

Does the Geriatric Nutritional Risk Index Predict Complication Rates and Implant Survivorship in Primary Total Joint Arthroplasty?

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INTRODUCTION:

Malnutrition is associated with poorer outcomes after primary total joint arthroplasty (TJA), though no universal metric for assessing malnutrition in TJA patients has been reported. This study sought to determine if malnutrition as defined by the Geriatric Nutritional Risk Index (GNRI) can independently predict complication rates and reoperation risk in TJA patients.

METHODS:

All patients ≥ 65 years old undergoing TJA from 2011 to 2021 at a single high-volume orthopaedic specialty hospital were identified. Preoperative albumin, height, and weight were used to calculate GNRI. Patients were stratified into three groups: normal nutrition (GNRI >98), moderate malnutrition (GNRI=92-98), and severe malnutrition (GNRI <92).

RESULTS:

A total of 3,089 TJA patients were included in the analysis. Patients with normal nutrition were younger ($p<0.001$), had a higher BMI ($p<0.001$), and were less likely to have a preoperative albumin <3.5 g/dL ($p<0.001$). Patients with malnutrition had higher rates of discharge to acute rehabilitation centers (severe malnutrition: 17.9%, moderate malnutrition: 11.3%, normal nutrition: 3.9%, $p<0.001$) and trended toward a longer LOS (3.60 \pm 1.56 vs. 2.82 \pm 1.75 vs. 2.73 \pm 1.81 days, $p=0.051$). Major complication, 90-day readmission, and 90-day revision rates were also similar between groups. In Kaplan-Meier analysis, 1-year and 2-year survivorship did not significantly differ between groups. In subgroup analysis of total hip arthroplasty (THA) cases, severe malnutrition was associated with longer operative time (100.8 \pm 44.3 vs. 88.4 \pm 27.3 vs. 99.7 \pm 29.7 minutes, $p=0.037$) and LOS (3.73 \pm 1.75 vs. 2.85 \pm 1.57 vs. 2.66 \pm 1.97 days, $p=0.042$) as compared to moderate and normal nutrition. In the THA cohort, complication rates and implant survivorship were similar between groups.

DISCUSSION AND CONCLUSION: Malnutrition, as defined by GNRI, was not associated with higher complication and revision rates in TJA patients. However, patients with malnutrition did have longer hospital stays and higher rates of discharges to rehabilitation centers. Further studies are needed to ascertain effective screening tools for nutrition in patients undergoing TJA.

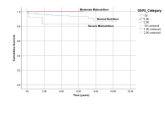
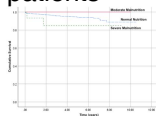


Table 1. Demographic characteristics of included patients.

Characteristic	Normal Nutrition (GNRI > 98)	Moderate Malnutrition (GNRI = 92-98)	Severe Malnutrition (GNRI < 92)	P-value
Total Patients	1,021	1,021	1,047	
Age (mean \pm SD)	68.2 \pm 7.1	71.5 \pm 6.8	73.1 \pm 6.5	<0.001
Female (%)	52.1	51.8	51.5	0.912
Preoperative Albumin (g/dL)	3.8 \pm 0.2	3.5 \pm 0.3	3.2 \pm 0.4	<0.001
BMI (kg/m ²)	28.5 \pm 4.2	26.8 \pm 4.1	25.9 \pm 4.0	<0.001
LOS (days)	2.73 \pm 1.81	2.82 \pm 1.75	3.60 \pm 1.56	0.051
Discharge to Rehabilitation (%)	3.9	11.3	17.9	<0.001

Table 2. Inpatient clinical outcomes stratified by GNRI.

Outcome	Normal Nutrition (GNRI > 98)	Moderate Malnutrition (GNRI = 92-98)	Severe Malnutrition (GNRI < 92)	P-value
Major Complication (%)	12.1	11.8	12.5	0.876
90-day Readmission (%)	8.5	8.2	8.9	0.712
90-day Revision (%)	1.2	1.1	1.3	0.634
Discharge to Rehabilitation (%)	3.9	11.3	17.9	<0.001
LOS (days)	2.73 \pm 1.81	2.82 \pm 1.75	3.60 \pm 1.56	0.051

Table 3. Long-Term Clinical Outcomes for patients undergoing total hip arthroplasty.

Outcome	Normal Nutrition (GNRI > 98)	Moderate Malnutrition (GNRI = 92-98)	Severe Malnutrition (GNRI < 92)	P-value
1-year Survivorship (%)	98.5	98.2	98.1	0.912
2-year Survivorship (%)	97.8	97.5	97.4	0.876
90-day Revision (%)	1.2	1.1	1.3	0.634
Discharge to Rehabilitation (%)	3.9	11.3	17.9	<0.001
LOS (days)	2.73 \pm 1.81	2.82 \pm 1.75	3.60 \pm 1.56	0.051

Table 4. Short-Term Clinical Outcomes for patients undergoing total hip arthroplasty.

Outcome	Normal Nutrition (GNRI > 98)	Moderate Malnutrition (GNRI = 92-98)	Severe Malnutrition (GNRI < 92)	P-value
Major Complication (%)	12.1	11.8	12.5	0.876
90-day Readmission (%)	8.5	8.2	8.9	0.712
90-day Revision (%)	1.2	1.1	1.3	0.634
Discharge to Rehabilitation (%)	3.9	11.3	17.9	<0.001
LOS (days)	2.73 \pm 1.81	2.82 \pm 1.75	3.60 \pm 1.56	0.051

Table 5. Long-Term Clinical Outcomes of patients undergoing total hip arthroplasty.

Outcome	Normal Nutrition (GNRI > 98)	Moderate Malnutrition (GNRI = 92-98)	Severe Malnutrition (GNRI < 92)	P-value
1-year Survivorship (%)	98.5	98.2	98.1	0.912
2-year Survivorship (%)	97.8	97.5	97.4	0.876
90-day Revision (%)	1.2	1.1	1.3	0.634
Discharge to Rehabilitation (%)	3.9	11.3	17.9	<0.001
LOS (days)	2.73 \pm 1.81	2.82 \pm 1.75	3.60 \pm 1.56	0.051

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