The Society of Thoracic Surgeons

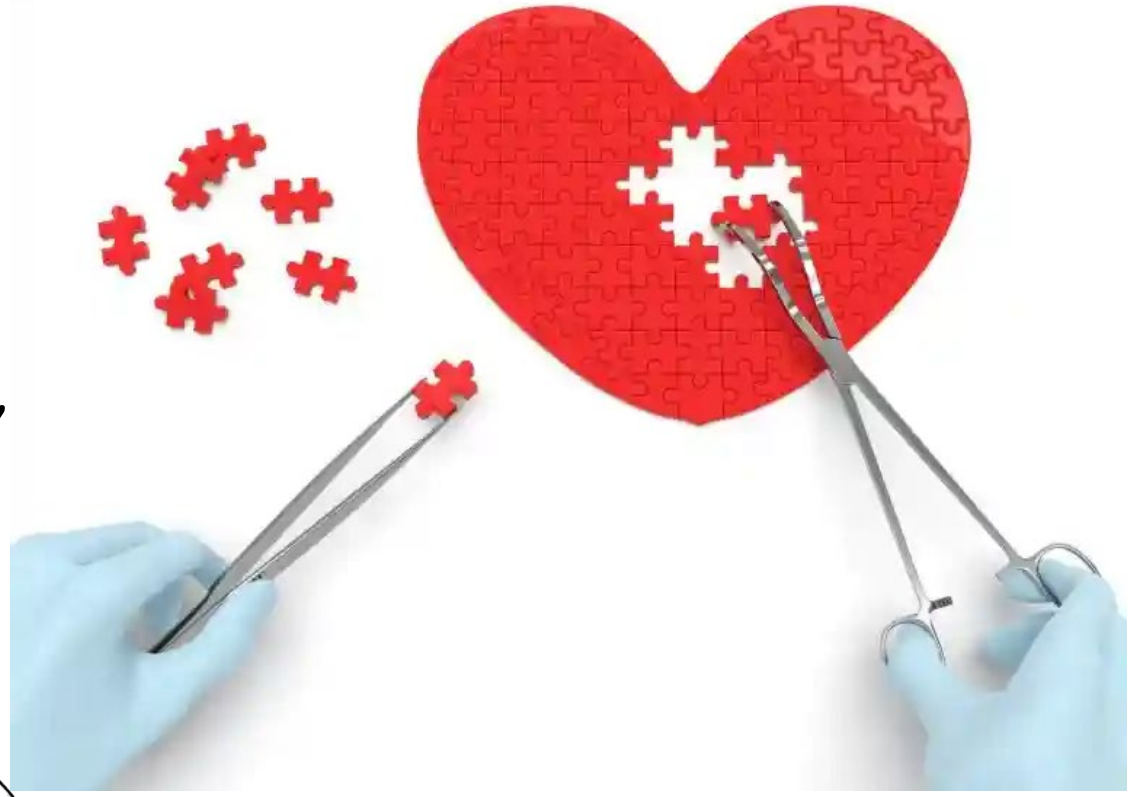
Adult Cardiac Surgery Database

Quality Improvement Series Webinar

Amanda Rea, DNP, CRNP, AGACNP-BC, CCAPP, CCRN, CMC, CSC, E-AEC

Clinical Program Manager and Lead of Advanced Practice
Division of Cardiac Surgery
University of Maryland St Joseph Medical Center

February 18, 2026



STS National Database™
Trusted. Transformed. Real-Time.

Agenda

- Welcome and Introductions
- Brief STS Updates
- Guest Speaker-Amanda Rea
- Q&A

Important Dates-Timeline

February 18

ACSD Quality Improvement Series Webinar @ 3pm ET/2pm CT

February 20

2026 Harvest 1 Closes

February 24

2026 Harvest 1 Opt-Out 5pm ET

March 4

ACSD Monthly Webinar @ 3pm ET/2pm CT

March 18

ACSD Quality Improvement Series Webinar @ 3pm ET/2pm CT

April 1

ACSD Monthly Webinar @ 3pm ET/2pm CT

Important Dates-2026 Harvest

2026 Harvest

Term	Harvest Submission Window Close	Opt-Out Date	Includes Procedures Performed Through:	Report Posting	Comments
Harvest 1	February 20	February 24	December 31, 2025	Spring 2026	Star Rating
Harvest 2	May 29	June 2	March 31, 2026	Summer 2026	
Harvest 3	August 28	September 1	June 30, 2026	Fall 2026	Star Rating
Harvest 4	November 20	November 24	September 30, 2026	Winter 2026/2027	
Analysis for each harvest is based on a 36-month window.					

Data Submission Open is continuous for all harvest terms. Submission Close occurs at 11:59 p.m. Eastern on the date listed.

Harvest Opt-Out closes at 5:00 p.m. Eastern on the date listed.

AQO 2026 – New Orleans

- September 30-October 2, 2026
- Intermacs & Pedimacs-Live Virtual Forum-September 24th
- CHSD & GTSD Sessions will be held Sept 30th (full day) and October 1st (half day)
- ACSD Sessions will be held October 1st (full day) and October 2nd (half day)
- Half day sessions will include breakout discussions for the on-site databases
- AQO 2026 Session Proposal Form | STS

Goal Directed Therapy

Amanda Rea, DNP, CRNP, AGACNP-BC, CCAPP, CCRN, CMC, CSC, E-AEC

Clinical Program Manager and Lead of Advanced Practice
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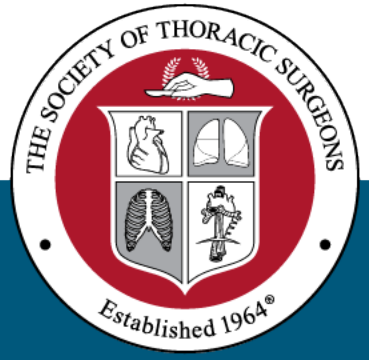


WHEN?
WHO?
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Open Discussion

Please use the raise-hand function.

Please use the Q&A Function.

We will answer as many questions as possible.

We encourage your feedback and want to hear from you!

Contact Information

- Carole Krohn, Director, STS National Database
  - ckrohn@sts.org
- Nancy Honeycutt, STS National Database Manager, ACSD, Intermacs/Pedimacs
  - nhoneycutt@sts.org
- STSDB@sts.org
  - Database Operational Questions (Billing, Contracts, Contacts)
- STSDB_Helpdesk@sts.org
  - IQVIA/Database Platform Questions (Uploader, DQR, Missing Variable, Dashboard, Password and Login)
- STSDB-FAQ@sts.org
  - Clinical Questions

We Need You!

If you or someone at your site have been successful in implementing a QI project to decrease postoperative renal failure, please reach out to Nancy Honeycutt @ nhoneycutt@sts.org.

Thank You for Joining!

Reminder: Our next ACSD Monthly Webinar will be held on Wednesday, March 4, 2026 at 3pm ET/2pm CT.

