The Dangerous Progression of Intra-Abdominal Hypertension

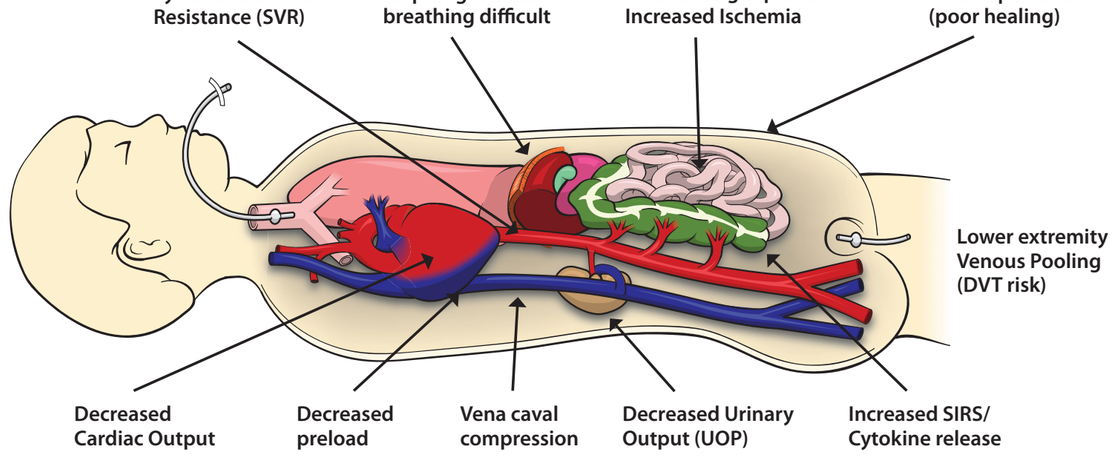
Patients undergoing resuscitation, especially in the setting of systemic inflammation, will "leak" intravascular fluid into their tissue. Large amounts of this fluid can accumulate in the abdomen as both free fluid and interstitial edema. As this fluid accumulates the pressure in the abdomen begins to rise. Once the intra-abdominal pressure (IAP) exceeds 12 mmHg it is defined as intra-abdominal hypertension (IAH), a syndrome found in as many as 50% of critically ill patients. Left unnoticed IAH may progress to multiple organ dysfunction, the abdominal compartment syndrome and death. Unfortunately, IAH cannot be identified through physical examination. Therefore proper detection and management of IAH requires screening of all patients at risk for IAH by monitoring their IAP. The optimal method of measuring IAP is via transduction of the pressure through the bladder using a Foley catheter. The diagrams below illustrate what happens to the patient's body as the severity of the illness increases. It highlights the patient's signs and symptoms, physiologic effects along with what can be done (interventions) to manage IAH.

Patient Signs and Symptoms | **Physiologic Effects of IAH** | **What Can Be Done (Interventions)**

Increasing Physiologic Compromise
IAP 12 – 15 mmHg

Very subtle clinical findings:

- Occult ischemia is occurring with little clinical evidence beyond IAP level
- Clinicians cannot feel abdomen or measure its circumference and gain any meaningful insight into the patient's IAP level
- Difficult to mobilize excess fluid
- Difficult to wean from the ventilator

