Intraoperative Hemodynamic Studies at HHS

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Conventional vital sign (CVP, HR, BP) monitoring is suboptimal in determining fluid responsiveness.

Excessive volume administration:
- Pulmonary edema, prolonged mechanical ventilation
- GI dysfunction (abdominal compartment syndrome, ileus, anastomotic leak)
- Hemodilution and coagulopathy

Insufficient volume administration:
- Low preload, low cardiac output, low BP, low perfusion
- Arrhythmia (hypovolemia)
- GI dysfunction (postoperative ileus, PONV, upper GI bleeding, anastomotic leak)
- Infectious complication (tissue hypoperfusion)
- Acute renal insufficiency or failure

A large body of clinical evidence demonstrates that you may reduce post-surgical complications by hemodynamically optimizing your patients using Perioperative Goal-Directed Therapy (PGDT)
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**PPV (SVV) limitations:**
- Mechanical Ventilation
- General Anesthesia
- Tidal volume > 6-8 mL/Kg
- No arrhythmia
- HR/RR > 3.6
- Arterial line
NHS-NICE/Kuper Protocol

Measure SV

200-250 ml fluid over 5-10 minutes

SV increase >10%?

NO

Monitor SV for clinical signs of fluid loss

NO

SV reduction >10%

YES
How to measure SV intraoperatively?

**ClearSight System**
*noninvasive approach*

- Stroke Volume (SV)
- Stroke Volume Variation (SVV)
- Cardiac Output (CO)
- Systemic Vascular Resistance (SVR)
- continuous Blood Pressure (cBP)

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**Flotrach System**
*Arterial line*

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**EV1000**
Hemodynamic Closed Loop

**Traditional Practice**
- Therapy determined by individual provider practice
- Provider implements actions
- High practice variability in both therapeutic goals and implementation

**Decision support**
- Decision support tools recommend interventions
- Provider implements recommended actions
- Therapeutic goals consistent across patients, implementation dependent of providers

**Closed Loop support**
- Provider sets therapy goals/targets
- Closed loop system takes action to maintain targets of therapy
- Therapeutic goals tailored to patient by providers, consistent implementation
1 – Pilot study:
100 patients – RCT
- Allocated to either routine or PGDT
- Patients: spinal and abdominal surgery >2hrs
- Outcome: Cost
- Objectives:
  1. demonstrate the economical interest of PGDT at HHS.
  2. Feasability of the PGDT protocol
- Timeline: First patient summer 2015.

2 – Outcome study
#1500 patients – multi-center RCT
- Allocated to either routine or PGDT
- Outcome: Postoperative complications
- Objective: Confirm reduction of postoperative complication
- Timeline: First patient spring 2016.
3 – Closed Loop evaluation:

80 patients – RCT

- Allocated to either routine (with blinded CO monitor) or Closed loop PGDT

- **Patients**: spinal and abdominal surgery >2hrs

- **Outcome**: Time spent in the predefined target zone

- **Objectives**: demonstrate that closed loop strategy improves the time spent in target zone.

- **Timeline**: First patient summer 2015.
Improve patients outcome:
  • Reduce postoperative complications in high risk population.

Knowledge dissemination:
  • Implement modern intraoperative hemodynamic strategies at HHS
  • Train residents and staffs to PGDT at HHS
  • Organise workshops to train PGDT to staffs from other centers.

Quality of care:
  • Provide a consistent implementation of perioperative fluid management strategies.
  • Report the time spent in the target zone as a quality indicator of the intraoperative management.

Research:
  • First Canadian center to conduct researches on the Hemodynamic closed loop.
  • One of the most promising intraoperative intervention to reduce postoperative complication.
  • Largest study conducted in this research field

Partnership:
  • Build a durable and robust partnership with industry
  • Based on research, education and expertise.