Preoperative PROMIS Scores Predict Postoperative Outcome in Total Shoulder Arthroplasty Patients

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Disclosures

- Dr. Voloshin reports personal fees from Innomed, personal fees from Arthrex, personal fees from Smith & Nephew, personal fees from ZimmerBiomet, personal fees from Arthrosurface

- All other co-authors have nothing to disclose
Introduction

• PROMIS has been validated in patients with upper extremity disease, including glenohumeral arthritis
• The purpose of this study was to:
  • Describe PROMIS scores in total shoulder arthroplasty (TSA) patients
  • Determine if preoperative scores predict postoperative outcomes
  • Determine if PROMIS PF is responsive to changes in clinical shoulder ROM
Methods

- Patients s/p primary anatomic TSA over 2 year period
- PROMIS PF (physical function), PI (pain interference), D (depression)
- Preoperative PROMIS scores (within 60 days of surgery), postoperative PROMIS scores (>3 months after surgery)
- Exclusion criteria - reverse TSA, revision TSA
- Collected shoulder forward flexion (FF), external rotation (ER)
Methods and Statistics

- Accuracy analyses to determine ability of preop PROMIS scores to predict achievement of MCID in same domain
- AUCs (area under curve) determined for univariate and multivariate (incorporating age, gender, BMI, ASA class) models
Results

- 62 patients
- Mean preop (35 days before surgery), postop (285 days after surgery)
- Significant increase in PROMIS PF and decreases in PROMIS PI and D (all p<0.001)
- Significant improvements in FF and ER (both p<0.001)
- Multivariate model showed strong ability of preop PROMIS PF, PI and D to predict postop achievement of MCID in same domain
- AUCs 0.700, 0.867, 0.712, respectively, all p<0.001
- 90% cutoff values
### Results

#### Perioperative PROMIS Scores

<table>
<thead>
<tr>
<th>PROMIS Score (mean)</th>
<th>Preoperative</th>
<th>Postoperative</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>PF</td>
<td>40.4</td>
<td>44.1</td>
<td>+3.7</td>
</tr>
<tr>
<td>PI</td>
<td>61.2</td>
<td>52.6</td>
<td>-8.6</td>
</tr>
<tr>
<td>D</td>
<td>49.7</td>
<td>45.5</td>
<td>-4.2</td>
</tr>
</tbody>
</table>

#### 90% Cutoff Values

<table>
<thead>
<tr>
<th>PROMIS Score</th>
<th>90% MCID</th>
<th>90% No MCID</th>
</tr>
</thead>
<tbody>
<tr>
<td>PF</td>
<td>&lt;=31.7</td>
<td>&gt;=47.8</td>
</tr>
<tr>
<td>PI</td>
<td>&gt;=66.9</td>
<td>&lt;=55.1</td>
</tr>
<tr>
<td>D</td>
<td>&gt;=55.5</td>
<td>&lt;=41.0</td>
</tr>
</tbody>
</table>

#### Range of Motion Data

<table>
<thead>
<tr>
<th>Degrees of motion (mean)</th>
<th>Preoperative</th>
<th>Postoperative</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>FF</td>
<td>99.3</td>
<td>145.9</td>
<td>+46.6</td>
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<tr>
<td>ER</td>
<td>25.9</td>
<td>54.4</td>
<td>+28.5</td>
</tr>
</tbody>
</table>
Discussion

- TSA patients showed significant improvement in all PROMIS domains after surgery
- The multivariate model demonstrated that preoperative PROMIS PF, PI and D scores were all highly predictive of postoperative achievement of MCID
- PROMIS PF scores were responsive to clinical improvements in shoulder ROM
- The 90% T-Score cutoff values can be directly utilized by surgeon to identify patients with higher likelihood for poor outcomes
Conclusion

• PROMIS has rapidly been adopted in multiple orthopaedic clinical settings
• This study found that preoperative PROMIS scores have the ability to predict postoperative outcomes after primary anatomic TSA
• The reported PROMIS scores and 90% cutoff values provide a valuable tool for surgeons to better counsel patients on the expected outcomes after TSA
References


• Norman GR, Sloan JA, Wyrwich KW. Interpretation of changes in health-related quality of life: the remarkable universality of half a standard deviation. Med Care 2003;41(5):582-592.
