ASSOCIATION OF METASTATIC LYMPH NODE RATIO, REGIONAL LYMPH NODES DISSECTED AND METASTATIC LYMPH NODES REMOVAL WITH DISEASE FREE SURVIVAL IN SMALL BOWEL ADENOCARCINOMA PATIENTS

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Introduction:

Small bowel adenocarcinoma (SBA) is a rare gastrointestinal malignancy, accounting for approximately 1–3% of all digestive system cancers.[1] Lymphnode involvement is an important prognostic factor in SBA.[2] Previous studies have demonstrated that lymph node metastasis is associated with poorer survival and increased risk of disease recurrence.[3,4] The number of regional lymph nodes examined has also been associated with survival outcomes in SBA.[5] The metastatic lymph node ratio (MLNR), calculated as the number of metastatic lymph nodes divided by the total number of regional lymph nodes examined, therefore been proposed as an alternative measure of nodal disease burden. It also adjusts for inter-patient variability and mitigates the stage migration.

Materials and methods:

This retrospective cohort study was carried out at SKMCH&RC. Patients with SBA who underwent surgical resection were included from HIS between January 2015 to December 2024. Information collected included: age, gender, tumor location, tumor grade, TNM stage, metastatic lymph nodes (MLN) and calculation of metastatic lymph nodes ratio (MLNR). Data was analyzed using SPSS 26.0. MLNR was stratified into categories based on quartiles. Kaplan-Meier curves were plotted for Disease Free Survival (DFS).

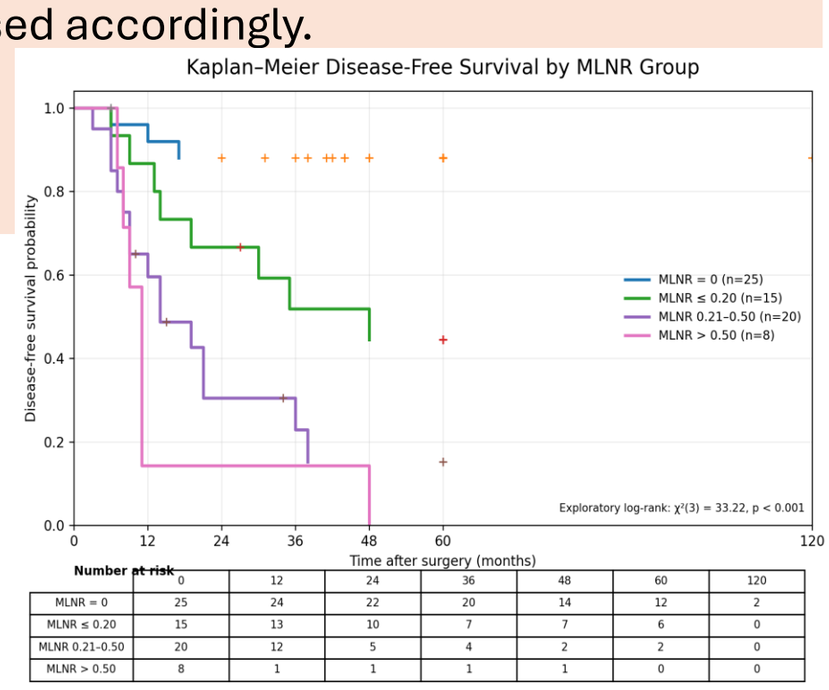
Results:

A total of 110 patients with small bowel adenocarcinoma were included. The mean age was 46.2 ± 13.8 years, with a male predominance (69.1%). The duodenum was the most common tumor site (52.7%), followed by the ileum (25.5%) and jejunum (21.8%). T3N1 was the most frequent stage at diagnosis (44.5%).

Among 68 patients with lymph nodes removed and available MLNR and DFS data, increasing MLNR was associated with progressively shorter DFS. Mean DFS decreased from 32.6 months in patients with MLNR 0 to 10.2 months in those with MLNR >0.5.

There was a statistically significant difference in DFS across MLNR groups (Kruskal–Wallis H = 11.14, p = 0.011). MLNR demonstrated a moderate inverse correlation with DFS (Spearman r = −0.44, p < 0.001). As MLNR increased, disease free survival decreased accordingly.

MLNR Group	n	Total LN Removed	MLN	Mean DFS (mo)	Median DFS (mo)
0 (No metastasis)	25	9.4	0.0	**32.6**	30.0
≤ 0.20	15	11.1	1.2	**25.7**	22.0
0.21–0.50	20	12.8	3.9	**18.4**	16.0
> 0.50	08	14.6	7.8	**10.2**	9.0



Discussion:

Our study demonstrated a significant inverse association between metastatic lymph node ratio (MLNR) and disease-free survival, with median DFS declining from 30 months in node-negative patients to 9 months in those with MLNR >0.5. This relationship is biologically plausible, as a higher proportion of metastatic nodes reflects greater nodal tumor burden and increased recurrence risk . Although the mean lymph node yield in our cohort was 10.9, exceeding the AJCC minimum of eight nodes for adequate staging, nodal yield alone may not adequately predict prognosis, particularly in the absence of metastatic involvement. The significant difference in DFS across MLNR groups (p = 0.011) and moderate inverse correlation between MLNR and DFS (ρ = −0.44, p < 0.001) further support its potential use as an adjunct to TNM staging

Conclusion:

Metastatic lymph node ratio (MLNR) is a significant prognostic indicator of disease-free survival in patients with small bowel adenocarcinoma. Patients with higher MLNR values experienced markedly shorter DFS, indicating a greater risk of recurrence following surgical resection. While the number of lymph nodes dissected and metastatic nodes removed are important for accurate staging, MLNR provides a more refined assessment of nodal disease burden.

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