Robotic Surgery in the Morbidly Obese Patient

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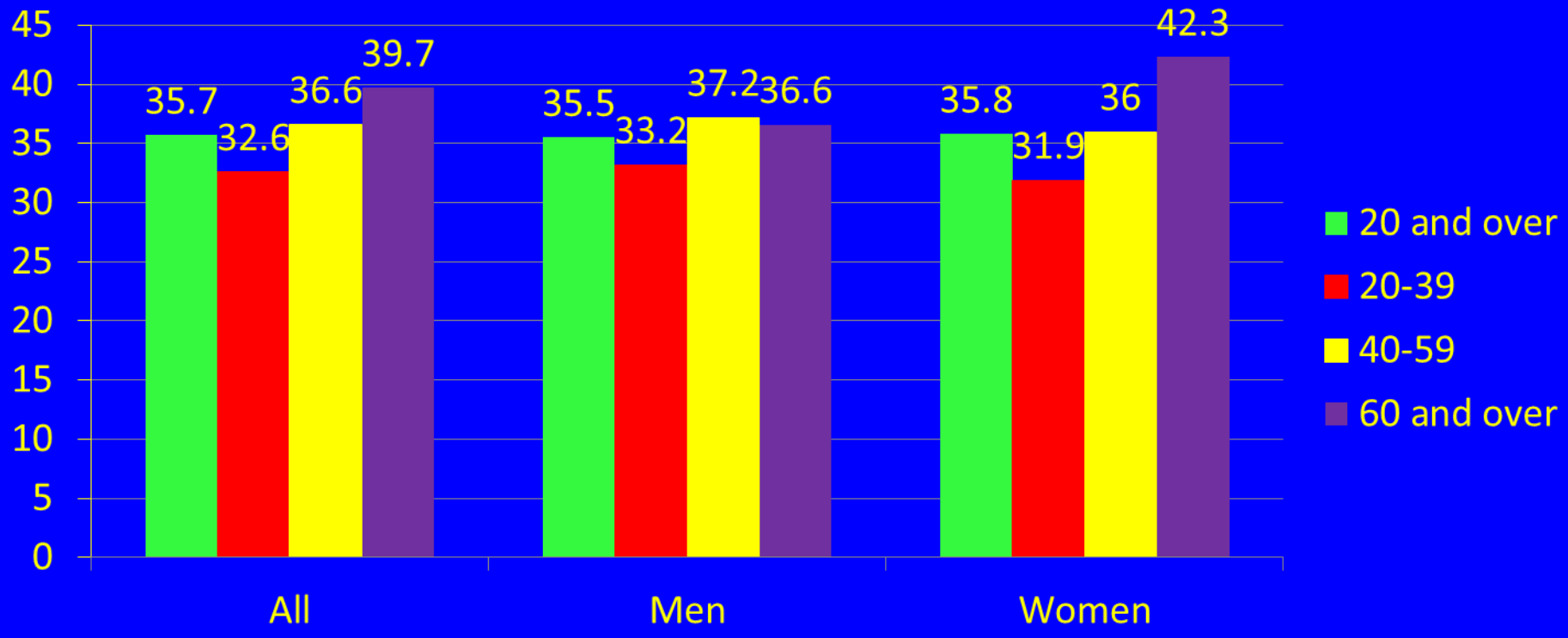
The Obesity Epidemic

- The prevalence of obesity in the United States increased during the last decades of the 20th century (Flegal KM et al, JAMA 2000).
- More recently there appears to have been a slowing of the rate of increase or even a leveling off (Flegal KM et al, JAMA 2010).