Goal Directed Therapy

Amanda Rea DNP, CRNP, AGACNP-BC, CCAPP, CCRN, CMC, CSC, E-AEC
Clinical Program Manager and Lead of Advanced Practice
Division of Cardiac Surgery
University of Maryland St Joseph Medical Center

ERAS® CARDIAC

Perfecting the Surgical Journey

Disclosures

- Consultant/speaker BD
- Consultant Renibus Therapeutics
- Advisory and Editorial Board for ERAS Cardiac Society

Table 1. Classification of Recommendation and Level of Evidence

LOE by COR	Recommendation
I	
A	Tranexamic acid or epsilon aminocaproic acid during on-pump cardiac surgical procedures
B-R	Perioperative glycemic control
B-R	A care bundle of evidence-based best practices to reduce surgical site infections
B-R	Goal-directed fluid therapy
B-NR	A perioperative, multimodal, opioid-sparing, pain management plan
B-NR	Avoidance of persistent hypothermia (<36.0°C) after cardiopulmonary bypass in the early postoperative period.
B-NR	Maintenance of chest tube patency to prevent retained blood
B-NR	Postoperative systematic delirium screening tool use at least once per nursing shift
C-LD	Stopping smoking and hazardous alcohol consumption 4 weeks before elective surgery
IIa	
B-R	Early detection of kidney stress and interventions to avoid acute kidney injury after surgery
B-R	Use of rigid sternal fixation to potentially improve or accelerate sternal healing and reduce mediastinal wound complications
B-NR	Prehabilitation for patients undergoing elective surgery with multiple comorbidities or significant deconditioning
B-NR	An insulin infusion to treat hyperglycemia in all patients postoperatively
B-NR	Strategies to ensure extubation within 6 h of surgery
C-LD	Patient engagement tools, including online/application-based systems to promote education, compliance, and patient-reported outcomes
C-LD	Chemical or mechanical thromboprophylaxis after surgery
C-LD	Preoperative measurement of hemoglobin A1c to assist with risk stratification
C-LD	Preoperative correction of nutritional deficiency when feasible
IIb	
C-LD	Continued consumption of clear liquids up until 2 to 4 h before general anesthesia
C-LD	Preoperative oral carbohydrate loading may be considered before surgery
III (No Benefit)	
A	Stripping or breaking the sterile field of chest tubes to remove clots.
III (Harm)	
B-R	Hyperthermia (>37.9°C) while rewarming on cardiopulmonary bypass.

Abbreviations: A, A-level evidence; B-R, B-level evidence, randomized studies; B-NR, B-level evidence, nonrandomized studies; C-LD, C-level evidence, limited data; COR, classification of recommendation; LOE, level of evidence.

ERAS® Cardiac Guidelines

Published 2019 by the ERAS® Cardiac Society

JAMA Network™

From: **Guidelines for Perioperative Care in Cardiac Surgery: Enhanced Recovery After Surgery Society Recommendations**

JAMA Surg. 2019;154(8):755-766. doi:10.1001/jamasurg.2019.1153

Table Title:
Classification of Recommendation and Level of Evidence Abbreviations: A, A-level evidence; B-R, B-level evidence, randomized studies; B-NR, B-level evidence, nonrandomized studies; C-LD, C-level evidence, limited data; COR, classification of recommendation; LOE, level of evidence.
Date of Download: 3/25/2023

Engelman et al, JAMA 2019

EXPERT CONSENSUS STATEMENT

Perioperative Care in Cardiac Surgery: A Joint Consensus Statement by the Enhanced Recovery After Surgery (ERAS) Cardiac Society, ERAS International Society, and The Society of Thoracic Surgeons (STS)

Michael C. Grant, MD, MSE,[1] Cheryl Crisafi, MS, RN,[2] Adrian Alvarez, MD,[3] Rakesh C. Arora, MD, PhD,[4] Mary E. Brindle, MD, MPH,[5] Subhasis Chatterjee, MD,[6] Joerg Ender, MD,[7] Nick Fletcher, MBBS,[8,9] Alexander J. Gregory, MD,[10] Serdar Gunaydin, MD, PhD,[11] Marjan Jahangiri, MBBS, MS,[12] Olle Ljungqvist, MD, PhD,[13] Kevin W. Lobdell, MD,[14] Vicki Morton, DNP,[15] V. Seenu Reddy, MD, MBA,[16] Rawn Salenger, MD,[17] Michael Sander, MD,[18] Alexander Zarbock, MD,[19] and Daniel T. Engelman, MD[2]

Enhanced Recovery After Surgery (ERAS) programs have been shown to lessen surgical insult, promote recovery, and improve postoperative clinical outcomes across a number of specialty operations. A core tenet of ERAS involves the provision of protocolized evidence-based perioperative interventions. Given both the growing enthusiasm for applying ERAS principles to cardiac surgery and the broad scope of relevant interventions, an international, multidisciplinary expert panel was assembled to derive a list of potential program elements, review the literature, and provide a statement regarding clinical practice for each topic area. This article summarizes those consensus statements and their accompanying evidence. These results provide the foundation for best practice for the management of the adult patient undergoing cardiac surgery.

(Ann Thorac Surg 2023;■:■-■)

Updated Guidelines 2024

Goal-Directed Therapy with Acumen HPI Software

Home > Intensive Care Medicine > Article

Fluid challenges in intensive care: the FENICE study

A global inception cohort study

Seven-Day Profile Publication | Open access | Published: 11 July 2015

Volume 41, pages 1529–1537, (2015) Cite this article

- 2213 patients
- Evaluated practice of fluid challenges in critically ill patients.
- Found it is highly variable.
- Prediction of fluid responsiveness is not used routinely, safety limits are rarely used, and information from previous failed FCs is not always taken into account.

The Problem with Fluid Overload

Fluid overload in cardiac surgery patients has demonstrated significant association with increased

- **Complications**
- **Length of Stay**
- **Mortality**

"Early identification of fluid overload is essential to establish adequate management in cardiac patients, since this is regarded as the most important hemodynamic factor in the worsening of renal function in patients with congestive heart failure."[1]

