How do you manage Fluid and Drug administration from pre-operative to post-operative?

Don’t guess at volume status. Be certain with the Starling™ SV Noninvasive Haemodynamic Monitoring System.

- 100% noninvasive, easy-to-use, no patient discomfort
- Eliminates risk of infection and vascular damage associated with older, invasive technologies requiring arterial or central lines
- Independently validated vs. pulmonary artery catheter
- Accuracy not affected by vasopressors, inotropes and shock states
- No requirement to upgrade or change monitor depending on severity of illness
- Provides real time, continuous information on Cardiac Index, Stroke Volume, Total Peripheral Resistance, Cardiac Power, Thoracic Fluid Content and other important parameters
Starling SV

Operating Room (OR)

The anesthesiologist and rest of the surgical team can, in real time:
- Pay special attention to the needs of compromised patients, e.g., cardiac patients with an ejection fraction < 25%
- Treat promptly to prevent an intraoperative crisis in surgical procedures with high fluid shifts, e.g., robotic prostatectomy
- Diagnose and treat complex hypotensive situations due to:
  - Combinations of blood loss
  - Changes in PVR (regional anesthesia)
  - Decreased venous return (laproscopic insufflation/patient positioning)

Preoperative
- STARLING SV can accurately and precisely assess stroke volume and volume status in the pre-op setting
- Patients can be awake and spontaneously breathing
- Can be used prior to intubation/ventilation

Intraoperative
- Helps determine fluid requirements in large fluid shift situations
- 4 external sensors that can be placed on front or back = minimal impact on workflow
- Predicts fluid responsiveness similarly to esophageal Doppler in guiding GDFT

Postoperative
- Nurse-driven capability
- Simple to use. Not operator dependent after training
- Continue to monitor fluid status in spontaneously breathing or intubated patients, in ICU or on floor

Surgical ICU (SICU)

Patients often emerge from surgery with an indeterminate volume status due to significant fluid shifts intraoperatively. An optimum recovery is facilitated by establishing adequate perfusion as soon as possible. STARLING SV is especially useful in:
- Post-Op bleeding where you can trend significant changes in circulating volume (Stroke Volume/CO)
- Providing real-time status of a patient’s fluid responsiveness vs “static” pressure measurements (CVP)
- Shock patients by allowing you to titrate therapy to optimize haemodynamics and tissue perfusion

General Ward and other patient settings in the hospital

- Haemodynamic monitoring with the Starling SV non-invasive monitoring may continue through to the general ward
- With critical information being available approximately 70 seconds after the sensors are placed, the portable STARLING SV is ideal for a rapid response to an emerging crisis in any patient setting within the hospital

Obstetrics

Patients undergoing caesarian section experience fluctuations in haemodynamics. Additionally, patients with preeclampsia provide additional challenges, therefore it is important to:
- Individualise patient assessment and anaesthetic management
- Precisely haemodynamically assess their patient
- Provide goal directed therapy in women with preeclampsia

Renal

Efficacy of fluid removal during haemodialysis is dependent upon the accurate assessment of a patient’s circulating blood volume and cardiovascular status. Poor fluid management is a significant component of the elevated cardiovascular risk observed in haemodialysis patients, dynamic assessment of volume status non-invasively is necessary.
The STARLING™ SV

- Has a sensitivity of 94% and specificity of 100% for predicting fluid responsiveness in critical care situations1
- May assist in reducing hospital length of stay2

The STARLING™ SV offers

- A portable and lightweight (H: 8.7”, W: 11.4”, D: 7.4”, 9.5 lbs) 10.4” touch screen monitor
- Setup wizard which walks the clinician through an easy, step-by-step protocol for executing the PLR or bolus test
- First results in approximately 70 seconds
- Unique additional parameters to assist in individualised haemodynamic monitoring: TFC, VET, Dxt, CPI
- User friendly interface provides easy to read graphics and numbers with responsive touch control
- Monitor fits on a table or IV pole
- Open platform facilitates connection to EMR
- Battery operation

Dashboard Display

- Real-time, continuous beat to beat data
- Displays results in real time for CI, DO2, HR, NIBP, SVI, SVI, TFC, and TPRI

Trend Display

- Displays parameters graphically
- Displays graphical results of all saved or ongoing measurements – SV, SVI, CO, CI, HR, NIBP (SBP, DBP & MAP), TPRI, TPR

Sensor Placement Display

- Shows correct sensor placement
- Glowing green sensors indicate proper sensor connection while glowing red sensors indicate an issue with the connection

Customizable screen parameters to help you focus on what’s important

Graphic representation of baseline vs. fluid challenge

Indicates where patient is on an approximated Starling curve

Measures response range, baseline through challenge for CI, CPI, HR, MAP, TPRI, SVI, DO2I & TFC

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STARLING™ SV

Noninvasive, real-time haemodynamic data for real-time, clinical decision-making

No matter the site of care or the clinical challenge, effective haemodynamic measurement and management is integral to achieving an optimal clinical outcome. Until now, the only choices for obtaining accurate, continuous haemodynamic measurements were invasive technologies that carry their own set of risks. With the Starling™ SV, the clinician has all the important parameters continuously at his/her fingertips. Clinical status and the effect of interventions can be monitored at any time and treatment modified accordingly.