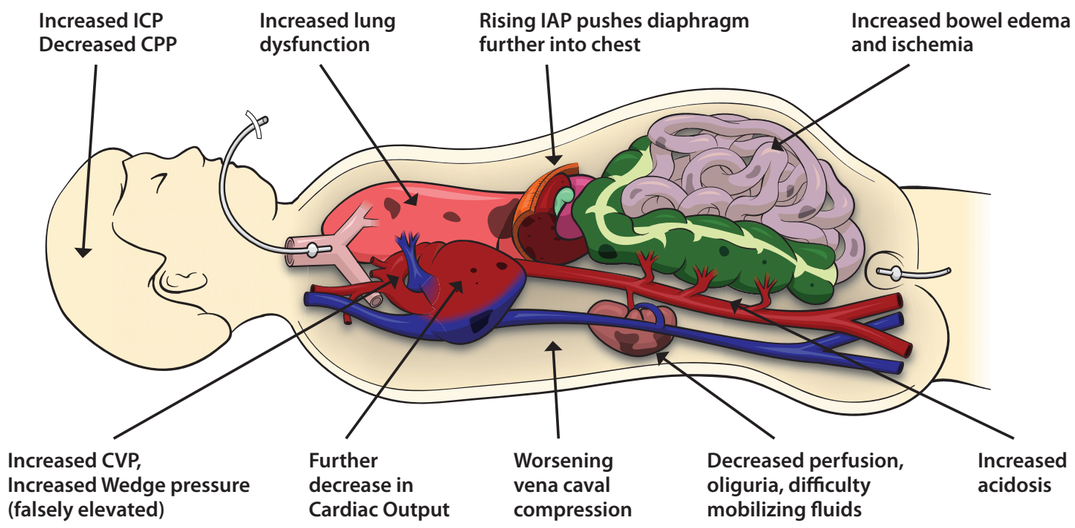


- Sedation
- Pain control
- Avoid prone position
- Reposition bed: reverse Trendelenburg without flexion at the hips
- Remove all constrictive bandages
- Carefully assess fluid administration:
  - Do not over resuscitate – use goal directed volumes and reassess
  - Avoid unneeded fluid boluses
  - Concentrate all drips
  - Aim for neutral to negative fluid balance by day 3
- Nasogastric tube
- Rectal tube
- Enemas
- Bowel prokinetic agents such as erythromycin, metoclopramide

Occult Organ Ischemia
IAP 16 – 20 mmHg

ALL OF THE ABOVE PLUS:

- Unexplained acidosis
- CVP and Wedge pressure measurements are often falsely elevated (due to IAP transmission to CVP catheter)
- Cardiac output decreasing
- Urine output decreased
- Peak and plateau pressures increasing on the ventilator
- Hypoxemia, hypercarbia, atelectasis
- Abdominal distention MIGHT be visible; not reliable in today's obese population



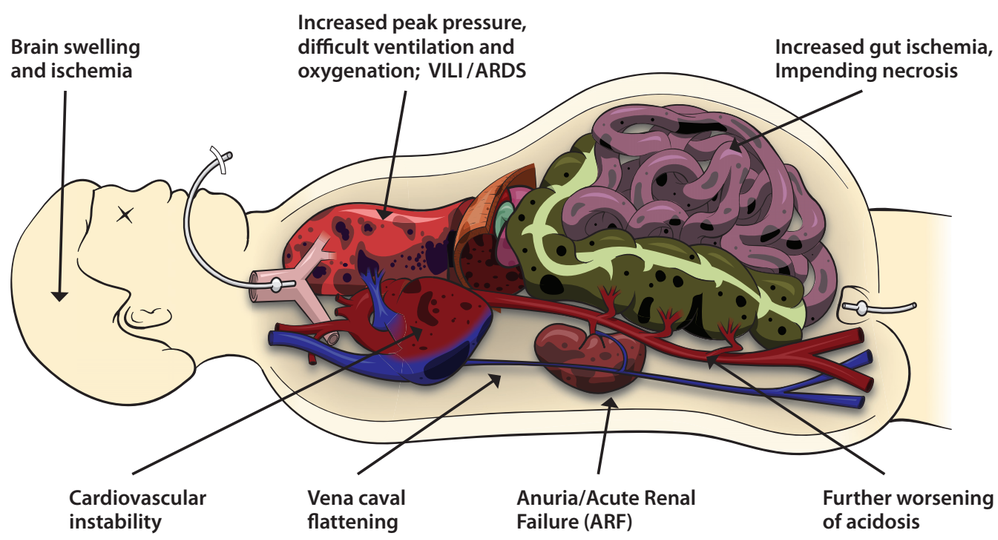
ALL OF THE ABOVE PLUS:

- Enteral nutrition at trophic levels only
- Colloids plus diuretics
- Hemofiltration / dialysis to remove excess fluid
- Ultrasound or CT the abdomen to identify free fluid, space occupying lesions amenable to drainage
- Paracentesis catheter to drain any free fluid
- CT or ultrasound guided drainage of abscesses, hematomas

Onset of Multiple Organ Dysfunction Syndrome (MODS)
IAP > 20 mmHg

ALL OF THE ABOVE PLUS:

- Intractable acidosis
- Abdomen tense (exam not reliable in today's obese population)
- Renal insufficiency / failure
- Pulmonary failure with significant difficulty ventilating
- Cardiovascular instability
- Rising intracranial pressure



ALL OF THE ABOVE PLUS:

- Neuromuscular blockade and infusion
- Colonoscopy to decompress distended colon
- Stop enteral nutrition
- Surgical evacuation of any tumors, masses
- Surgical consultation to plan decompressive laparotomy if the above interventions fail, IAP exceeds 25 mmHg or organ failure ensues

Interventions are based upon WSACS.org international guidelines.

References on file

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