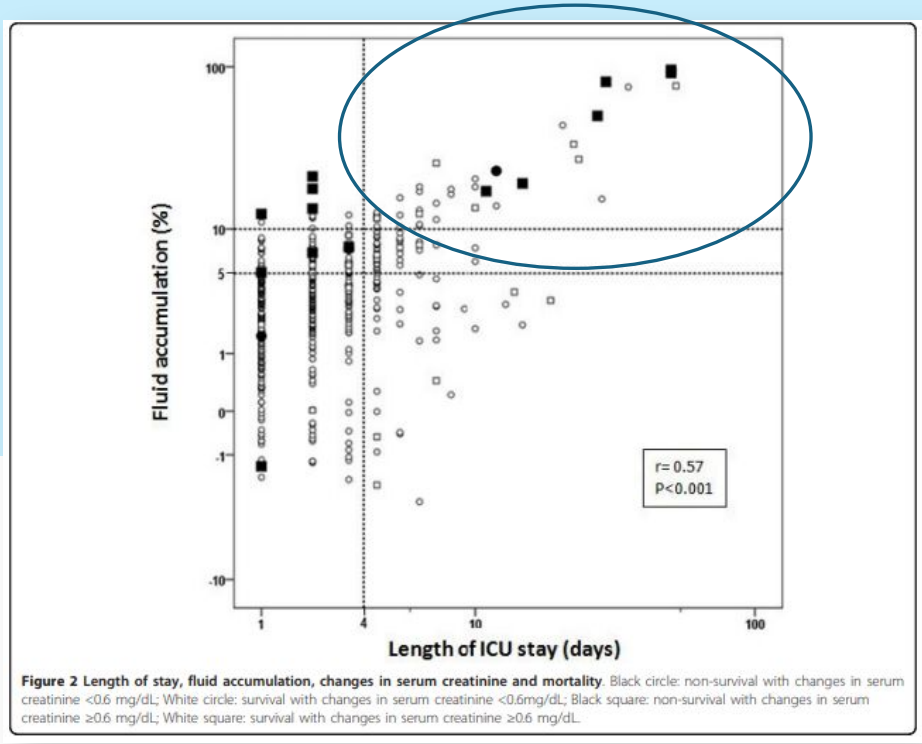
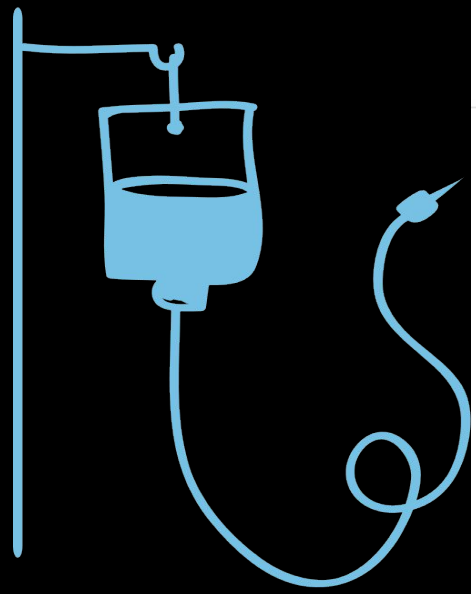


Figure 2 Length of stay, fluid accumulation, changes in serum creatinine and mortality. Black circle: non-survival with changes in serum creatinine <0.6 mg/dL; White circle: survival with changes in serum creatinine <0.6mg/dL; Black square: non-survival with changes in serum creatinine ≥0.6 mg/dL; White square: survival with changes in serum creatinine ≥0.6 mg/dL.

1. Stein, A., et al. Fluid overload and changes in serum creatinine after cardiac surgery: predictors of mortality and longer intensive care stay. A prospective cohort study. Critical Care, 2012.



The NEW ENGLAND JOURNAL of MEDICINE

CURRENT ISSUE SPECIALTIES TOPICS

ORIGINAL ARTICLE

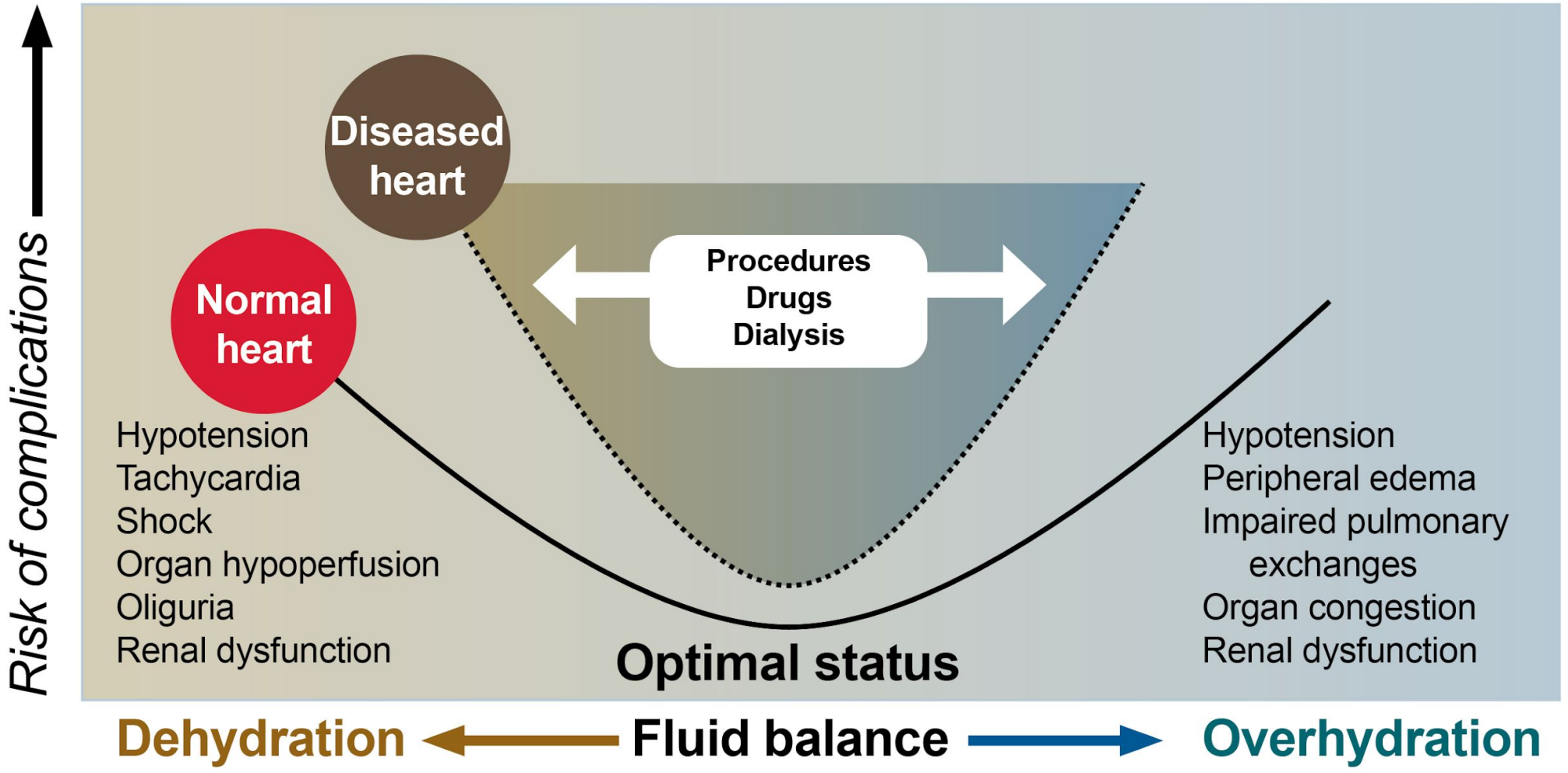
Restrictive versus Liberal Fluid Therapy for Major Abdominal Surgery

Authors: Paul S. Myles, M.P.H., D.Sc., Rinaldo Bellomo, M.D., Tomas Corcoran, M.D., Andrew Forbes, Ph.D., Philip Peyton, M.D., Ph.D., David Story, M.D., Chris Christophi, M.B., B.S., +9, for the Australian and New Zealand College of Anaesthetists Clinical Trials Network and the Australian and New Zealand Intensive Care Society Clinical Trials Group* Author Info & Affiliations

Published May 9, 2018 | N Engl J Med 2018;378:2263-2274 | DOI: 10.1056/NEJMoa1801601 | VOL. 378 NO. 24

- RELEIF study -3000 patients
- Abdominal surgery
- Restrictive vs liberal fluid (median 3.7L vs 6.1L)
- Restrictive group > AKI ($p<0.001$)
- Restrictive group > SSI ($p=0.02$)

Fluid Imbalance Leads to Complications

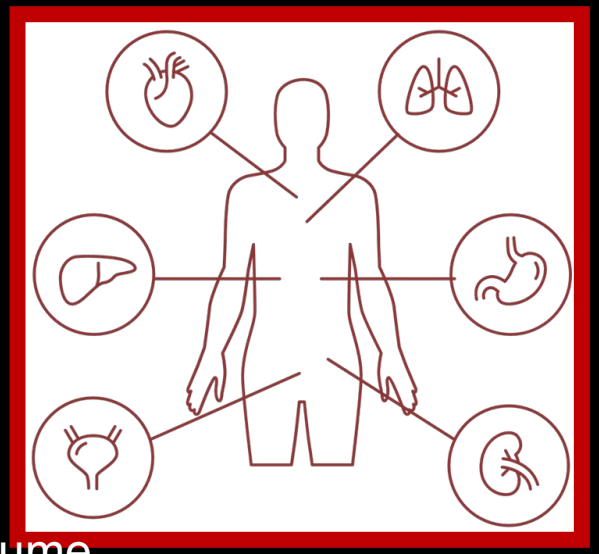


What is goal-directed therapy?

