IVC Replacement For Malignancy: How I Do it

R. Clement Darling III M.D.
Chief, Division of Vascular Surgery
Professor of Surgery
Director, The Institute for Vascular Health and Disease
Albany Medical Center

Pre-Operative Considerations

- Extent of disease
- Pre-operative renal artery embolization
- ?Supra-hepatic control
- ?Involving Right atrium
- Difficult to access if vein wall involvement
- What type of reconstruction?
- Embolectomy versus Bypass (patch or bypass with ePTFE)

Features predictive of IVC invasion on MRV, c=0.81

- AP diameter of IVC at RVo > 24 mm
- Occlusion of IVC at RVo
- Right sided tumor

Features %

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<th>Features</th>
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<th>1</th>
<th>2</th>
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<td>%</td>
<td>2</td>
<td>8 – 11</td>
<td>26 – 35</td>
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Predicted probability IVC resection

Disclosures

- None Fiscally
- Thank Tom Bower and the Mayo artists for their diagrams

Options for IVC Tumor Involvement

- Tumor resection and Primary Repair
- Patch Repair
- Replacement with graft and re-implant vessels
- Infra-renal IVC resection without Replacement

Surgical Management

- Control of proximal and distal IVC essential
- Liver mobilization techniques (liver on a stick)
- Thrombus milked back and Hepatic veins are clamped
- Division of small / lesser hepatic veins etc
- Excision of IVC may be necessary
**Lower IVC and Common Iliac Vein Exposure**

- Often requires mobilization of the distal aorta and common iliac arteries
- There may be one or more lumbar vein branches to ligate
- Beware of lateral and middle sacral veins

**Right Medial Visceral Rotation to Expose Suprarenal IVC**

- Anterior approach: Ligate and divide caudate lobe veins
- Retrohepatic: Divide ligaments to fully mobilize liver

**Suprahepatic Control**

- Detach Medial and Lateral Ligaments
- Isolate Hepatic Veins separately, if possible
Supra Hepatic Dissection

Operative Approach

• Isolate Contralateral Renal Vein

Clamping Sequence

• Arterial inflow (Pringle)
• Suprahepatic Cava
• Contralateral vein
• Hepatic Veins
• Infrarenal Cava

Tumor Removed

Infra Hepatic Clamp Placed

Removing The Tumor

Evaluate Resection
Completed Reconstruction

Retrohepatic IVC Replacement Using Total Vascular Isolation of Liver

- Secure place for suprahepatic clamp
- Test clamp of the suprahepatic IVC to determine level of hemodynamic support
- Transfer clamp to graft after washout of acid metabolites from liver
- Graft cut to length after max. inhalation/exhalation

Operation under hypothermic circulatory arrest

- Recreation of hepatic vein orifices; hepatic and right renal vein reimplantation
- Graft from right atrium to left renal vein-caval confluence

Hemodynamic Adjuncts

Cardiopulmonary Bypass

Intra-atrial IVC thrombus or Liver congestion
Veno-venous bypass

SVC Patch Repair

Contemporary Results

<table>
<thead>
<tr>
<th>Year</th>
<th>n</th>
<th>Type</th>
<th>Location*</th>
<th>Graft</th>
<th>Mortality</th>
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<td>IR 74 SS 28 SH 14</td>
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</table>

*IR= infrarenal  SS= suprarenal  SH= suprahepatic
**Multiple segments in remainder

Thank You

THE VASCULAR GROUP