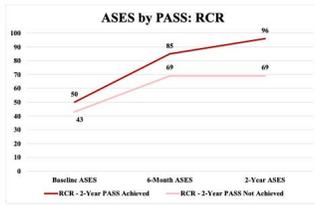
We examined patient reported outcomes (PROs) at 6 months to understand their predictive value for future PRO success and orthopaedic visit utilization. All patients who underwent RCR and had documented PRO data preoperatively, at 6 months, and at 2-years postoperatively were considered. These patients were linked to an Orthopaedic Patient Data Repository (OPDR) to determine their shoulder-related health system encounters in the first 2 years post-RCR. Encounters were summed between 6 months and 2 years and dichotomized into <2 versus 2 or more. A receiver operator curve (ROC) was used to establish a cut point of ASES at 6 months that predicted a successful outcome at 2 years, which was defined as a terminal ASES score  $\geq 86$ . Area under the curve (AUC) and the ASES cut score with 95% confidence intervals (CIs) were calculated. The lower bound of the CI was used as the ultimate cut point from which additional analyses were performed. Logistic regression, using this lower bound cut score, established odds ratios that a patient would attend 2 or more E&M visits and achieve a terminal ASES score  $\geq 86$  in the next 18 months. Significance was determined a priori at  $\alpha=0.05$ .

### **RESULTS:**

Three-hundred eighty (380) patients met the inclusion criteria of having all requisite information. A slight majority of patients were male (53%), and mean age was  $66.2 \pm 9.2$  years at the time of surgery. Mean pre-operative ASES was  $48.0 \pm 18.0$  and mean 2-year ASES was  $88.0 \pm 15.5$ . Seventy-two percent of patients achieved a successful 2-year ASES ( $\geq 86$ ). A ROC curve had an AUC of 0.773 and established a 6-month ASES score of 79.8 (95% CI 69.9, 84.9) as predictive of a successful 2-year outcome. Patients that failed to achieve the lower bound ASES at 6 months ( $\geq 70$ ) were 2.4 (95% CI: 1.4, 4.0) times more likely to have 2 or more shoulder-related encounters and 92% (95% CI: 85%, 96%) less likely to achieve a successful 2-year ASES ( $\geq 86$ ).

### **DISCUSSION AND CONCLUSION:**

Our findings indicate that patients who do not achieve an adequate 6-month ASES score of 70 are not as likely to achieve successful 2-year outcomes and 2.4 times more likely to require increased shoulder-related care over the following 18 months. These results align with previous studies demonstrating that the majority of functional improvement occurs within the first six months postoperatively and that the six-month timepoint is critical for identifying patients at risk of poor recovery and increased healthcare utilization. Early identification enables targeted interventions to optimize rehabilitation outcomes and reduce unnecessary healthcare resource use. Further research is needed to validate these findings and explore additional factors that may influence patient recovery and outcomes following RCR.



Patient Information	All & by 2-Year ASES PASS Status		p-value
	All	Not	
Count	302	294 (22%)	<0.001
Sex = Female	182 (60%)	126 (44%)	0.225
Age	60.2±9.1	64.4±9.6	<0.001
Pre-Op ASES	48.3±18.0	43.3±17.5	0.001
Pre-Op VR12 PCS*	36.6±8.1	34.9±8.1	0.012
Pre-Op VR12 PCS**	52.7±10.7	49.1±11.7	<0.001
Smoking Status = Not Current	19 (3%)	130 (11%)	0.068
Tear Size = Large/Massive	208 (52%)	61.6±11.5	0.655

\*Mean±SD \*\*Item General Health Survey \*\*Physical & \*\*Mental Component Score