Goal-directed therapy (GDT) utilizes advanced monitoring technique to optimize a specific endpoint or goal to guide optimal timing and administration of fluids, inotropes, and vasopressors to optimize tissue oxygen delivery

Where is this used?

- Perioperatively-multiple surgical specialties
- Critical care
- Heart failure
- Anywhere you need to asses volume responsiveness

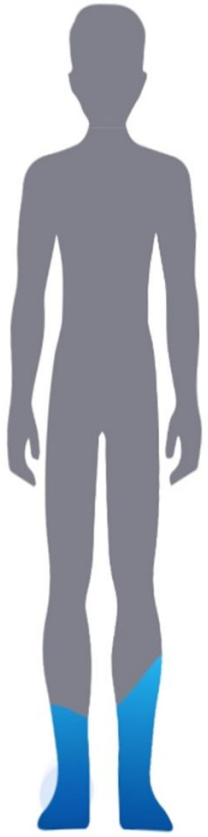


Goals:

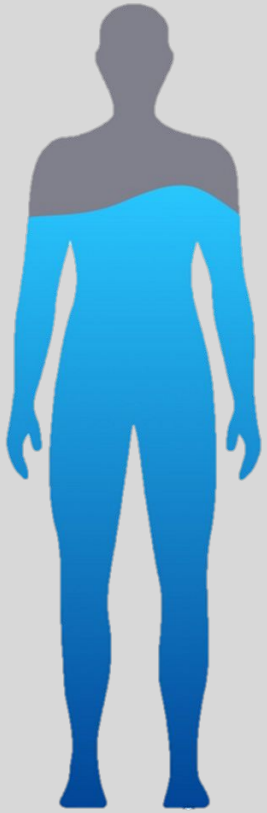
- Assure perfusion adequacy
- Promptly detect hemodynamic instability and differentiate the cause and treat
- Give the patient the right thing at the right time!

The importance of goal directed therapy

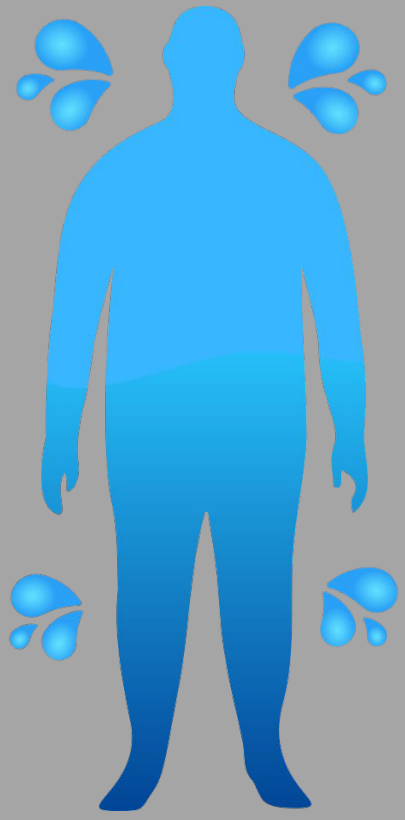
Hypovolemia



Euvolemia



Hypervolemia



EJA

Eur J Anaesthesiol 2018; **35**:469–483

ORIGINAL ARTICLE

Does goal-directed haemodynamic and fluid therapy improve peri-operative outcomes?

A systematic review and meta-analysis

Matthew A. Chong, Yongjun Wang, Nicolas M. Berbenetz and Ian McConachie

- Meta analysis-11,000 patients
- Decreased pneumonia, AKI, LOS, wound infections

British Journal of Anaesthesia **110** (4): 510–17 (2013)
Advance Access publication 27 February 2013 · doi:10.1093/bja/aet020

BJA

REVIEW ARTICLES

Goal-directed therapy in cardiac surgery: a systematic review and meta-analysis

H. D. Aya, M. Cecconi*, M. Hamilton and A. Rhodes

St George's Hospital NHS Trust and St George's University of London, London SW170QT, UK
* Corresponding author. E-mail: m.cecconi@nhs.net

- Meta-analysis-699 patients
- Decreased hospital LOS

- 20 studies, 9,677 patents
- Different monitoring tools
- Importance in using the right measuring tools for the right patient

YALE JOURNAL OF BIOLOGY AND MEDICINE
YJBM

Yale J Biol Med. 2023 Mar 31;96(1):107–123. doi: 10.59249/JOAP6662

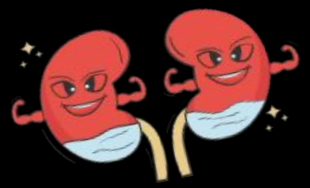
Current Commonly Used Dynamic Parameters and Monitoring Systems for Perioperative Goal-Directed Fluid Therapy: A Review

Chin Fung Kelvin Kan [1,*], John D Skaggs [1]

Author information · Article notes · Copyright and License information

PMCID: PMC10052600 PMID: 37009197

- 260 patients
- Decreased LOS (ICU and hospital) and AKI



Journal of Critical Care 29 (2014) 997–1000

Contents lists available at ScienceDirect

Journal of Critical Care

journal homepage: www.jccjournal.org

Goal-directed therapy after cardiac surgery and the incidence of acute kidney injury

Rebekah Thomson, Dip HE, BSc (Hons) [a,*], Hanif Meeran, MBBS, FRCA [a], Oswaldo Valencia, MD [b], Nawaf Al-Subaie, MBChB, FRCA, EDIC, FFICM [a]

[a] Cardiothoracic Intensive Care Unit, St Georges NHS Hospital Trust, London, United Kingdom
[b] Department of Cardiac Surgery, St Georges NHS Hospital Trust, London, United Kingdom

Effect of Perioperative Goal-Directed Hemodynamic Resuscitation Therapy on Outcomes Following Cardiac Surgery: A Randomized Clinical Trial and Systematic Review