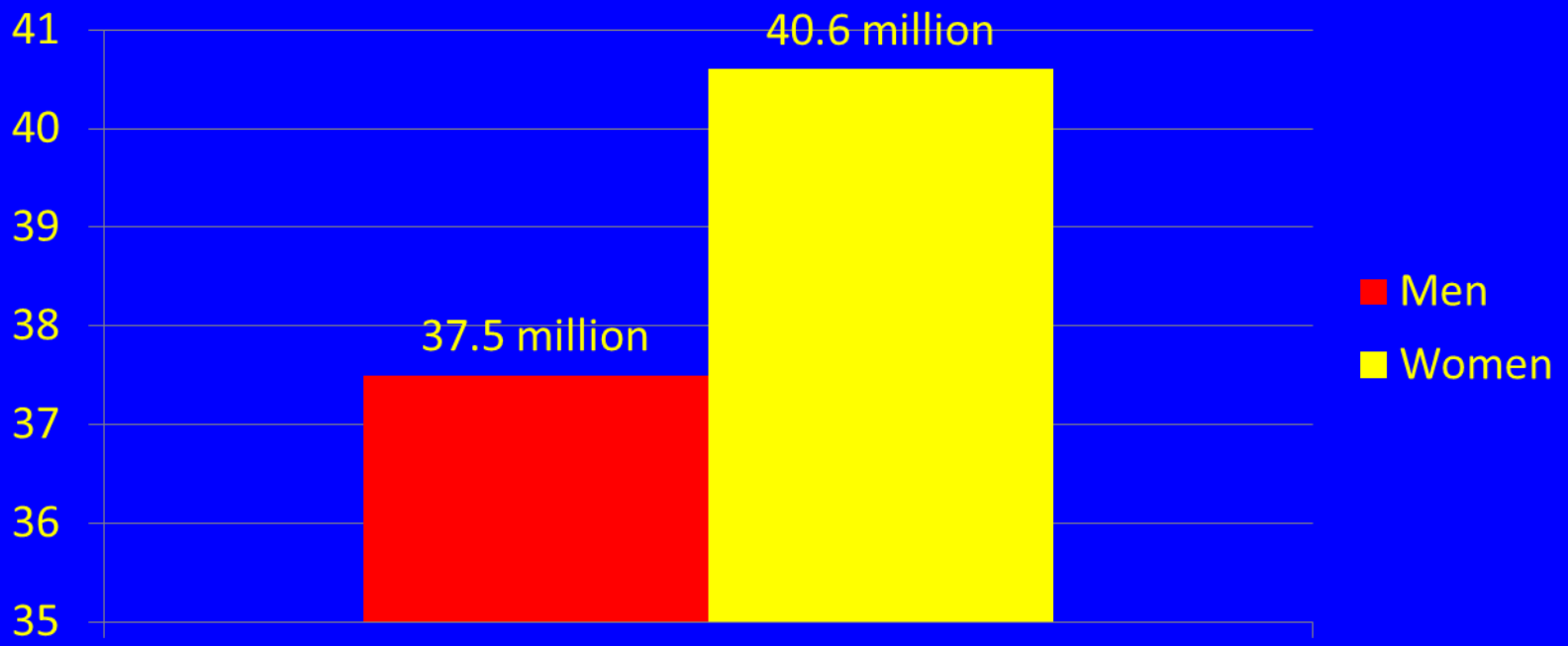
The Obesity Epidemic

In 2009 – 2010, 35.7% of U.S. adults were obese (National Center for Health Statistics)



The Obesity Epidemic

- Over 60 percent of U.S. adult women are overweight, according to 2007 estimates from the National Center for Health Statistics of the Center for Disease Control and Prevention.
- In 2009 – 2010, 78 million U.S. adults were obese (CDC / National Center for Health Statistics, National Health and Nutrition Examination Survey)



The Obesity Epidemic Worldwide

- **More than 1.4 billion adults were overweight in 2008, and more than half a billion obese**
- The prevalence of obesity has nearly doubled between 1980 and 2008. Once associated with high-income countries, obesity is now also prevalent in low- and middle-income countries.

