Patients with Insufficient Laparoscopic Workspace

What can the anaesthesiologist do to improve this?

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Which patients have frequent problems?

1. Obese patients BMI>40, WHR>1 and intra abdominal fat: male apple type.
2. Obese woman without children, never laparoscopy in the past, did have an abdominoplasty.

How do you measure this objectively <-> surgical: it presses?

1. Measure the abd pressure volume relation with three points: calculate E and PV0. PV0 > 8, E > 3 mmHg/l.
2. Measure inflated volume at 15 mmHg. IAV < 4 l.

How do you improve the workspace?

1. Deep Neuromuscular blockade TOF = 0 (PTC > 3) till end of pneumoperitoneum.
   On average + 1000 ml

2. Deep anaesthesia with Inhalation or Remifentanil does not help. (Prevents breathing against ventilator and prevents active contractions of the abdominal muscles)
   + 0 ml

3. Flexing the legs rotates the pelvis and shortens the distance for the m. rectus.
   On average + 700 ml

4. Trendelenburg position displaces the diaphragm into the thorax
   On average + 500 ml

5. Use higher IAP. Max 20 mmHg continuously. Set PEEP higher!
   On average + 1000 ml

6. Use ARM to elongate the abdominal wall, use higher peep to protect the lungs, control hemodynamic impact and venous return.
   Three minutes at 30 mmHg increases persistent the volume with 500 ml in 50 % of the patients. (does not work in an abdomen already elongated)

7. Use ARM during short moments when surgeon has no access in a critical step.
   Inflate to a higher pressure for a short moment. Ask the surgeon to release the lap instruments to give space. According to the leak and the IAP repeat manual inflation.
ARM
Abdominal Recruitment Method

Is it acceptable? Patient approval to use higher insufflation pressures if no space.

Pneumoperitoneum during > 1 hour at > 15 mmHg
- elongates the abdominal wall at end surgery only in the first laparoscopy
- persist many years after laparoscopy
- Is comparable to the effect of gravidy > 2

ARM elongate the abdomen from the beginning.

If no ARM is used:
- need to change to laparotomy,
- cancelation of surgery
- change of surgical procedure (lap band instead of lap RNY)
- surgical procedure doubles in time
- increased complications like liver trauma, leak due to incorrect stapling...

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**Table:**

<table>
<thead>
<tr>
<th>All patients</th>
<th>E</th>
<th>PV0</th>
</tr>
</thead>
<tbody>
<tr>
<td>start</td>
<td>3.42 +/- 1.34</td>
<td>1.11 +/- 2.0</td>
</tr>
<tr>
<td>end</td>
<td>2.33 +/- 2.0</td>
<td>1.53 +/- 1.87</td>
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K Verbeke. ESA 2010: Impact of laparoscopy on the abdominal compliance
Case of ARM use

Female   BMI 38.6;   neck circumference 48 cm
           age: 53 y;
           RBW 100.1 kg;

History:
   1999 Lap band (95 kg): difficult intubation; 20 kg weight loss.
   2001 Abdominoplasty. Peni allergic
   2001 Strabismus operation with anaphylaxis probably on NMB. Skin test: allergic to all NMB.
   2010 Dilatation of lachrymal duct: NPO > 14 h and aspiration, not able to intubate with video laryngoscope.

Intubation problem – No NMB use – aspiration risk

Neck circumference 48 cm; allergic to Penicilline and NMB; aspiration risk; impossible to intubate. Approval from patient to use ARM

Procedure: Awake fiberoptic intubation with local anesthesia
Deep inhalation anesthesia with Desflurane > 1 MAC
No NMB   beach chair,   IAP at 20 mmHg lap space < 2 l
Surgical comment: No space impossible to operate, no access, flat tunnel.
Use of ARM at beginning to recruit space: insufficient gain by 3 min at 40 mmHg
Therefore at critical steps higher IAP to 30 mmHg for a short moment.

Surgical access suddenly possible during short moments:
Lap band removal possible
Lap gastric bypass possible
All in one time.
Recovery without problems, left hospital on 3 day, no vomiting and RNY working

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