Eduardo A. Osawa, MD, PhD[1]; Andrew Rhodes, M(Res)[2]; Giovanni Landoni, MD, PhD[3]; Filomena R. B. G. Galas, MD, PhD[1]; Julia T. Fukushima, MSc[1]; Clarice H. L. Park, MD, PhD[1]; Juliano P. Almeida, MD, PhD[1]; Rosana E. Nakamura, MD, PhD[1]; Tania M. V. Strabelli, MD, PhD[1]; Brunna Pileggi, MD[1]; Alcino C. Leme, MD, PhD[1]; Evgeny Fominskiy, MD, PhD[3]; Yasser Sakr, MD, PhD[4]; Marta Lima, MD[1]; Rafael A. Franco, MD, PhD[1]; Raquel P. C. Chan, MD, PhD[1]; Marilde A. Piccioni, MD, PhD[1]; Priscilla Mendes, RN[1]; Suéllen R. Menezes, RN[1]; Tatiana Bruno, RN[1]; Fabio A. Gaiotto, MD, PhD[5]; Luiz A. Lisboa, MD, PhD[5], Luiz A. O. Dallan, MD, PhD[5], Alexandre C. Hueb, MD, PhD[5]; Pablo M. Pomerantzeff, MD, PhD[5], Roberto Kalil Filho, MD, PhD[5]; Fabio B. Jatene, MD, PhD[5]; Jose Otavio Costa Auler Junior, MD, PhD[1]; Ludhmila A. Hajjar, MD, PhD[1]

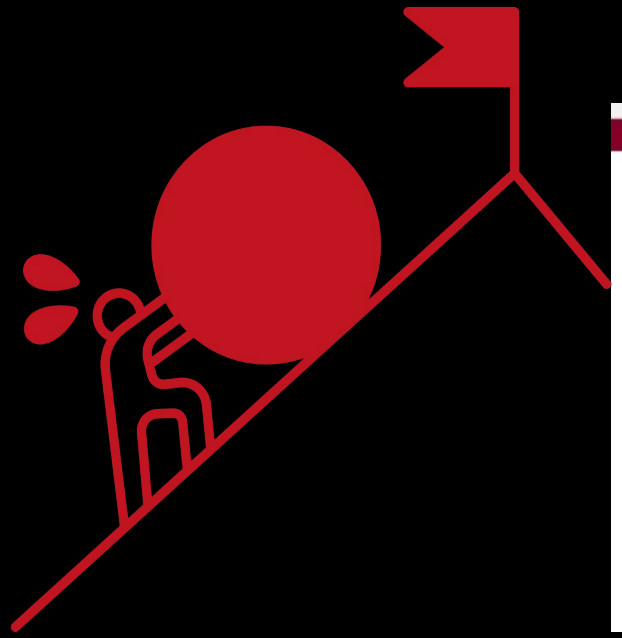
- RCT-120 patients
- 30 day complications
- Decreased infection, Low Cardiac Output Syndrome, ICU and Hospital LOS

Individually Optimized Hemodynamic Therapy Reduces Complications and Length of Stay in the Intensive Care Unit

A Prospective, Randomized Controlled Trial

Matthias S. Goepfert, M.D.,* Hans Peter Richter, M.D.,† Christine zu Eulenburg, Sc.D.,‡ Janna Gruetzmacher, M.D.,§ Erik Rafflenbeul, M.D.,§ Katharina Roeher, M.D.,* Alexandra von Sandersleben, M.D.,* Stefan Diedrichs, M.D.,† Herrmann Reichenspurner, M.D., Ph.D.,‖ Alwin E. Goetz, M.D., Ph.D.,# Daniel A. Reuter, M.D., Ph.D.**

- RCT-100 patients
- Decreased ICU LOS



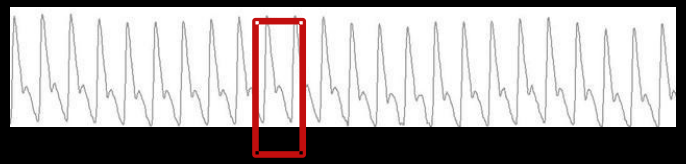
Review | Open access | Published: 16 May 2025

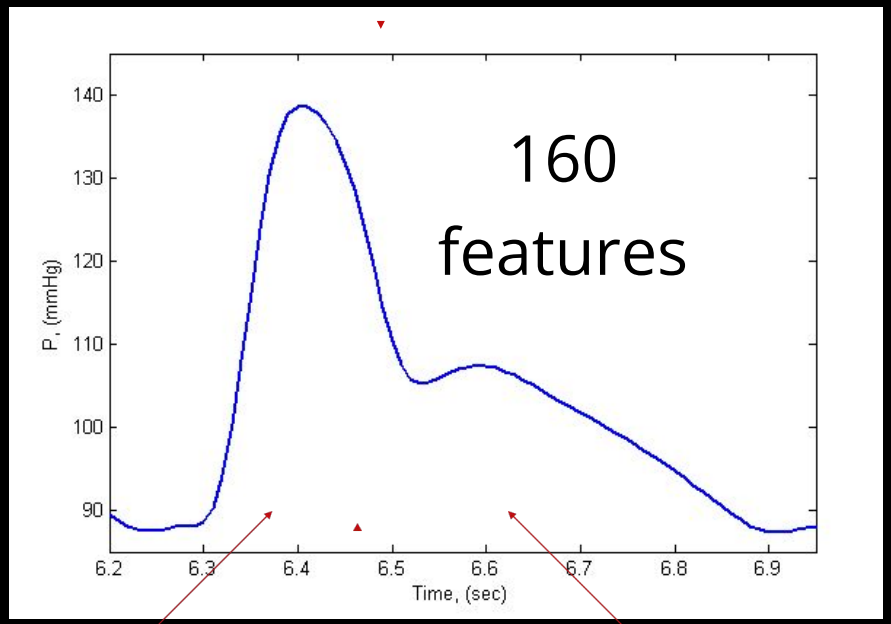
Goal-directed therapy: what is the goal again?

Amy Yerdon, Ken Taylor, Katie Woodfin, Ryan Richey, Susan McMullan & Desirée Chappell

Perioperative Medicine **14**, Article number: 57 (2025) | Cite this article

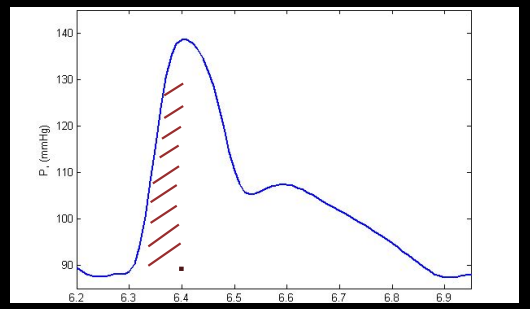
- Evidence-based GDT strategies
- GDT experience and protocol compliance
- Alternatives for clinicians without access to GDT
- Monitors
- Prevention of IOH and hemodynamic instability



