

FLAGLER HOSPITAL PROTOCOL - ABDOMINAL COMPARTMENT SYNDROME

As with any protocol, this protocol serves to provide evidence-based, comprehensive recommendations to guide our multidisciplinary team in patient care, with the expectation that expert practitioners will modify and customize as necessary the present protocol to meet individual patient needs. This Protocol is not intended to replace the physician's judgment; it is intended to provide guidance to the physician for the group of patients described in this Protocol.

Intra-abdominal hypertension (IAH) and abdominal compartment syndrome (ACS) are common entities in the ICU, however, not infrequently unrecognized. The development of ACS is associated with increased morbidity and mortality in critically ill patients. Therefore, recognizing its presence is essential as a guide in its prevention and implementing appropriate therapy.

Definitions by the World Society of the Abdominal Compartment Syndrome (WSACS)

The Abdominal Compartment Society in 2013, updated IAH and ACS definitions and clinical practice guidelines were developed to standardize and optimize management and treatment (1) .

- IAH is defined by a sustained or repeated elevation of IAP greater than or equal to 12 mmHg.
- Abdominal Perfusion Pressure (APP) is the difference between mean arterial pressure (MAP) and the IAP and is an indicator of organ perfusion.
- ACS is defined as a sustained intrabdominal pressure (IAP) greater than 20 mmHg, with or without an APP of < 60 mmHg, associated with new organ failure.
 - Primary ACS is a condition associated with injury in the abdominopelvic region that frequently requires early surgical or interventional radiological intervention.
 - Secondary ACS refers to conditions that do not originate from the abdomen.
 - Recurrent ACS refers to the condition in which ACS redevelops following previous surgical or medical treatment of primary or secondary ACS.

Although the APP is an indicator of organ perfusion and a study showed that an APP less than 60 mmHg reliably predicted the necessity for surgical decompression, making it useful for both, diagnosis and treatment (2), the WSACS did not endorse the use of the APP as a resuscitative endpoint (1).

Grading system for IAH according to the level of IAP by the WSACS

Grade I: IAP 12–15 mmHg

Grade II: 16–20 mmHg

Grade III: IAP 21–25 mmHg

Grade IV: IAP > 25 mmHg.

These grading systems and classification developed by WSACS facilitate the subsequent management of IAH and ACS in an organized stepwise approach.

OBJECTIVE

To optimize the general care of patients with IAH and ACS at Flagler Hospital.

SCREENING

All patients admitted to the ICU with risk factors for developing IAH and ACS will be eligible to be included in the protocol.

Risk factors for IAH and ACS

- Shock/hypotension/sepsis
- Respiratory failure requiring mechanical ventilation
- Oliguric renal failure and acidemia
- Abdominal surgery/abdominal infection/ileus
- Pancreatitis, cirrhosis, obesity
- Large-volume resuscitation/Capillary leak

The presence of shock with multiorgan failure and the need for large volume initial resuscitation appear to be important considerations in determining risk of IAH and ACS.

MONITORING AND INTERVENTIONS

Guidelines from the WSACS recommends screening for IAH/ACS when risk factors are present (1).

Management (See algorithm proposed by the WSACS)

Patients with IAP ≥ 12 mmHg:

- Begin medical management to reduce IAP
- Titrate therapy to maintain IAP ≤ 15 mmHg
- Measure IAP every 4-6 hours

- Avoid head of bed $>30^\circ$
- Improve abdominal wall compliance with adequate sedation, analgesia and need for neuromuscular blockers according to Flagler ABCDEF protocol
- Avoid excessive fluid resuscitation and corrects excessive positive fluid balance
- Ileus management including NGT decompression, rectal decompression with a rectal cannula when colonic ileus is pronounced and prokinetics agents (metoclopramide or erythromycin). When such pharmacologic measures are unsuccessful in decreasing intraluminal volume, endoscopic decompression can be considered and GI service will be consulted.
- Evacuate intrabdominal fluid collections if present (paracentesis, percutaneous drainage)

Patients with IAP >20 mmHg but without new organ failure:

- Medical management as above
- Monitor IAP every 4 hours while patient is critically ill
- Discontinue monitoring once IAP is consistently ≤ 12 mmHg

Patients with ACS (IAP >20 mmHg and new organ failure):

- Identify and treat underlying etiology
- Medical management as above
- Stat general surgery consult for consideration of surgical decompression with temporary abdominal closure as needed to reduce IAP. The decision for surgical intervention will be at the discretion of the general surgeon
- Monitor IAP every 4 hours while patient is critically ill
- Discontinue monitoring once IAP is consistently ≤ 12 mmHg

The following steps must be applied in parallel rather than in sequence:

Measuring intra-abdominal pressure via intravesicular route

- Report IAP in mmHg
- Patient should be in a supine position
- Measurements should be taken at end-expiration during abdominal muscle relaxation
- Transducer should be zeroed in the mid-axillary line at the level of the iliac crest

Equipment required

- Foley urine catheter with a urine bag
- Pressure monitoring system
- IV bag of 0.9 Normal Saline (NS)
- Transducer cable and 30 ml syringe

Steps for measuring intra-vesicular pressure

- Connect the transducer cable to the monitor and set up the pressure monitoring system

- Place patient in the supine position to avoid higher IAP, a urinary catheter should be in place
- Adjust the transducer and zero it so that atmospheric port is level with the mid-axillary line at the iliac crest
- Clamp the catheter distal to the port, clean the port with alcohol swab then connect the transducer tubing to the sampling port
- Turn the stopcock off to the patient and allow the syringe to fill to maximum of 25 ml of 0.9 NS from the IV bag
- Turn the stopcock off to the NS and inject the 25 ml of 0.9 NS into the bladder
- Release the clamp on the urinary drainage tubing to allow all air to be flushed from the urinary catheter Allow 30–60 s after installation for bladder detrusor muscle relaxation and stabilization to occur
- Measure IAP in the end-expiratory phase, document the pressure reading in the monitor

REFERENCES

1. World Society of the Abdominal Compartment Syndrome (WSACS)
website: <http://www.wsacs.org>.
2. Cheatham M, White M, Sagraves S, Johnson J, Block E. Abdominal perfusion pressure: a superior parameter in the assessment of intra-abdominal hypertension. *J Trauma Acute Care Surg*. 2000;49:621–627.