

Adrenocortical carcinoma with inferior vena cava tumor thrombus

Daniel V. Laan, MD,^a Cornelius A. Thiels, DO,^{a,b} Amy Glasgow, MHA,^b Kevin B. Wise, MD,^a Geoffrey B. Thompson, MD,^a Melanie L. Richards, MD,^a David R. Farley, MD,^a Mark J. Truty, MD,^a and Travis J. McKenzie, MD,^a Rochester, MN

Background. *The safety, efficacy, and prognostic implications of resection of adrenocortical carcinoma with inferior vena cava tumor thrombus are poorly described.*

Methods. *A retrospective review was performed during a 30-year period on patients who underwent resection of locally advanced, nonmetastatic adrenocortical carcinoma. We compared patients with and without inferior vena cava tumor thrombus, examining perioperative characteristics, completeness of resection, mortality, and survival.*

Results. *We identified 65 patients who underwent resection of locally advanced (T4N0 and T4N1) adrenocortical carcinoma (28 patients with inferior vena cava tumor thrombus, 37 noninferior vena cava tumor thrombus). Rate of complete resection, adjuvant chemotherapy, and short-term postoperative morbidity was similar between groups.*

Overall survival was similar at 12-months. At 24 months overall survival was less in the inferior vena cava tumor thrombus group (59% vs 30%, $P = .04$). Differential survival through 60-month follow-up favored the noninferior vena cava tumor thrombus group (36% vs 0%, $P = .001$). Subgroup analysis including only patients with complete resection demonstrates similar survival at 24-months but at 36-months survival favored the noninferior vena cava tumor thrombus patients (65% vs 29%, $P = .047$) and this continued through 60 months (40% vs 0%, $P = .049$).

Conclusion. *Attempt at complete resection of adrenocortical carcinoma with inferior vena cava tumor thrombus seems justified particularly as short-term safety and survival are similar to patients without inferior vena cava tumor thrombus. However, survival beyond 36-months is limited in patients with inferior vena cava tumor thrombus. Patients being evaluated for resection in the setting of inferior vena cava tumor thrombus should be selected carefully. (Surgery 2016;■■:■■-■■.)*

From the Department of Surgery,^a Mayo Clinic; and Mayo Clinic Robert D. and Patricia E. Kern Center for the Science of Health Care Delivery,^b Rochester, MN

ADRENOCORTICAL CARCINOMA (ACC) is a rare and aggressive neoplasm associated with a poor prognosis.^{1,2} Ninety percent of ACCs are >6 cm in size on presentation, with 40% of patients presenting with widely metastatic disease at the time of diagnosis.³ Adjuvant chemotherapy has limited

efficacy, and operative resection remains the initial treatment for ACC when technically feasible.⁴

The incidence of inferior vena cava (IVC) involvement in ACC is not well defined. Furthermore, the safety and efficacy of ACC resection requiring IVC tumor thrombectomy or IVC resection are poorly described. We aimed to compare the safety and oncologic efficacy of resection of ACC with and without IVC-TT (tumor thrombus) among patients with stage IV locally advanced, nonmetastatic, ACC, with the hypothesis that stage IV nonmetastatic ACC with IVC-TT involvement portends worse survival compared with similar stage ACC without IVC-TT.

MATERIALS AND METHODS

After obtaining institutional review board approval, a retrospective review of a prospectively collected institutional database was performed to identify all patients with ACC that underwent

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Reprint requests: Travis J. McKenzie, MD, Mayo Clinic, 200 First St. Southwest, Rochester, MN 55905. E-mail: Mckenzie.Travis@mayo.edu.