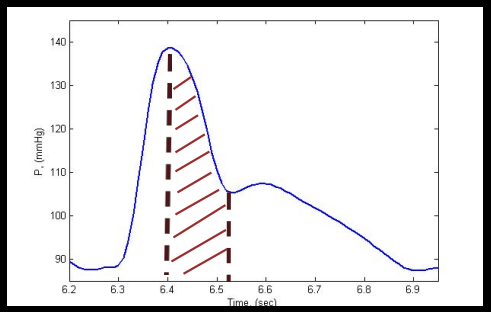


Contractility Peripheral Effects

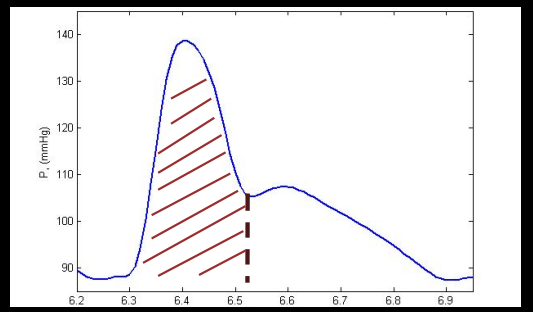
Aortic compliance



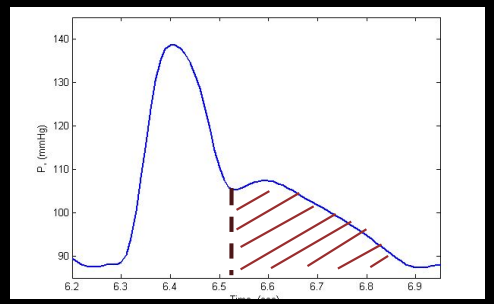
Contractility



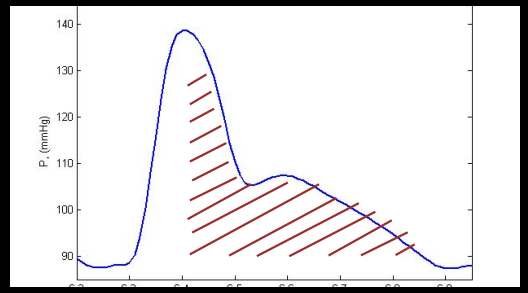
Compliance



Stroke volume



Vascular tone



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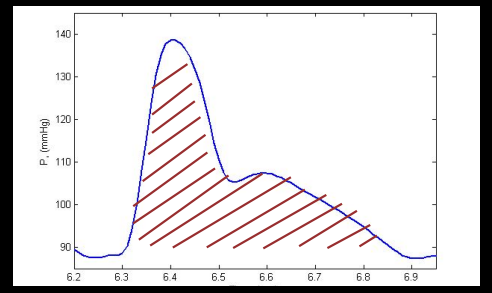