Cheetah medical technology

All Cheetah Medical’s monitoring platforms use the unique, patented BioReactance® technology to take measurements continuously and precisely, and it requires only four, easy-to-place sensors. The sensors can be placed anywhere on the chest or back as long as two are positioned above and below the heart.

- An electric current of known frequency is applied across the thorax between the outer pair of sensors.
- A signal is recorded between the inner pair of sensors.

As the heart expands and contracts, a time delay, or phase shift, is created in the current by blood flow. The monitor then uses this phase shift as a baseline for stroke volume measurement.

Validated technology

<table>
<thead>
<tr>
<th>Author</th>
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<tbody>
<tr>
<td>Waldron NH, et al</td>
<td>Anesth Analg</td>
<td>2014</td>
<td>CHEETAH NICOM versus EDM guided goal directed fluid therapy in the perioperative period</td>
<td>Consistent &amp; significant correlation of baseline SV between monitors in 234 fluid challenges. Additionally, BioReactance had fewer missing data points. N=61</td>
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<td>Marik PE, et al</td>
<td>Chest</td>
<td>2013</td>
<td>The use of bioReactance and carotid Doppler to determine volume responsiveness and blood flow redistribution following passive leg raising in haemodynamically unstable patients</td>
<td>The PLR was validated with sensitivity of 90%, specificity of 100%, with BioReactance, compared to a sensitivity of 94% and a specificity of 86% for carotid doppler.</td>
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<tr>
<td>Rich JD, et al</td>
<td>Eur Respir</td>
<td>2013</td>
<td>Noninvasive cardiac output measurements in patients with pulmonary hypertension</td>
<td>Performed with more precision than Swan TD in vasodilator challenge (p&lt;0.001) N=20</td>
</tr>
<tr>
<td>Squara, P et al</td>
<td>Intensive Care Med</td>
<td>2007</td>
<td>Noninvasive cardiac output monitoring (CHEETAH NICOM): a clinical validation</td>
<td>Demonstrated a 93% sensitivity and 93% specificity for detecting directional changes, and correlated highly with thermodilution (r=.82). N=110</td>
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<td>Squara, P et al</td>
<td>Critical Care</td>
<td>2009</td>
<td>Comparison of monitoring performance of BioReactance vs. pulse contour during long recruitment maneuvers</td>
<td>BioReactance &amp; PICCO had equivalent CO &amp; SV monitoring capabilities, including the ability to detect directional changes in CO. N=20</td>
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<tr>
<td>Dunham et al</td>
<td>J Trauma Acute Care Surg</td>
<td>2012</td>
<td>Emergency department noninvasive (NICOM) cardiac outputs are associated with trauma activation, patient injury severity and host conditions and mortality</td>
<td>Multiple associations of CO with different patient conditions demonstrates how NICOM provides an objective and clinically valid, relevant, and discriminant measure of cardiac function in acutely injured trauma patients. NICOM use may be associated with a shorter length of stay (p&lt;0.00) in surviving patients with complex injuries</td>
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Fluid management makes a clinical difference

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<td>Intravenous fluids in adults undergoing surgery: British Consensus Guidelines on Intravenous Fluid Therapy for Adult Surgical Patients</td>
<td>Concern has arisen from a high incidence of osteoarticular sodium and water overload. Evidence suggests that more accurate fluid therapy would improve outcomes.</td>
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Additional patient populations

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STARLING™ SV
A clinically and economically, sound solution

How does the Starling™ SV compare to alternative modalities?

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<tr>
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<th>STARLING SV</th>
<th>Pulse Contour</th>
<th>Thermo Dilution</th>
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<tr>
<td>Severe vasoconstriction i.e. shock (septic, cardiogenic)¹</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Arrhythmia¹²</td>
<td>+</td>
<td>-</td>
<td>+/-</td>
</tr>
<tr>
<td>Arterio-spasm¹</td>
<td>+</td>
<td>-</td>
<td>+</td>
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<tr>
<td>Pulmonary Hypertension²</td>
<td>+</td>
<td>+</td>
<td>+/-</td>
</tr>
<tr>
<td>Noninvasive</td>
<td>+</td>
<td>-</td>
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What is the economic impact of using the Starling™ SV for managing volume?

With healthcare expenses continuing to rise, the pressure has never been greater on hospitals to pro-actively manage costs.

An Economic Analysis Tool was created by Adi Renbaum, MBA and Thomas Hopkins, MD MBA to demonstrate a new approach to business intelligence in healthcare, providing clinicians and executives with the tools they need to simultaneously improve patient care and avoid costs. The Economic Analysis Tool can be used as part of a personalized and predictive model that can be leveraged to evaluate the cost effectiveness of purchasing noninvasive haemodynamic monitoring equipment.

For a more detailed analysis of how the 100% noninvasive Starling SV can positively impact your institution’s economics, visit cheetah-medical.com/tools/economic-analysis.


ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Product Description</th>
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<tr>
<td>Starling SV Noninvasive Cardiac Output &amp; Haemodynamic Monitoring System, with 3.7m patient cable, power cord</td>
<td>CMM-ST5</td>
</tr>
<tr>
<td>Cheetah Sensors™ (25 Box), Pre-attached Leadwires</td>
<td>CMS25</td>
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<td>Cheetah Sensors™ (50 Box), Pre-attached Leadwires</td>
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