

Trajectory of Perioperative Deficit Accumulation Survival Index Predicts Overall Survival Following Robotic-Assisted Pulmonary Lobectomy

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Introduction

- The Deficit Accumulation Survival Index (DASI) integrates metabolic, physiologic, pathologic, and functional domains to provide a singular value that characterizes patient vulnerability and has been proven to predict long-term survival outcomes.
- Nevertheless, how DASI changes across the perioperative course and whether postoperative deterioration is associated with early postoperative outcomes have not been elucidated.

Study Design

- Retrospective Cross-Sectional

Methodology

- We retrospectively reviewed 860 consecutive patients undergoing robotic-assisted pulmonary lobectomy (RAPL).
- Preoperative, Immediate, Postoperative, and Discharge DASI scores were calculated using 24 clinical variables. Patients were categorized into Low-, Intermediate-, or High-Risk groups based on validated cutoffs.
- Analysis was restricted to patients who were Low-Risk at the Preoperative timepoint and Intermediate- or High-Risk at the Immediate Postoperative time point.
- Outcomes, including hospital length of stay (LOS), discharge disposition, and overall survival (OS), were compared across final Discharge DASI groups.

Table 1: DASI Score Variables, with Hospital LOS included only in Discharge DASI.

DASI Variables
Marital Status (Single/Divorced/Widowed = 1, Married = 0)
Language (Not English = 1; English = 0)
BMI, kg/m2 (<19 = 1, >19 = 0)
ECOG Status (2,3,4 = 1, 0,1 = 0)
Fall Risk (High = 1, Moderate/Low = 0)
Number of Medications (>5 = 1, <5 = 0)
Healthcare Utilization in Prior 6 months (>2 visits = 1, <2 visits = 0)
WBC, k/uL (>11 = 1, <11 = 0)
Neutrophils, k/uL (<1.8 = 1, >1.8 = 0)
Lymphocytes, k/uL (<1.1 = 1, >1.1 = 0)
NLR Index (>5 = 1; <5 = 0)
Hgb, g/dL (<12 = 1, >12 = 0)
Platelet Count, k/uL (>450 or <150 = 1, 150-450 = 0)
PLR Index (>250 = 1, <250 = 0)
SII Score (>1600 = 1, <1600 = 0)
Sodium, mmol/L (<135 = 1, >135 = 0)
Creatinine, mg/dL (>1.3 = 1, <1.3 = 0)
Calcium Corrected, mg/dL (>11 = 1, <11 = 0)
Albumin, g/dL (<3.5 = 1, >3.5 = 0)
PNI Score (<45 = 1, >45 = 0)
Path Tumor Size (>3cm = 1, <3cm = 0)
Path Nodal Metastasis (N1,N2 = 1; N0 = 0)
Path Distant Metastasis (M1 = 1, M0 = 0)