Full cardiac cycle

Advanced Monitoring Parameters

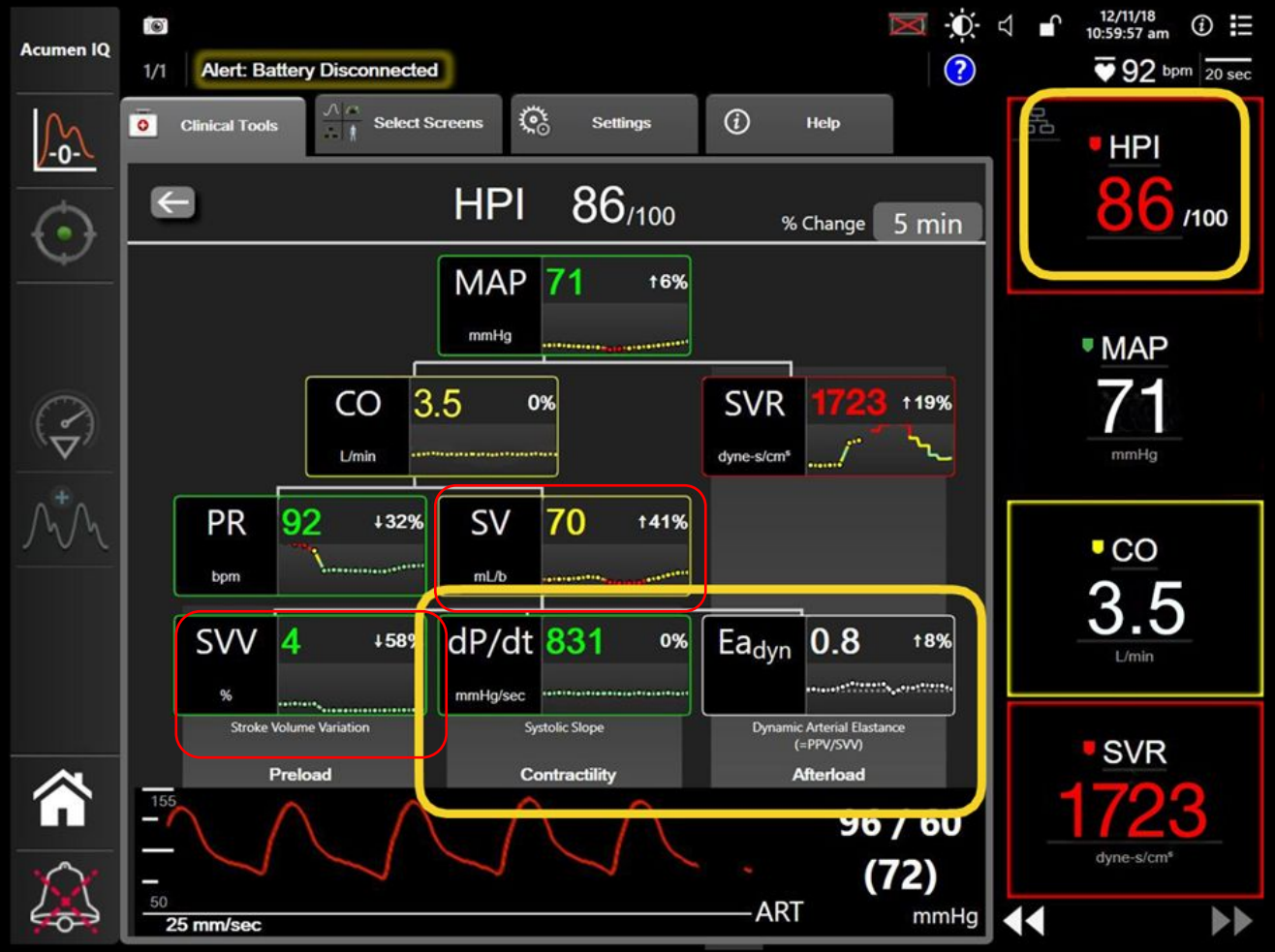
Hypotension prediction index - HPI

Dynamic arterial elastance – Ea_{dyn}

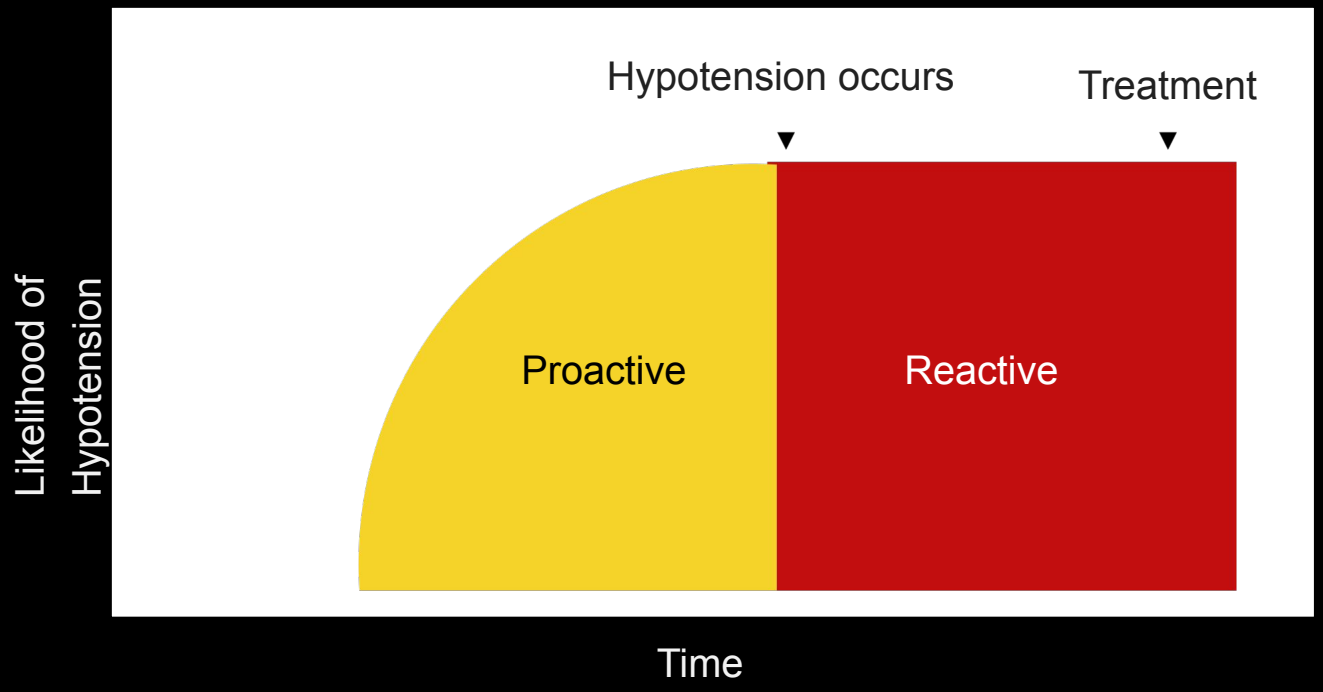
Derivative of pressure over time - dP/dt

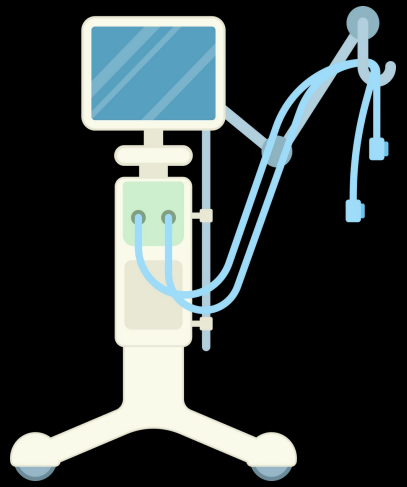
Stroke Volume-SV

Stroke Volume Variation-SVV



Proactive Versus Reactive





Advanced artificial intelligence–guided hemodynamic management within cardiac enhanced recovery after surgery pathways: A multi-institution review

V. Seenu Reddy, MD, MBA, FACS, FACC,[a] David M. Stout, MD,[b] Robert Fletcher, MS,[c] Andrew Barksdale, MD, FACS,[d] Manesh Parikshak, MD, FACS,[d] Chanice Johns, RN, BSN, CCRN,[d] and Marc Gerdisch, MD, FACS, FACC, FHRS[d]

1404 cases (795 preprogram; 609 program)
3 hospitals
Reduced ICU LOS and vent hours

- Reddy VS, Stout DM, Fletcher R, Barksdale A, Parikshak M, Johns C, Gerdisch M. Advanced artificial intelligence-guided hemodynamic management within cardiac enhanced recovery after surgery pathways: A multi-institution review. JTCVS Open. 2023 Aug 7;16:480-489. doi: 10.1016/j.xjon.2023.06.023. PMID: 38204636; PMCID: PMC10774974.

What is Ea_{dyn}?

Dynamic Arterial Elastance (Ea_{dyn})-defined as the ratio between pulse pressure variations and stroke volume variations, this is a <u>measure functional arterial stiffness</u>

$$Ea_{dyn} = \frac{PPV}{SVV}$$

If Eadyn is >1, the blood pressure will likely increase with volume administration

If Eadyn is <1, the blood pressure is unlikely to increase with volume administration (Grey zone of 0.8-1.2)

Intensive Care Med
DOI 10.1007/s00134-016-4666-z

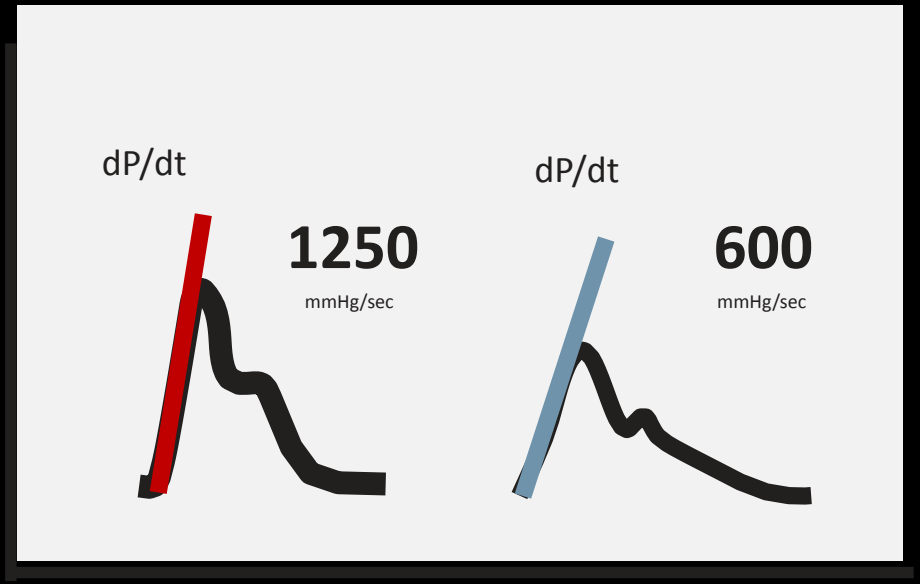
ORIGINAL

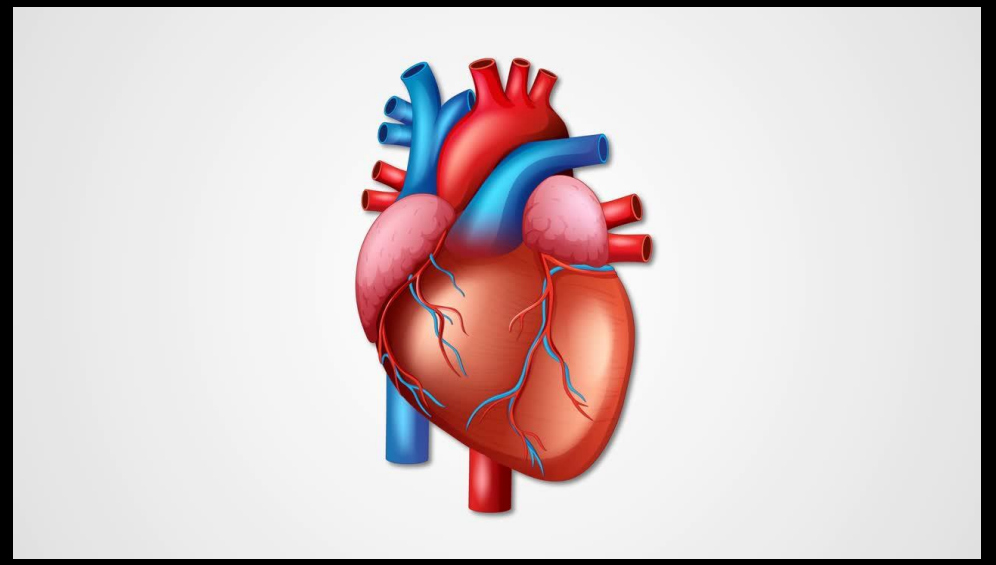
Monitoring dynamic arterial elastance as a means of decreasing the duration of norepinephrine treatment in vasoplegic syndrome following cardiac surgery: a prospective, randomized trial

