UPDATE ON RECOGNITION AND TREATMENT OF ABDOMINAL COMPARTMENT SYNDROME (ACS) – ESPECIALLY AFTER EVAR TREATMENT OF RUPTURED AAAS

Dieter Mayer, MD, FEBVS, FAPWCA
On behalf of vascular surgery UHZ

Disclosures

• AVB member @Acelity Europe

Abdominal Compartment Syndrome kills!

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Treatment</th>
<th>n</th>
<th>ACS (in mmHg)</th>
<th>Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malbrain</td>
<td>2005</td>
<td>COS</td>
<td>37</td>
<td>5 (3)</td>
<td>59%</td>
</tr>
<tr>
<td>Yeh</td>
<td>2005</td>
<td>EVAR</td>
<td>31</td>
<td>6 (4)</td>
<td>53%</td>
</tr>
<tr>
<td>Krennemen</td>
<td>2005</td>
<td>COS</td>
<td>43</td>
<td>4 (3)</td>
<td>26%</td>
</tr>
<tr>
<td>Deimelberger</td>
<td>1997</td>
<td>COS</td>
<td>38</td>
<td>8 (4)</td>
<td>50%</td>
</tr>
<tr>
<td>Flottmann</td>
<td>1995</td>
<td>COS</td>
<td>106</td>
<td>4 (3)</td>
<td>First description</td>
</tr>
</tbody>
</table>

• 3 to 5-fold mortality rate in the presence of clinical ACS
• Proactive diagnostic and treatment to save lives!

Update on Recognition

Abdominal Compartment Syndrome (ACS)

Abdominal Compartment Syndrome (ACS)
**MANAGEMENT OF ACS**

**WHEN**
- ACS Any time
- Before Arrival
- Upon arrival
  - @ AS or OR
  - @ ICU

**WHAT**
- Diagnosis
  - Bladder P
  - Organ failure
  - Hemodynamic instability
  - ST elevation
- ACS
  - CT
  - Shock room
  - ICU
  - Shock room
  - Procedure
  - OT
  - Aortic emergency

**DIAGNOSTIC CRITERIA**
- Bladder pressure >20 mm Hg

**MEASUREMENTS**
- Continuous measurement via transducer
- Foley catheter method

**MANAGEMENT OF ACS**

**WHEN**
- ACS Any time
- Before Arrival
- Upon arrival
  - @ AS or OR
  - @ ICU

**WHAT**
- Diagnosis
  - Bladder P
  - Organ failure
  - Hemodynamic instability
  - ST elevation
- ACS
  - CT
  - Shock room
  - ICU
  - Shock room
  - Procedure
  - OT
  - Aortic emergency

**DIAGNOSTIC CRITERIA**
- Bladder pressure >20 mm Hg

**MEASUREMENTS**
- Continuous measurement via transducer
- Foley catheter method

**MANAGEMENT OF ACS**

**WHEN**
- ACS Any time
- Before Arrival
- Upon arrival
  - @ AS or OR
  - @ ICU

**WHAT**
- Diagnosis
  - Bladder P
  - Organ failure
  - Hemodynamic instability
  - ST elevation
- ACS
  - CT
  - Shock room
  - ICU
  - Shock room
  - Procedure
  - OT
  - Aortic emergency

**DIAGNOSTIC CRITERIA**
- Bladder pressure >20 mm Hg

**MEASUREMENTS**
- Continuous measurement via transducer
- Foley catheter method
Measurements

- Continuous measurement via transducer
- Foley catheter method

ACS

<table>
<thead>
<tr>
<th>WHEN</th>
<th>WHAT</th>
<th>HOW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before Arrival</td>
<td>Bladder P</td>
<td>DAT</td>
</tr>
<tr>
<td>Upon arrival @ AS or OR @ ICU</td>
<td>Organ failure</td>
<td>Biogota</td>
</tr>
<tr>
<td></td>
<td>Hemodynamic instability</td>
<td>VAC</td>
</tr>
<tr>
<td></td>
<td>ST elevation (right ventricle)</td>
<td>Other</td>
</tr>
</tbody>
</table>

Diagnosis

- Bladder P
- Organ failure
- Hemodynamic instability
- ST elevation (right ventricle)

Treatment

- OAT
- Bogota
- VAC
- Closure
- Mesh
- Other

Update on

MANAGEMENT OF ACS

What can be done to prevent/treat ACS?

- Best results @ IAP < 12 mm Hg
- BEFORE organ failure occurs!

- Best results @ IAP < 12 mm Hg
- BEFORE (multiple) organ failure occurs!

Prospective study, 66 patients: 28.8% versus 30-50% mortality in patients suffering from abdominal or vascular pathology, major trauma, or abdominal sepsis.

Prospective 6-year study, 478 patients: mortality decreased from 72% to 50%, the fascial closure increased from 59% to 81% and resource usage decreased.

Update on Treatment

WHEN

- 24h

WHAT

- What can be done to prevent/treat ACS?

HOW

- Best results @ IAP < 12 mm Hg
- BEFORE organ failure occurs!

- Best results @ IAP < 12 mm Hg
- BEFORE (multiple) organ failure occurs!
UHZ algorithm for ACS

UHZ RAAA experience 1998-2015

Emergency EVAR for RAAA (n=198)

ACR + primary decompression: 78%
ACR + secondary decompression: 22%
ACR -: 3%
ACR +: 17%

Progressive closure

14 d 20 d 23 d

REVAR 30-day mortality as a function of ACS

ACR -: 9
ACR +: 26
Orebrö sub-algorithm for ACS

A Novel Technique for Treatment of Abdominal Compartment Syndrome

Thomas Larzon
Tel Hörr, Per Skoog, Ken Eliassen, Göran Gruber, Asko Toivola, Artai Pirouzian,
Örebro University Hospital
Örebro, Sweden


Orebrö sub-algorithm for ACS

Upsala sub-algorithm for ACS

VAC+mesh
• Combination of VAWC and a Prolene® mesh to approximate the fascial edges and permit primary closure in patients requiring prolonged treatment with open abdomen


In the end, all mesh is removed and the fascia is closed

What to take home!

Protocols reduce ACS/PCS mortality

Proactive approach to ACS necessary

„Bogota“ VAC as excellent bail out tool

Various effective abdominal closure tecs