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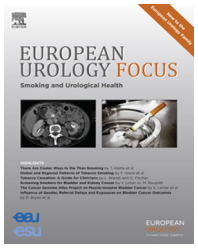

Platinum Priority – Kidney Cancer
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Surgical Management and Oncologic Outcomes of Recurrent Venous Tumor Thrombus after Prior Nephrectomy for Renal Cell Carcinoma

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Abstract

Background: While the management of a venous tumor thrombus in renal cell carcinoma is well described, there is a paucity of evidence to guide care in patients who recur within the vena cava.
Objective: To report our experience with patients presenting with recurrent venous tumor thrombi after prior radical nephrectomy.
Design, setting, and participants: A retrospective review of 16 patients from 1970 to 2013 with a history of renal cell carcinoma treated surgically for a recurrent tumor thrombus unrelated to a new renal tumor.
Intervention: Recurrent tumor thrombectomy.
Outcome measurements and statistical analysis: Intraoperative outcomes, recurrence-free survival, and cancer-specific survival following resection.
Results and limitations: Of the 16 patients, three patients were diagnosed with synchronous widely metastatic disease, did not undergo recurrent tumor thrombectomy, and died within 6 mo. Among the remaining 13 repeat surgical patients, the median age was 67 (range: 48–76) yr with a median time from prior nephrectomy to diagnosis of 6 (range: 3–58) mo. Nine patients had known tumor thrombus at nephrectomy, all of whom were thought to have complete tumor thrombectomy at initial surgery. During exploration for recurrent thrombus, surgical resection was completed in 11, with a median blood loss of 2500 (range: 200–7000) ml, and a median transfusion requirement of four (range: 0–18) units. At a median follow-up of 12 mo all patients had recurred and died of disease. The median time to recurrence and death was 4 mo and 12 mo following repeat exploration, respectively.
Conclusions: Recurrent tumor thrombectomy is a technically feasible yet challenging operation. Survival is poor in this population with metastatic progression appreciated in all patients in our series.
Patient summary: In this report we evaluated outcomes for patients presenting with vena cava tumor thrombus after prior nephrectomy for renal cell carcinoma. We found that surgical excision is complex yet feasible and that survival following resection was poor.

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1. Introduction

Renal cell carcinoma (RCC) is a common diagnosis with an estimated 63 920 cases diagnosed in 2014 [1]. Historically, 10% of cases will present with a synchronous venous tumor thrombus [2]. The management of these patients is well described, and surgical excision with nephrectomy and tumor thrombectomy is the standard of care [3–5]. Despite excellent outcomes from intervention, up to 40% of patients will ultimately recur even in the absence of metastatic disease at the time of their surgical management [4,6].

While most recurrences after radical nephrectomy are distant, a small minority will present locally in the renal fossa [7,8] or in the vena cava [9]. At present, only a few case reports have been published regarding recurrent venous tumor thrombi (defined as a recurrence of RCC located within the vena cava and unrelated to a new primary tumor) [9–13]. Due to the rarity of recurrent tumor thrombi, management and outcomes are poorly described, leaving the individual surgeon to base their management decisions on limited information. Herein we report on the Mayo Clinic experience with recurrent venous tumor thrombi.

2. Materials and methods

An Institutional Review Board-approved retrospective chart review was performed of patients identified with a tumor thrombus due to RCC at the Mayo Clinic from 1970 to 2013. Adult (≥18 yr) patients were included for analysis if they had undergone prior treatment of RCC with partial or radical nephrectomy, with or without tumor thrombectomy. Exclusion criteria included presentation of tumor thrombus from a new primary renal tumor, heritable forms of RCC, and pediatric patients (≤18 yr). Patients with metastatic disease were not excluded on the basis of describing the characteristics of all patients diagnosed with recurrent tumor thrombi. Therefore, the resulting cohort represented patients with a previously treated RCC presenting with a recurrent tumor thrombus, with or without additional metastatic disease. Tumor thrombus level was defined by the anatomic location and classified according to level of extension as has been previously described [3], with the exception that Levels I and II were grouped here given the challenge to accurately determine the location of the previously ligated renal vein on preoperative radiographic imaging. Patient demographics, clinicopathologic data, and survival outcomes were collected and herein reported. For patients undergoing surgical resection (recurrent tumor thrombectomy), intraoperative and postoperative outcomes were assessed. Survival was evaluated using the Kaplan-Meier method (SPSS 22.0; Armonk, New York, USA; IBM Corp).