Choice of Approach

- When BMI increases, so does the difficulty of the surgical procedure
- Surgeons are more likely to recommend laparotomy versus laparoscopy for obese and morbidly obese patients



Preoperative Evaluation

- The uterine size and mobility are difficult to evaluate on physical examination



Surgical History

- Previous abdominal procedures
- The omentum and intestines are involved in adhesions
- It can be difficult to expose the pelvis and the periaortic area



Previous Abdominal Procedures



Preoperative Evaluation and Selection

- Preoperative Anesthesia consult
- Request an experienced Anesthesiology team
- Difficult IV access and intubation



After Induction of Anesthesia

- Remove any makeshift devices used to facilitate a difficult intubation



The Lung Capacity Does Not Increase with the Patient's Weight

- Maintain a low tidal volume +/- increased frequency
- Some hypercapnia is permitted
- The orogastric tube will be placed on low continuous suction

Intraocular Pressure

- The steep Trendelenburg position will increase the intraocular pressure
- Monitored with a handheld tonometer



‘Pears’ vs. ‘Apples’





‘Pears’ vs. ‘Apples’



‘Apples’

- The actual weight is much less important than the distribution of fat
- Generally, the procedures are more difficult in patients with androgenic fat distribution
- The abdomen is ‘tighter’ and it is less likely to relax under anesthesia



‘Pears’

- The abdomen relaxes and extends laterally after induction of anesthesia



‘Apples’

- The abdomen of these patients can be long and the camera and instruments placed too high in preparation for para-aortic LND may not reach the pelvis.



Weak Abdominal Wall





Very Wide Abdomen



Very Wide Abdomen



Patient Positioning

- On the table
  - Bean bag
  - Gel padding
  - Egg crate
  - Shoulder supports



Patient Positioning



Use of shoulder supports or makeshift bed sheet sling to prevent sliding while in Trendelenburg position



Patient Positioning

- Shoulder supports and gel pads



Patient Positioning

- Shoulder supports and gel pads
- No brachial plexus injuries





Padding

- Apply the points of maximum pressure preferably posterior to the acromion



Patient Positioning

- If the patient is wider than the OR table, place arm rests along the side



Patient Positioning

- If the arms cannot be tucked in, the arm opposite from the assistant can be placed at an angle.