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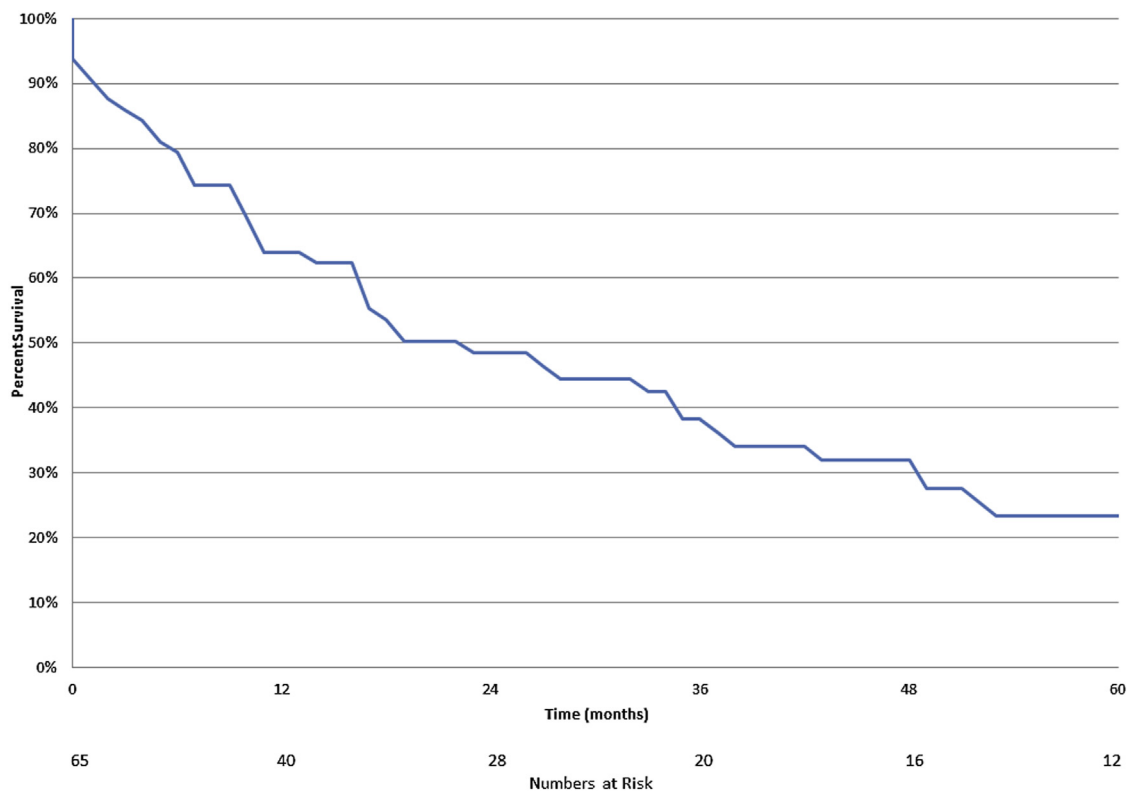


Fig 1. Kaplan-Meier curve demonstrating overall survival of patients with stage IV-non metastatic adrenocortical carcinoma.

resection from 1985–2015. Only patients with locally advanced, nonmetastatic (M0) ACC were included. Those undergoing a planned palliative operation without curative intent were excluded ($n = 3$). Patients were selected for inclusion in the study based on TNM staging as defined by our institutional pathologists. Patients with T4 tumors, defined as tumor of any size with invasion of adjacent organs with or without nodal involvement (T4N0 or T4N1) were included. By definition these patients are classified American Joint Committee on Cancer Seventh Edition stage IV or European Network for the Study of Adrenal Tumors (ENSAT) stage III.^{5,6} All patients underwent a preoperative evaluation, including magnetic resonance imaging and/or positron emission tomography/computed tomography (CT) when indicated, to rule out metastatic disease.

Comparison was made between patients with and without IVC-TT. The primary outcome of the study was overall survival. Secondary outcomes included 30-day morbidity and mortality. Subset analysis was utilized including only patients with R0 resection. Clavien-Dindo (CD) scores were used to assess grade of postoperative complications and was calculated on a 5-point scale from the medical

record.⁷ Analysis was performed using χ^2 , Fisher exact test, and Wilcoxon rank-sum test as indicated. Overall survival was reported using the Kaplan-Meier method of analyses.

RESULTS

We identified 65 patients that underwent curative intent resection of T4N0 ($n = 61$) or T4N1 ($n = 4$) nonmetastatic ACC during a 31-year period. Among this total operative group, mean age was 51.0 ± 14.6 years and 34 (52%) patients were females. Average tumor size was 13.9 ± 5.5 cm (range, 3.1–26.0 cm). R0 resection was obtained in 42 patients (65% of the total cohort). Failure to obtain R0 resection was due primarily to residual disease in periaadrenal fat ($n = 15$, 65%). Recurrence occurred in 54 patients (83% of the total cohort). The median survival was 17.7 months (Fig 1).

Of these 65 patients, 28 (43%) had IVC-TT and 37 (57%) did not. Groups were similar in terms of age, sex, laterality, hormonal activity, rate of R0 resection, and percentage receiving adjuvant therapy (Table). Within the IVC-TT group, the classification of T4 was assigned based on adjacent organ involvement in addition to IVC-TT in 46 %

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