15-Year Experience With Renal Cell Carcinoma Caval Tumor Thrombus

Mark K. Eskandari, M.D., F.A.C.S.
The James S.T. Yao MD PhD Professor of Vascular Surgery
Northwestern University Feinberg School of Medicine

Disclosures

W.L. Gore:
TEVAR Training—course director

Prairie Research (Bard):
LEVANT-2—consultant

Silkroad:
Silkroad—consultant

Renal Cell Carcinoma With IVC Tumor Thrombus

• Poor prognosis
• Ineffective neoadjuvant radiation or cytotoxic therapies
• Current standard of care is radical resection and adjuvant therapy

Neves Classification: Tumor thrombus

To evaluate the prognostic value of venous tumor thrombus levels on morbidity and mortality of patients with renal cell carcinoma

Purpose

Hypothesis

A higher level of venous tumor thrombus, which requires a more extensive surgical dissection, would contribute to poorer long-term survival
Methods

• Retrospective review
• Single tertiary academic center
• All patients underwent radical resection for renal cell carcinoma with venous tumor thrombus
• 15-year period (2001-2015)
• Mean follow-up 58 months

Methods: Operative techniques

Neves 0-II (infrahepatic)
• Thoracoabdominal or partial chevron incision
• Mobilization of right colon
• Kocher maneuver to expose the IVC

Neves III-IV (suprahepatic)
• Chevrons incision with selective sternotomy
• Pringle maneuver and mobilization of liver
• Selective cardiopulmonary bypass

Methods: Operative techniques

• Ligation of lumbar veins
• No systemic heparin
• Lateral vena cava incision at renal vein confluence
• Grossly negative margins

A  B  C

Results: Demographics

• 37 patients
  – 26 men, 11 women
  – Mean age 61

• Cancer
  – All cancer stage 3 or 4
  – 15 (41%) metastatic disease
    • Pulmonary, hepatic, spinal, brain

Results: Neves level

No statistically significant difference between
Neves 0-II (infrahepatic) vs Neves III-IV (suprahepatic):

– Tumor side
– T class
– Cancer stage
– Fuhrman grade
– Margin status
– Metastasis at time of surgery
Results: Perioperative findings

<table>
<thead>
<tr>
<th>Overall</th>
<th>Neves 0-II</th>
<th>Neves III-IV</th>
<th>P value</th>
</tr>
</thead>
</table>

- Operative time:
  - > 3 hours: 41% 30% 70% 0.050
- Estimated blood loss:
  - >=2000 mL: 43% 33% 70% 0.005
- Length of SICU stay:
  - > 1 day: 38% 30% 60% 0.034
- Length of hospital stay:
  - > 7 days: 54% 44% 80% 0.073

Results: 30-day outcomes

- 1 myocardial infarction
- 1 permanent acute renal failure
- No death, stroke, or new pulmonary embolism

Results: Late outcomes

- 1-year survival 93% (n=34)
- 3-year survival 77% (n=30)
- 5-year survival 71% (n=21)
- 5 patients developed recurrence
  - no local IVC recurrence

Results: Survival (entire cohort)

Results: Survival (Neves 0-II v III-IV)

Comparison Of Survival

<table>
<thead>
<tr>
<th>Authors</th>
<th>Publication year</th>
<th>Number of patients</th>
<th>30-day survival</th>
<th>5-year survival</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swierzewski et al</td>
<td>1994</td>
<td>100</td>
<td>64%</td>
<td></td>
</tr>
<tr>
<td>Glazer et al</td>
<td>1996</td>
<td>18</td>
<td>89%</td>
<td>57%</td>
</tr>
<tr>
<td>Nesbit et al</td>
<td>1997</td>
<td>37</td>
<td>97%</td>
<td>34%</td>
</tr>
<tr>
<td>Kalkut et al</td>
<td>2008</td>
<td>68</td>
<td>94%</td>
<td>37%</td>
</tr>
<tr>
<td>Ciacco et al</td>
<td>2009</td>
<td>87</td>
<td>97%</td>
<td>46%</td>
</tr>
<tr>
<td>Nooromid et al</td>
<td>2016</td>
<td>37</td>
<td>100%</td>
<td>71%</td>
</tr>
</tbody>
</table>

### Summary
- Suprahepatic venous tumor thrombus was associated with increased
  - Operative time
  - Blood loss
  - Length of stay in intensive care unit
- Advanced tumor thrombus did not significantly impact long-term survival

### Conclusion
With a multidisciplinary surgical approach to renal cell carcinoma presenting with venous tumor thrombus, perioperative morbidity and overall survival have continued to improve