Patient Positioning

- May need to improvise because of equipment limitations

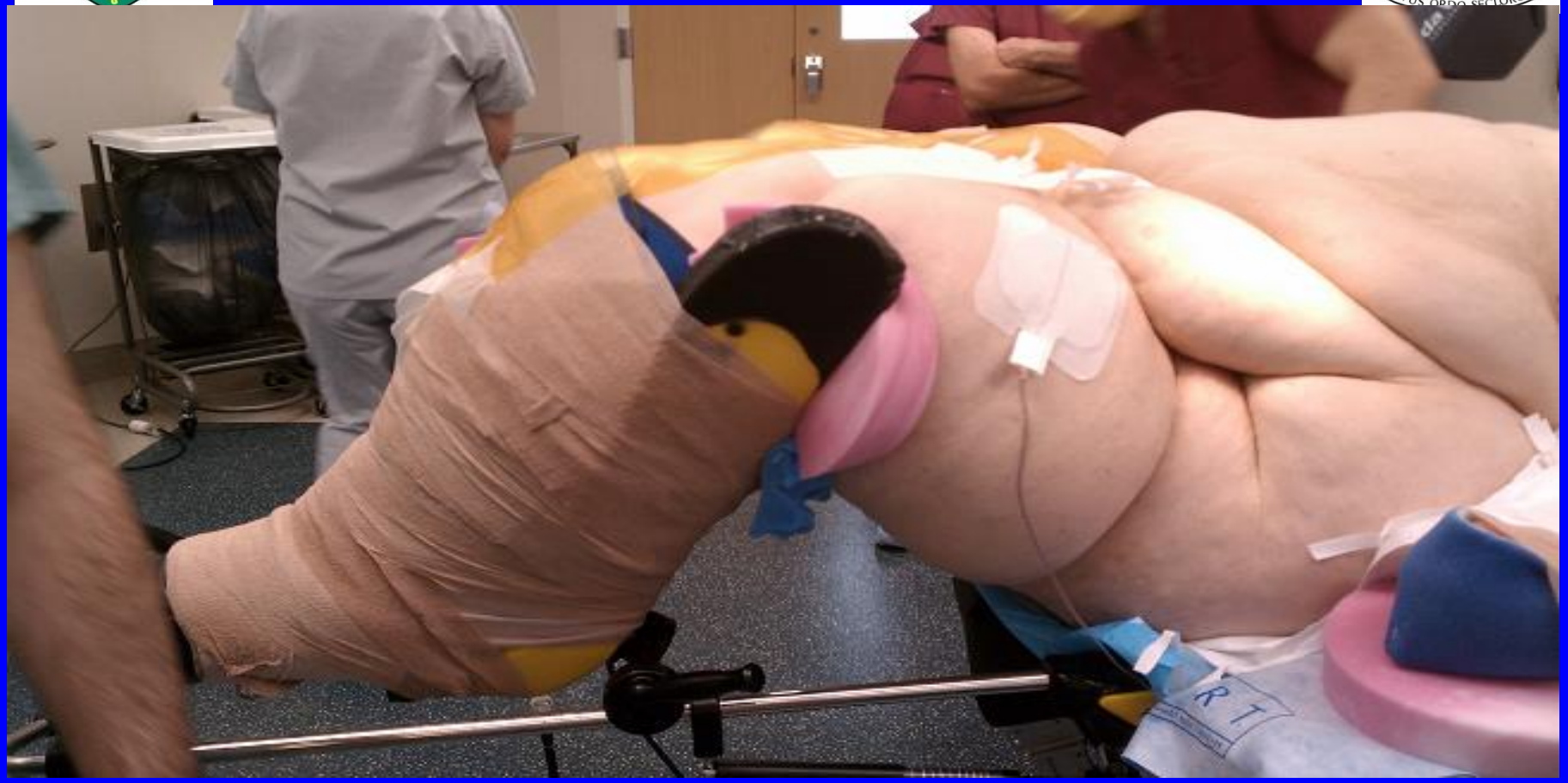




Patient Positioning



Patient Positioning



Patient Preparation



Use of Montgomery Straps and Adhesive Tape



Use of Montgomery Straps and Adhesive Tape



The abdominal wall does not shift when in Trendelenburg position

Pneumoperitoneum

- My preference is to place the Veress needle supraumbilically
- Reasons
  - Small umbilical hernias are frequent in morbidly obese patients
  - May contain bowel
  - May be harder to detect on palpation because of habitus
  - With a hanging pannus, the umbilicus is pulled down

