Goal Directed Fluid Therapy at UCSD

Monitors and Algorithms
Enhanced Recovery

- Audit of compliance/outcomes
- Perioperative oral nutrition
- Early removal of catheters
- Stimulation of gut motility
- Prevention of nausea and vomiting
- Non-opiate oral analgesics/NSAIDs
- Routine mobilisation care pathway
- Warm air body heating in theatre
- Short incisions, no drains

- Pre-admission counseling
- No bowel prep
- Fluid and CHO - loading/no fasting
- No premed
- No NG tubes
- Mid-thoracic epidural anaesthesia/analgesia
- Short-acting anaesthetic agent

- Avoidance of sodium/fluid overload
Perioperative Surgical Home

Enhanced Recovery

Preoperative
- Evaluation
- Consultation
- Counseling
- Optimization
  - ↓ bowel prep
  - Carb drink

Intraoperative
- GDT
- Thromboprophylaxis
- Temp maintenance
- Antibiotics

Postoperative
- Pain Control
  - Multimodal
  - Opiate sparing
- Early Extubation
- Early Mobilization

Discharge, Post-discharge management
GDT: a physiologic approach to fluid and hemodynamic management

- Standard ASA Monitors
- Blood Flow (CO, SVI)
  - Arterial Based CO (FloTrac™)
  - Esophageal Doppler (Deltex CardioQ™)
- Preload Responsiveness
  - SVV
  - FTc
GDT for major surgeries results in BETTER OUTCOME

- Fewer complications
- Fewer readmissions
- Shorter length of stay
- Decreased suffering
- Decreased cost
- It’s actually fun to do
Which patients?

Goal Directed Therapy for high risk surgeries:

- Laparotomy Exploratory
- Resection Bowel Large, Colectomy
- Whipple Pancreato-duodenectomy
- Hepatectomy
- Splenectomy
- Transplant Kidney
- Dissection Radical Neck
- Bypass Aorto –Femoral/ Popliteal/Axillary
- Open Hysterectomy Abdominal Total /Bilateral Salpingo-oophorectomy
- Chemotherapy Hyperthermic Interperitoneal
- Laminectomy Fusion w/ Instrumentation ( > 3 levels)
- Arthroplasty Hip, Knee, Elbow
- Excision Burn
- Cystoprostatectomy w/ Ileal Conduit
- Radical Cystectomy
The UCSD algorithms are only guidelines

- In concert with other clinical data
- Based on previous algorithms in literature
- There is more research to be done
  - Patient outcome
  - Tissue perfusion
  - Tissue oxygenation
Welcome

Welcome to the UC San Diego Department of Anesthesiology. You will see that we emphasize postgraduate education in anesthesiology and opportunities to develop clinical and research skills in all aspects of anesthesiology and pain medicine.

Gerard Manecke M.D., Chairman.

Dr. Banumof (right)
Winner of the 2010 IARS Career Teaching Award

News & Highlights

2016 Anesthesiology Update - January 13th-16th
Registration NOW OPEN!

Mission Statement

Our mission is to advance the art and science of anesthesiology, and to train its next generation of clinicians and scientists.

Quick Links
The Deltex CardioQ
# TED Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
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<th>Goal</th>
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<tbody>
<tr>
<td>Stroke Volume Index (SVI)</td>
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<td>&gt;35 ml/m²</td>
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<td>Cardiovascular Performance</td>
<td>&gt;2.5 L/min/m²</td>
</tr>
<tr>
<td>Flow Time</td>
<td>Preload</td>
<td>&gt;350 msec</td>
</tr>
<tr>
<td>Peak Velocity</td>
<td>Contractility</td>
<td>&gt;50 cm/sec</td>
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FloTrac Sensor
## APCO (FloTrac™) Parameters

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<td>Stroke Volume Variation (SVV)</td>
<td>Preload Responsiveness</td>
<td>&lt;13%*</td>
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</table>

**SVV:**
- Controlled Ventilation TV > 8cc/Kg

*Note: Limitation of SVV are not CO monitoring limitations*
Preload Responsiveness:

- SVV
  - Arterial Pulse Wave systems
- FTc
  - Esophageal Doppler
Positive Pressure Breath

↑ Intrathoracic Pressure

↑ RV
Afterload ↓ RV

↑ LV Preload

Acute ↑ SV

Empty Pulmonary Venous System

Delayed ↓↓↓ SV
Stroke Volume Index (SVI) with FTc

Monitor SVI
(Assess Q10min)

- **YES**
  - SVI ≥ 35 ml/m²
    - **YES**
    - FTc < 350 msec
      - **YES**
      - Fluid Bolus
    - **NO**
      - SVI ↑ > 10%
      - **NO**
      - Consider Noncardiac causes:
        - Blood loss
        - Cardiac Tamponade
        - Pulmonary embolus
        - Pneumothorax
        - Pulm HTN → RV Failure

- **NO**
  - SVI ≥ 35 ml/m²
    - **NO**

- **YES**
  - SVI ≥ 35 ml/m²
    - **NO**
      - Consider Fluid Bolus to optimize if FTc < 350

Maintenance Fluid 1 ml/kg/hr

Check BP

- **BP WNL**
  - BP Low
    - Inotrope
    - Inotrope, lighten anesthesia
  - BP High
    - Vasodilator
  - BP Low
    - Inotrope
**Stroke Volume Index (SVI) with SVV/PPV**

- **Monitor SVI (Assess Q10min)**
  - **YES**
    - SVI ≥ 35 ml/m²
  - **NO**
    - SVI ≥ 35 ml/m²
      - **YES**
        - SVV > 12%
      - **NO**
        - **NO**
          - Fluid Bolus
    - SVI ↑ > 10%
  - **NO**
    - **YES**
      - Consider Noncardiac causes:
        - Blood loss
        - Cardiac Tamponade
        - Pulmonary embolus
        - Pneumothorax
        - Pulm HTN → RV Failure
      - **NO**
        - BP Low
          - **NO**
            - BP WNL
              - **NO**
                - BP High
                  - **NO**
                    - Vasodilator
                  - **YES**
                    - Inotrope
        - **YES**
          - Inotrope, lighten anesthesia
Thank You!!