Ischemic bowel

- Mesenteric Ischemia (ischemia of the *small bowel*) and Ischemic colitis (ischemia of the *colon*)

- < 1 in 1,000 hospital admissions
  - 30%-90% Mortality
  - Incidence 1.2/100,000 persons (Malmö experience 1970-1982)

- Surgical patient, non-surgical patient

Risk factors IB

- Occlusive disease
  - CT and/or SMA and/or IMA and/or Hypogastrics

Risk factors IB

- Occlusive disease
  - CT and/or SMA and/or IMA and/or Hypogastrics
  - Aortic atheromatosis
    - suprarenal clamping or endoclamping
  - Atrial fibrillation
  - Coagulation disorder(s)
Risk factors IB

- **Non-Occlusive MI (NOMI)**
  - Shock w/wo catecholamines
    - SBP < 70 mmHg during 20 minutes
    - Hb < 8 g/dl
    - pH < 7.3
  - Intra-operative fluids volume > 5 L
  - Transfusion of > 6 RBCs
  - Hypothermia < 35°C Celsius
  - Huge retroperitoneal hematoma


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**Elevated IAP**

Normal intra-abdominal pressure < 10mmHg

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**Foley UC & Manometer LV**

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**IAP measurement**

A really simple method allowing early detection of abdominal hypertension

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**Elevated IAP**

Normal intra-abdominal pressure < 10mmHg

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**Table 1:** The effect of IAP on individual organ systems. It should be noted that sequential insults such as hemorrhage, without hypotension threshold at which physiological dysfunction occurs.

<table>
<thead>
<tr>
<th>System</th>
<th>IAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-15mmHg</td>
<td>15-20mmHg</td>
</tr>
<tr>
<td>Renal</td>
<td>Contusional</td>
</tr>
<tr>
<td>CNS</td>
<td>Slight transtentorial and subarachnoid</td>
</tr>
<tr>
<td>Lower</td>
<td>Motor and sensory function</td>
</tr>
</tbody>
</table>

Loftus IM et al, Eur J Vasc Endovasc Surg 2003
**IB Recognition (closed abdomen)**

- High probability (>2 RF)

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- Patient extubated and/or stable
  - Imaging diagnostic

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**American College of Radiology**

**ACR Appropriateness Criteria**

**IB Recognition (closed abdomen)**

- High probability (>2 RF)

**CTA**

- **Vascular CT findings:**
  - Occlusive lesion, NOMI
  - Mesenteric vein thrombosis

- **Non-Vascular CT findings:**
  - Bowel wall thickening, hypoperfusion
  - Bowel dilatation
  - Bowel wall hemorrhage
  - Pneumatosis intestinalis
  - Portal venous gas

- **Combined findings**
  - Specificity 94%
  - Sensitivity 96%

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**Endoscopy**

**IB Recognition (closed abdomen)**

- High probability (>2 RF)

- Patient extubated and/or stable
  - Imaging diagnostic

- Patient intubated and/or unstable
  - Laparoscopy/tomy (ev. bedside)
Abdominal decompression is generally performed through (full) midline laparotomy

Laparostoma with Bogota/VAC is excellent technique for achieving dry and clean wound dressing

Bogota/VAC allows optical control of bowel vitality and function

Recovery on next morning

Segmental IB on next morning

ACS/IB Algorithm @ UHZ

Results

rEVAR 1998-2015

• 50% shock (SBP<70mmHg)
• 20% OAT
• 5% IB with bowel resection

Conclusions

• Bowel ischemia still is an issue in aortic surgery
  – Not infrequent and high mortality rate

Table 1: Distribution of bowel viability, acute gastrointestinal injury, and aortic injury in patients with complications

<table>
<thead>
<tr>
<th>Complication</th>
<th>Number</th>
<th>Mortality</th>
<th>RAO (t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allogene</td>
<td>200</td>
<td>0.05</td>
<td>1.2</td>
</tr>
<tr>
<td>Bleeding trauma</td>
<td>200</td>
<td>0.05</td>
<td>1.2</td>
</tr>
<tr>
<td>Bowel injury</td>
<td>200</td>
<td>0.05</td>
<td>1.2</td>
</tr>
<tr>
<td>Nephrotic</td>
<td>200</td>
<td>0.05</td>
<td>1.2</td>
</tr>
<tr>
<td>Renal failure</td>
<td>200</td>
<td>0.05</td>
<td>1.2</td>
</tr>
<tr>
<td>Preoper Co2 in shock</td>
<td>200</td>
<td>0.05</td>
<td>1.2</td>
</tr>
<tr>
<td>Other complications</td>
<td>200</td>
<td>0.05</td>
<td>1.2</td>
</tr>
<tr>
<td>Postoper Co2 in shock</td>
<td>200</td>
<td>0.05</td>
<td>1.2</td>
</tr>
</tbody>
</table>

*After intraoperative consideration
**Intraoperative consideration
Conclusions

• Aggressive laparotomy policy probably beneficial

• BogotaVAC
  – Allows compliant decompression and continuous observation of suspect small bowel and partially from colon

• Abdominal second look
  – Indicated in all
  – Mandatory in resection cases

Thank You!