Pneumoperitoneum

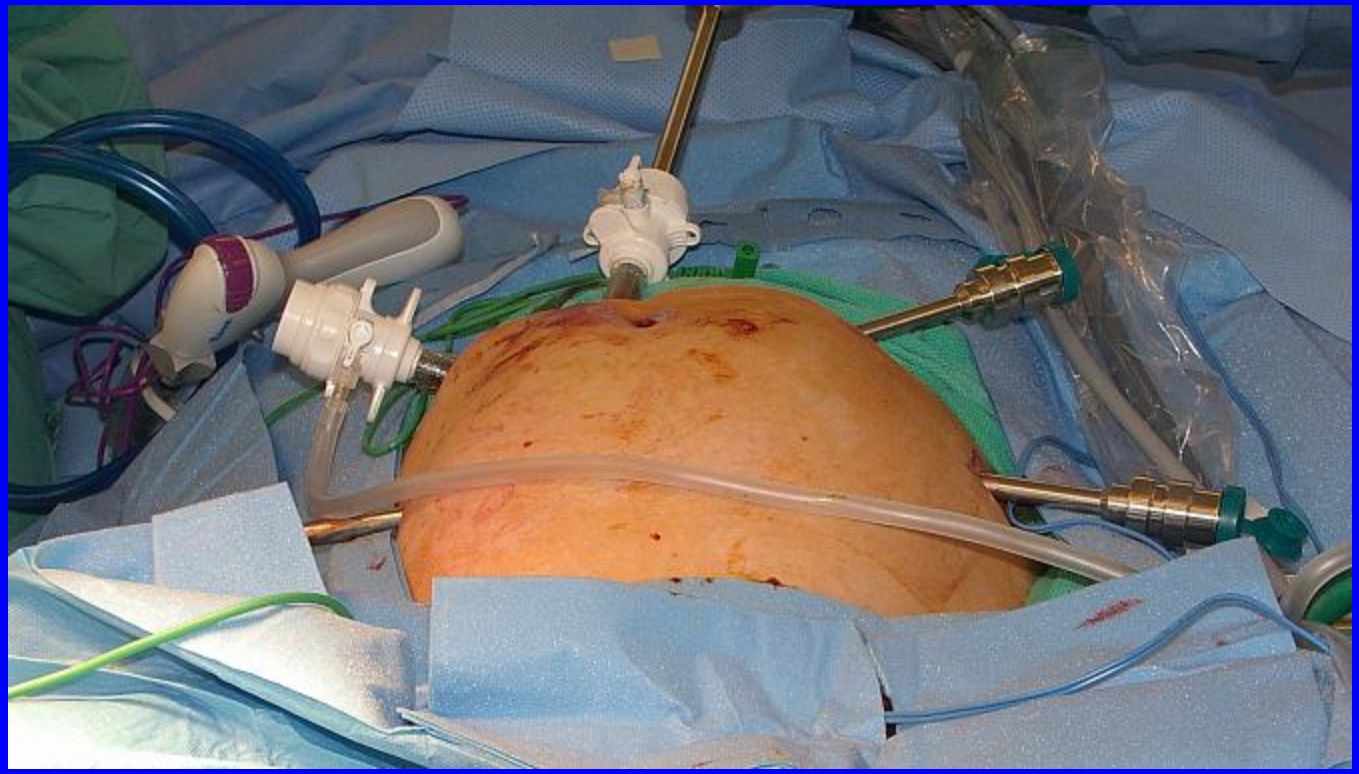
- When inserting the Veress needle above the umbilicus
  - The patient is horizontal
  - Insert the needle at an angle, to compensate for the skin and subcutaneous fat shift when in Trendelenburg
  - Risk to run short on the camera trocar

Pneumoperitoneum

- Occasionally 2 insufflation systems may be necessary to maintain the intrabdominal pressure, especially if the fascia is attenuated and CO_2 leaks
- If the bowel keeps rolling into the pelvis, may increase pressure to 20-25 mm Hg, even if temporary, to provide adequate exposure

Port Placement

- Any configuration is feasible because the abdomen is so wide
- My preference is the sunrise distribution centered around the camera port



Port Placement

- Straight line



Port Placement

- In the umbilicus and abdominoplasty scar



Port Placement

- If the abdominal wall is too thick (especially laterally)



Telescoping



Uterine Manipulator

- Manipulation is very difficult because of the size of the thighs and it is usually unnecessary
- Delineation of the vaginal fornices by the Koh ring (RUMI) can be useful when the abundant fat surrounding the bladder makes the recognition of the anatomical landmarks difficult
- The uterine manipulator is placed after pelvic washings are obtained



Bowel Injury from Trocar Insertion

- Repair the injury at the beginning of the case with the patient still in horizontal position
- It can be repaired robotically or by free hand laparoscopy, with the same port positioning (straight line or sunrise distribution)

Bowel Injury from Trocar Insertion

- Especially for small bowel, it may be difficult to find a small injury, even if tagged, after the bowel shifts with peristalsis and Trendelenburg positioning
- The transverse colon is less mobile
- Injuries may be hidden by the omentum

Bowel Injury from Trocar Insertion

- Repairs in the upper abdomen may require shoulder docking



Keeping the Bowel Away

- Bowel preparation
- Bowel retractors (paddle, fan)
  - May use more than one
- Suture the sigmoid epiploica to the left abdominal sidewall peritoneum
- Place extra ports if necessary

Thank you for your attention!

- Questions?

