Prognostic Significance of Ki-67 Proliferation Index in Pulmonary Carcinoid Tumors: A Single-Center Retrospective Cohort Study

University of Nevada, Reno School of Medicine

Rylan Howell B.S.[1]*, Wendy Magaña B.S.[1]*, Katharine Thomas M.D.[1,2]

University of Nevada Reno School of Medicine[1]; Renown Regional Medical Group[2]

*Equal Contribution

Renown HEALTH

Introduction

Pulmonary carcinoid tumors are rare neuroendocrine neoplasms[1]. Classified as typical or atypical based on mitotic count and necrosis[1]. Ki-67 is a well-established grading tool in gastroenteropancreatic neuroendocrine tumors.[2] Its prognostic value in pulmonary carcinoids remains less defined. Ki-67 is not part of the current WHO diagnostic criteria.[3]

Study Objective

Evaluate the association between Ki-67 proliferation index and clinical outcomes in patients with pulmonary carcinoid tumors at a single regional medical center.

Methods

Retrospective cohort study: Renown Regional Medical Center

Study period: Jan 2020–Dec 2025

Included patients with histologically confirmed pulmonary carcinoid tumors

Collected:
- Patient demographics,
- Tumor characteristics(including Ki-67 proliferation markers),
- Clinical outcomes

Ki-67 categorized as: Low ≤5% and Elevated >5%

Stable disease defined as: Alive without documented recurrence or progression at last follow-up

Associations assessed between:Ki-67category:
- Histologic subtype
- Stable disease status
- Progression
- Recurrence

Statistical analysis: Fisher's exact test

Study conducted under IRB approval

Results

Ki-67 reported in 50/56 patients (89.3%)

Total patients	Typical carcinoid	Atypical carcinoid
56	**45 (80.4%)**	**11 (19.6%)**

Elevated Ki-67 (>5%)

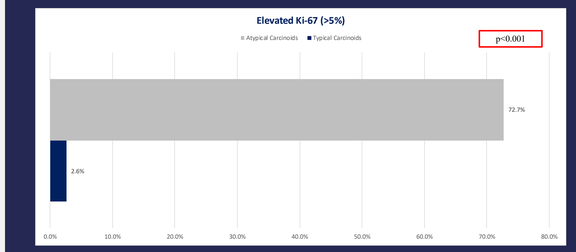
9 patients
8 atypical | 1 typical

Ki-67 and Recurrence

Ki-67 was **not significantly associated with recurrence**. **(p = 0.62)**

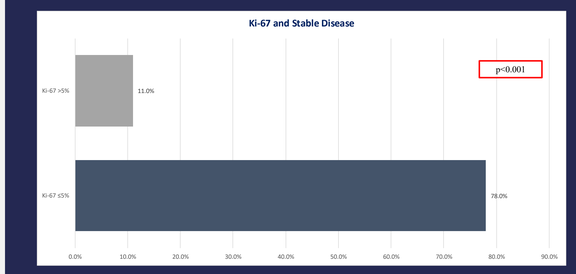
Results

Elevated Ki-67 was more common in atypical carcinoids



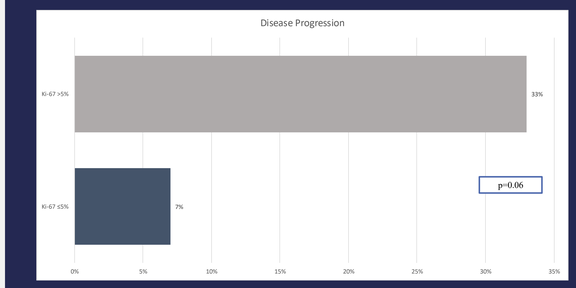
Elevated Ki-67 (>5%) was observed in 8 of 11 atypical tumors (72.7%) compared with 1 of 39 typical tumors (2.6%, p<0.001).

Stable disease was more common with Ki-67 ≤5%



Stable disease = alive without documented recurrence or progression at last follow-up

Disease progression occurred more frequently among patients with elevated Ki-67



The difference did not reach statistical significance (p = 0.06).

Discussion and Conclusion

In a community-based cohort, elevated Ki-67 was strongly associated with atypical histology and adverse clinical outcomes including a lower likelihood of being alive without recurrence or progression at last follow-up with pulmonary carcinoid tumors. These findings support the potential utility of Ki-67 as a prognostic marker, and the concept that pulmonary carcinoids exist along a biologic continuum that may not be completely captured by the existing WHO framework and suggest that routine Ki-67 assessment could improve risk stratification. The incorporation of Ki-67 into pulmonary carcinoid classification in larger multicenter studies evaluating neuroendocrine tumor outcomes may assist in better identifying patients who may benefit from intensified surveillance or individualized management.

References

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