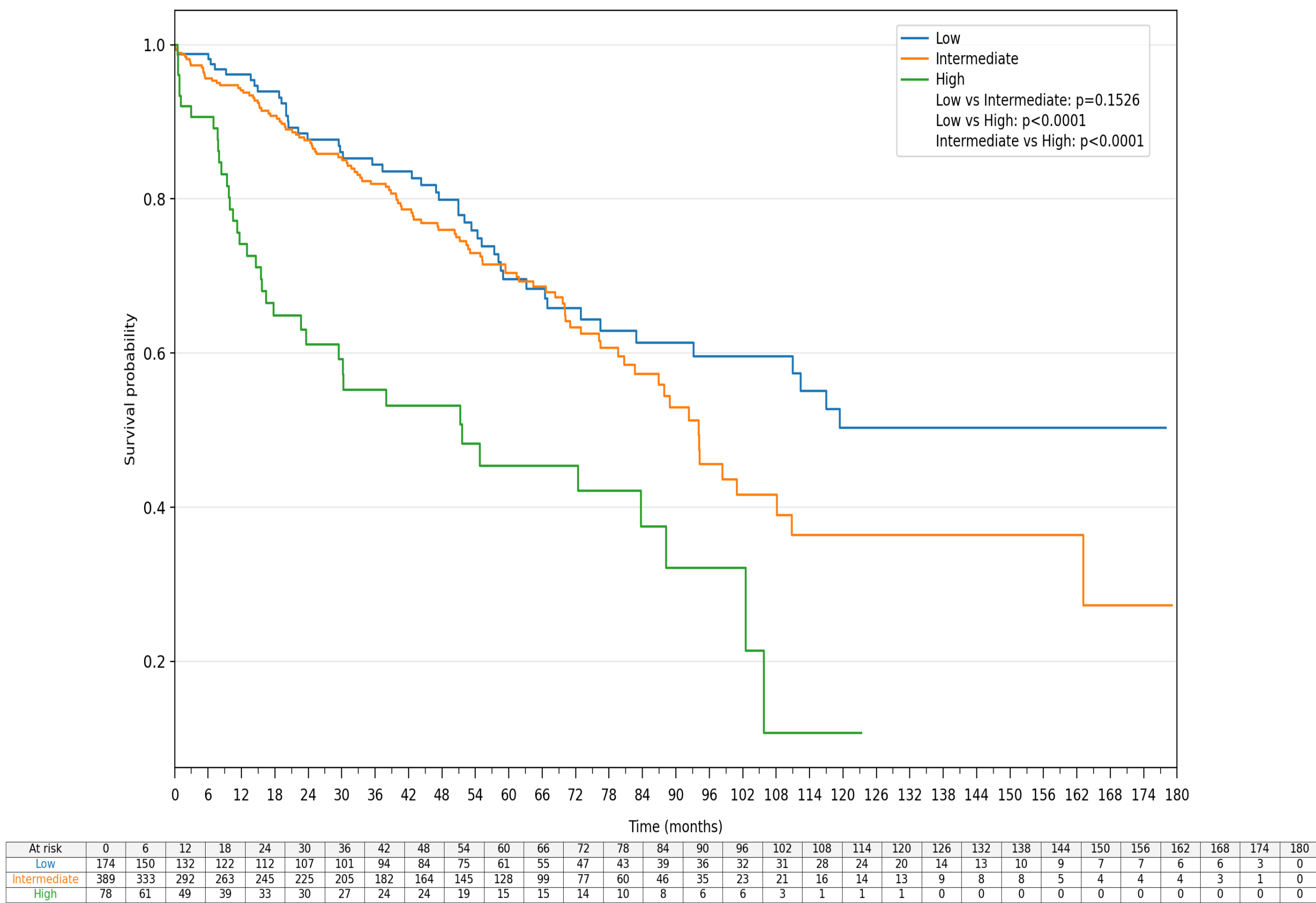
Table 3: Discharge Disposition by Discharge DASI Risk Category.

Discharge Risk Group	Home	Home with Health Services	Transfer to Another Facility	Long-Term Acute Care	Hospice	In-Hospital Death
Low	147 (85.0%)	20 (11.6%)	2 (1.2%)	0 (0.0%)	2 (1.2%)	2 (1.2%)
Inter-mediate	336 (86.4%)	42 (10.8%)	3 (0.8%)	3 (0.8%)	1 (0.3%)	4 (1.0%)
High	65 (85.5%)	5 (6.6%)	2 (2.6%)	1 (1.3%)	0 (0.0%)	3 (3.9%)

Table 2. Distribution of patient risk-categories across the Preoperative, Immediate Postoperative and Discharge Time points.

Time-Period	Risk Category	Count (n)	Percentage (%)
Pre-Op (n=860)	Low	663	77.1
	Intermediate	157	18.3
	High	40	4.7
Immediate Post-Op (n=860)	Low	22	2.6
	Intermediate	254	29.5
	High	584	67.9
Discharge (n=860)	Low	205	23.8
	Intermediate	490	57.0
	High	165	19.2

Figure 1. Kaplan-Meier Overall Survival Curves by Discharge DASI Risk Group.



Results

- A cohort of 641 patients met Preoperative and Immediate Postoperative DASI score inclusion criteria.
- Among this cohort, 174 (27.1%) were Low-Risk, 389 (60.1%) were Intermediate-Risk, and 78 (12.2%) were High-Risk at discharge.
- Global Kruskal-Wallis testing revealed a significant difference in hospital LOS across Discharge DASI groups (p=0.0148), and post-hoc testing with Holm's adjustment revealed High-Risk patients had significantly longer hospital LOS (median 5, [interquartile range (IQR) 3-8] days) than Intermediate-Risk patients (4 [3-6] days).
- Discharge disposition did not differ significantly across Discharge DASI groups (p=0.3145).
- Kaplan-Meier OS curves with log-rank testing showed clear separation between Low- versus High-Risk (p<0.001) and between Intermediate- versus High-Risk patients (p<0.001).

Conclusion

- Perioperative DASI scores markedly fluctuate in the days following RAPL, with a majority of patients experiencing acute postoperative deterioration, followed by varying levels of recovery.
- Patients remaining in the High-Risk category at Discharge experienced significantly longer hospital LOS and decreased OS.
- Our results suggest that continued postoperative vulnerability, as measured by the dynamic DASI score, warrants intensified recovery protocols and tailored longitudinal interventions to mitigate risk.
- These findings further demonstrate how the DASI score offers meaningful prognostic information and may serve as a novel risk-stratification tool when incorporated into perioperative care pathway.

Questions?

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