The Geriatric Nutritional Risk Index as a Prognostic Indicator for Shoulder Arthroscopy in the Elderly

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DISCLOSURES: We have nothing to disclose.

INTRODUCTION: Shoulder arthroscopy has gained popularity as a minimally invasive procedure capable of treating a wide spectrum of upper extremity pathology, particularly among the elderly. Malnutrition is an important preoperative risk factor to examine when considering surgical management for the older population, as it is frequently underdiagnosed and has been related to postoperative complications in geriatric patients. There are several diagnostic modalities for assessing malnutrition. Preoperative albumin levels are frequently used alone to assess nutrition status, though they are susceptible to insult from other conditions besides malnutrition. The Geriatric Nutrition Risk Index (GNRI) is a simple validated nutritional prognostic indicator that incorporates anthropometric values, including weight, ideal body weight, and serum albumin levels. The purpose of this study is to describe the relationship between preoperative GNRI and early postoperative complications following shoulder arthroscopy.

METHODS: The American College of Surgeons National Surgical Quality Improvement Program (NSQIP) database was used to identify all patients ≥ 65 who underwent shoulder arthroscopy between 2015 and 2021. Postoperative complications, patient demographics, and comorbidities were recorded. Preoperative GNRI was calculated through the use of body weight, ideal body weight, and serum albumin levels. The study population was then categorized into three cohorts of preoperative GNRI: normal/reference (GNRI > 98), moderate malnutrition (92 ≤ GNRI ≤ 98), and severe malnutrition (GNRI < 92). Bivariate logistic regression analysis was conducted to determine significant patient comorbidities and demographics associated with moderate and severe malnutrition. Multivariate logistic regression analysis was then conducted to determine the postoperative complications that were independently associated with malnutrition.

RESULTS: Following exclusion criteria, 10,738 cases remained in this study: 9,017 in the normal group, 1,339 in the moderate malnutrition group, and 387 in the severe malnutrition group. We controlled for significantly associated patient demographics and comorbidities, finding that moderate malnutrition had a higher likelihood of any complications (odds ratio [OR] 1.84, 95% confidence interval [CI] 1.40-2.42; P < 0.001), sepsis (OR 3.75, 95% CI 1.30-10.86; P = 0.015), non-home discharge (OR 2.09, 95% CI 1.21-3.61; P = 0.008), readmission (OR 1.66, 95% CI 1.09-2.52; P = 0.017), unplanned reoperation (OR 4.23, 95% CI 1.82-9.84; P < 0.001), and length of stay > 2 days (OR 2.37, 95% CI 1.59-3.55; P < 0.001). Severe malnutrition was independently associated with a greater likelihood of any complication (OR 11.70, 95% CI 8.58-15.94; P < 0.001), sepsis (OR 26.61, 95% CI 10.86-65.21; P < 0.001), septic shock (OR 7.53, 95% CI 1.56-36.32; P = 0.012), blood transfusions (OR 25.38, 95% CI 6.40-100.59; P < 0.001), pulmonary embolism (OR 7.25, 95% CI 1.27-41.40; P = 0.026), surgical site infection (OR 22.08, 95% CI 7.51-64.97; P < 0.001), non-home discharge (OR 15.75, 95% CI 9.83-25.23; P < 0.001), readmission (OR 2.69, 95% CI 1.52-4.74; P < 0.001), unplanned reoperation (OR 6.32, 95% CI 2.23-17.92; P < 0.001), length of stay > 2 days (OR 23.66, 95% CI 16.25-34.45; P < 0.001), and mortality (OR 14.25, 95% CI 2.89-70.40; P = 0.001).

DISCUSSION: A higher degree of malnutrition assessed by GNRI was independently associated with a greater rate of 30-day complications following shoulder arthroscopy. Through its capability of predicting postoperative complications, our findings support the use of GNRI to preoperatively to risk-assess geriatric surgical patients. As a greater number of elderly patients undergo shoulder arthroscopy, recognizing and addressing the impact of malnutrition may allow for improved postoperative outcomes, quality of life, and patient satisfaction. The use of the NSQIP database allowed this study to examine a robust sample size, though we were limited by the 30-day window of recorded complications.

SIGNIFICANCE/CLINICAL RELEVANCE: The use of GNRI can serve as a useful tool when assessing geriatric surgical patients for malnutrition and may encourage preoperative interventions that can improve outcomes and reduce the risk of complications.

TABLES:

Table I. Multivariate analysis of 30-day postoperative complications in patients with preoperative normal GNRI, moderate malnutrition, and severe malnutrition. Dashes represent associations not significant in bivariate analysis and were not included in multivariate analysis. Bold P values indicate statistical significance with P < 0.05.

<table>
<thead>
<tr>
<th>Complication</th>
<th>Moderate malnutrition</th>
<th>Severe malnutrition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any complication</td>
<td>1.84, &lt;0.001 (1.40-2.42)</td>
<td>11.70, &lt;0.001 (8.58-15.94)</td>
</tr>
<tr>
<td>Sepsis</td>
<td>3.75, 0.015 (1.30-10.86)</td>
<td>26.61, &lt;0.001 (10.86-65.21)</td>
</tr>
<tr>
<td>Septic shock</td>
<td>--</td>
<td>7.53, 0.012 (1.56-36.32)</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>--</td>
<td>2.72, 0.153 (0.69-10.75)</td>
</tr>
<tr>
<td>Cardiac arrest/myocardial infarction</td>
<td>--</td>
<td>2.44, 0.335 (0.40-14.91)</td>
</tr>
<tr>
<td>Stroke</td>
<td>--</td>
<td>3.41, 0.167 (0.60-19.44)</td>
</tr>
<tr>
<td>Blood transfusions</td>
<td>--</td>
<td>25.38, &lt;0.001 (6.40-100.59)</td>
</tr>
<tr>
<td>Deep vein thrombosis</td>
<td>--</td>
<td>7.25, 0.026 (1.27-41.40)</td>
</tr>
<tr>
<td>Pulmonary embolism</td>
<td>--</td>
<td>3.36, 0.095 (0.81-13.93)</td>
</tr>
<tr>
<td>On ventilator &gt; 48 hours</td>
<td>--</td>
<td>22.08, &lt;0.001 (7.51-64.97)</td>
</tr>
<tr>
<td>Surgical site infection</td>
<td>--</td>
<td>4.64, 0.084 (0.81-26.42)</td>
</tr>
<tr>
<td>Clostridiodes difficile infection</td>
<td>--</td>
<td>5.73, 0.177 (0.46-72.01)</td>
</tr>
<tr>
<td>Non-home discharge</td>
<td>2.09, 0.008 (1.21-3.61)</td>
<td>15.75, &lt;0.001 (9.83-25.23)</td>
</tr>
<tr>
<td>Readmission</td>
<td>1.66, 0.017 (1.09-2.52)</td>
<td>2.69, &lt;0.001 (1.52-4.74)</td>
</tr>
<tr>
<td>Unplanned reoperation</td>
<td>4.23, &lt;0.001 (1.82-9.84)</td>
<td>6.32, &lt;0.001 (2.23-17.92)</td>
</tr>
<tr>
<td>Length of stay &gt; 2 Days</td>
<td>2.37, &lt;0.001 (1.59-3.55)</td>
<td>23.66, &lt;0.001 (16.25-34.45)</td>
</tr>
<tr>
<td>Mortality</td>
<td>--</td>
<td>14.25, 0.001 (2.89-70.40)</td>
</tr>
</tbody>
</table>

GNRI, Geriatric Nutritional Risk Index; OR, odds ratio; CI, confidence interval.

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