3. Results

A total of 16 patients were identified. Patient characteristics are depicted in Table 1. Prior surgical treatment of the primary tumor was performed at the Mayo Clinic in 13 (81.3%) of these patients, and no patient had undergone a partial nephrectomy. The median age at the time of diagnosis of recurrent tumor thrombus was 67 (interquartile range [IQR]: 65, 73; range: 47, 82) yr, with a median interval of 6 (IQR: 4, 34; range: 4, 154) mo from prior nephrectomy to diagnosis of recurrence with thrombus. Eleven patients presented with a venous tumor thrombus at the time of primary RCC diagnosis, all of whom had a pathologically complete surgical excision.

Table 1 – Characteristics of patients presenting with recurrent tumor thrombus

Total	16%
Median age, yr (IQR)	67 (65, 73)
Sex (male)	13 (81.3)
Smoking status (*n* = 15)	
Never	4 (25.0)
Current/former	10 (62.5)
ECOG (*n* = 1 2)	
0	9 (56.3)
1	1 (6.3)
2	2 (12.6)
Prior nephrectomy side	
Left	9 (56.3)
Right	7 (43.7)
Surgical approach (*n* = 13)	
Subcostal	9 (69.2)
Midline	3 (23.1)
Flank	1 (7.7)
Primary tumor classification at nephrectomy (*n* = 13)	
pT2a/b	2 (12.5)
pT3a	4 (25.0)
pT3b	5 (31.3)
pT3c	2 (12.5)
Primary tumor grade (*n* = 15)	
Grade 2	5 (31.3)
Grade 3	8 (50.0)
Grade 4	2 (12.5)
Tumor thrombus at nephrectomy (*n* = 11)	11 (68.8)
Pathologic vein invasion (*n* = 9)	7 (77.8)
Median time to diagnosis of recurrent thrombus (IQR)[a]	6 (4, 34)
Presentation (*n* = 16)	
Asymptomatic (surveillance)	6 (37.5)
Symptomatic	7 (43.7)
Unknown	3 (18.8)
Symptoms at presentation (*n* = 7)	
Pulmonary embolism	2 (28.6)
Dyspnea	2 (28.6)
Weakness/fatigue	2 (28.6)
Syncope	1 (14.2)
Metastatic disease at diagnosis of recurrent thrombus	5 (31.3)

ECOG = Eastern Cooperative Oncology Group; IQR = interquartile range.
[a] Time (mo) from nephrectomy to diagnosis of recurrent tumor thrombus.

Among these 16 patients, seven were diagnosed with a recurrent tumor thrombus symptomatically, six presented on surveillance imaging, and the remaining three had an unknown method of presentation. Three were diagnosed with a recurrent tumor thrombus at the time of synchronous widespread metastatic disease and were not managed with additional surgical intervention. All three of these patients progressed and died within 6 mo of diagnosis. Two additional patients had oligometastatic disease (one with isolated pulmonary disease treated postoperatively with targeted therapy and one locally recurrent disease to the gallbladder resected at the time of recurrent tumor thrombectomy) at diagnosis of their recurrence thrombus.

A total of 13 patients underwent attempted repeat surgical exploration, of which two were found to have extensive local invasion at the time of the exploration which was not evident on preoperative imaging and complete excision was unable to be accomplished. Thus, a total of 11 patients underwent a complete surgical excision of their

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