

ABDOMINAL COMPARTMENT SYNDROME

(Last updated 07/23/2019; Reviewers: Srdjan Gavrilovic, MD; Yiwu Zhou, MD)

PRESENTING COMPLAINT: Distended, Firm (painful) abdomen

FINDINGS

- **A** Check airway
- **B** ↑ RR
- **C** ↓ BP, ↑ HR, weak pulse
- **D** Variable altered (V,P,U,D)*
- **E** Distended, firm (painful) abdomen, distal edema, signs of hypoperfusion, oliguria
- **L_{PC}** ↑ Lactate ↓ PaO₂, ↓pH, ↓ HCO₃, ↓pCO₂ (metabolic acidosis)
- **U_{PC}** Peritoneal fluid collection in the abdomen, fluid in the intestine, inferior vena cava compression (may be relatively empty despite increased overall fluid status), renal compression, thickened bowel wall

***V** (verbal), **P** (pain), **U** (unconsciousness), **D** (delirious)

U_{PC} (point of care ultrasound) **L_{PC}** (point of care labs)

OTHER HISTORY

- Trauma, intraabdominal/retroperitoneal hemorrhage, pancreatitis, surgical/radiologic intervention, aggressive fluid resuscitation during severe hemorrhage or septic shock, burns, liver transplant, massive ascites

DIFFERENTIAL DIAGNOSIS

- Abdominal neoplasms

OTHER INVESTIGATIONS

- **Labs:** Blood count, electrolytes, glucose, serial lactate, renal/liver function, bilirubin, lipase, coagulation profile, blood type and cross match, pregnancy test (if female), ABG
- **Monitoring**
 - Intra-abdominal pressure (IAP)
 - **Non-invasive:** Repeat abdominal girth measures, drastic intra-abdominal pressure (IAP) increase when critical girth reached
 - **Invasive:** Consider intravesical (bladder)/ intragastric/ intracolonic/ inferior vena cava catheters, head-body in the same supine position, at end of expiration, zero pressure at the mid-axillary level
 - **Miscellaneous**

- IAP grades (mmHg) I (12-15), II (16-20), III (21-25), IV (>25)
- Abdominal compartment syndrome: If sustained IAP ≥ 20 mmHg, or IA hypertension (≥ 12) + new organ dysfunction (Cardiovascular, pulmonary, renal, gastrointestinal, hepatic, central nervous system)
- Abdominal perfusion pressure AAP= MAP – IAP; Goal > 60mmHg
- Consider chronic elevated IAP: Morbid obesity, ascites, pregnancy
- **Imaging:** US/CT abdomen: As mentioned above, bilateral inguinal herniation

THERAPEUTIC INTERVENTIONS

- Treat underlying disease!
- **Procedures**
 - Decompression: Nasogastric aspiration (continuous or intermittent) and rectal tube placement if not contraindicated; Percutaneous drainage if ACS is a result of fluid collection: ascites, hematomas, abscess evacuation
- **Consult**
 - Call surgeon immediately to consider early surgical decompression
 - Linea alba midline incision
 - Surgical intervention is the first step in primary (postoperative) intraabdominal compartment
- **Anxiolysis & Sedation:** Optimal analgesia (IV opioids) and sedation, strongly consider paralysis
- **Prevention**
 - Avoid head of bed > 30 degrees unless Trendelenburg position
 - Avoid excessive fluid resuscitation: Aim for zero to negative fluid balance
 - As needed diuresis and/or renal replacement therapy
 - Patients at risk for secondary ACS receiving crystalloid resuscitation (severe shock regardless of the cause) must be monitored closely and, when given >6 liters of crystalloid in a 6-hour period, IAP should be measured
 - Minimize constrictive dressings: Consider addressing abdominal eschars
 - In post-injury primary ACS: correction of coagulopathy, acidosis, and hypothermia should be an early goal
 - Post-injury ACS occurs most frequently during the first 12 hours
- **Miscellaneous**
 - Resuscitation if hemodynamic failure. However, avoid fluid overload. Change to colloids instead of crystalloids, use of early vasopressors

- Ventilatory support: Follow closely intrathoracic pressures; Use PEEP (higher than usual), mild permissive hypercapnia, strongly consider neuromuscular blockade
- NPO: Nothing by mouth

MANAGEMENT AFTER STABILIZATION

- Continue Monitoring: Intra-abdominal pressure
- Prevent Complications: Watch for hypotension after large volume paracentesis: calculate albumin replacement
- Maintenance and inspection of temporary abdominal wall closure
- Prognosis: Best predictors of survival are post-decompression improvement in blood pressure/cardiac index, urine output, and signs of perfusion

CAUTIONS

Complications

- Recurrence of Abdominal Compartment Syndrome
- Ongoing effects of prior compartment syndrome including organ ischemia

REFERENCES & ACKNOWLEDGMENTS

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