Pierre-Grégoire Guinot[1,2*], Osama Abou-Arab[1], Mathieu Guilbart[1], Stéphane Bar[1], Elie Zogheib[1], Mona Daher[1], Patricia Besserve[1], Joseph Nader[2,3], Thierry Caus[2,3], Said Kamel[2], Hervé Dupont[1,2] and Emmanuel Lorne[1,2]

- Decreased vasopressors dosing, ICU LOS

dP/dt (Derivative of Pressure Over Time)





An alternative measure of contractility is the maximal change in pressure over time (slope) in the left ventricle.

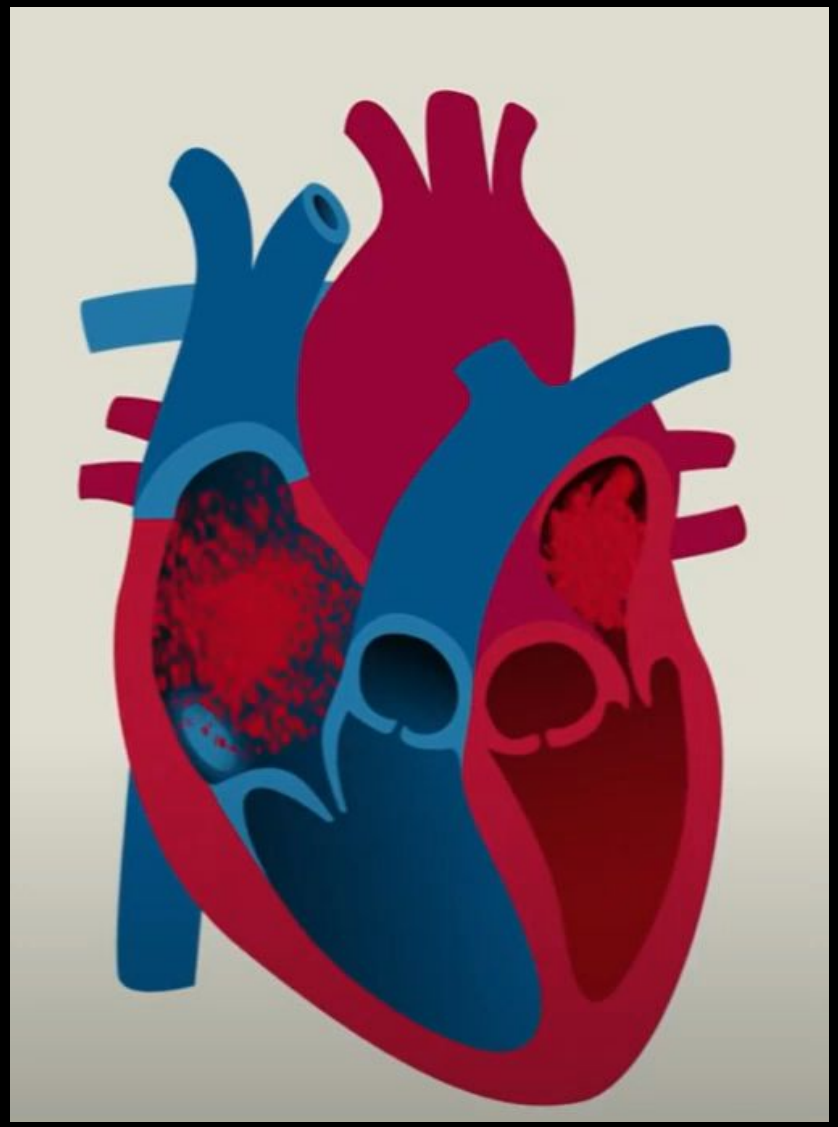
Determined by myocardial contractility and the loading conditions on the ventricle

There is no normal value. The value is designed to be used as a trend.

Cannesson & Pearse. Perioperative Hemodynamic Monitoring and Goal Directed Therapy. 1st Edition Cambridge U Press 2014
De Hert J of CT and Vasc Anes, Vol 20, No 3 (June), 2006: pp 325-330

SV-Stroke Volume

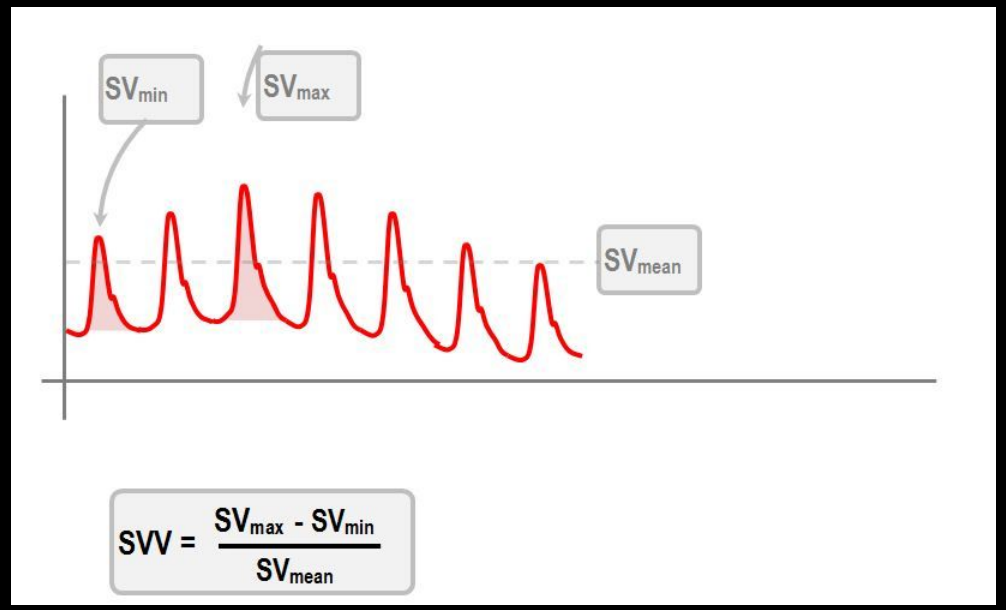
Stroke volume is the amount of blood that is expelled with each heartbeat.



SVV- Stroke Volume Variation

Arterial pulse pressure falls during inspiration and rises during expiration due to changes in intra-thoracic pressure secondary to negative pressure ventilation in spontaneously breathing

Inversely arterial pressure rises during inspiration and falls during expiration due to changes in intra-thoracic pressure secondary to positive pressure ventilation.



Limitations

- Arrythmias
- High PEEP levels
- Spontaneous respirations
- Poor Vascular Tone

respiratory stroke volume variation (SVV) of >12% accurately predicts fluid responsiveness

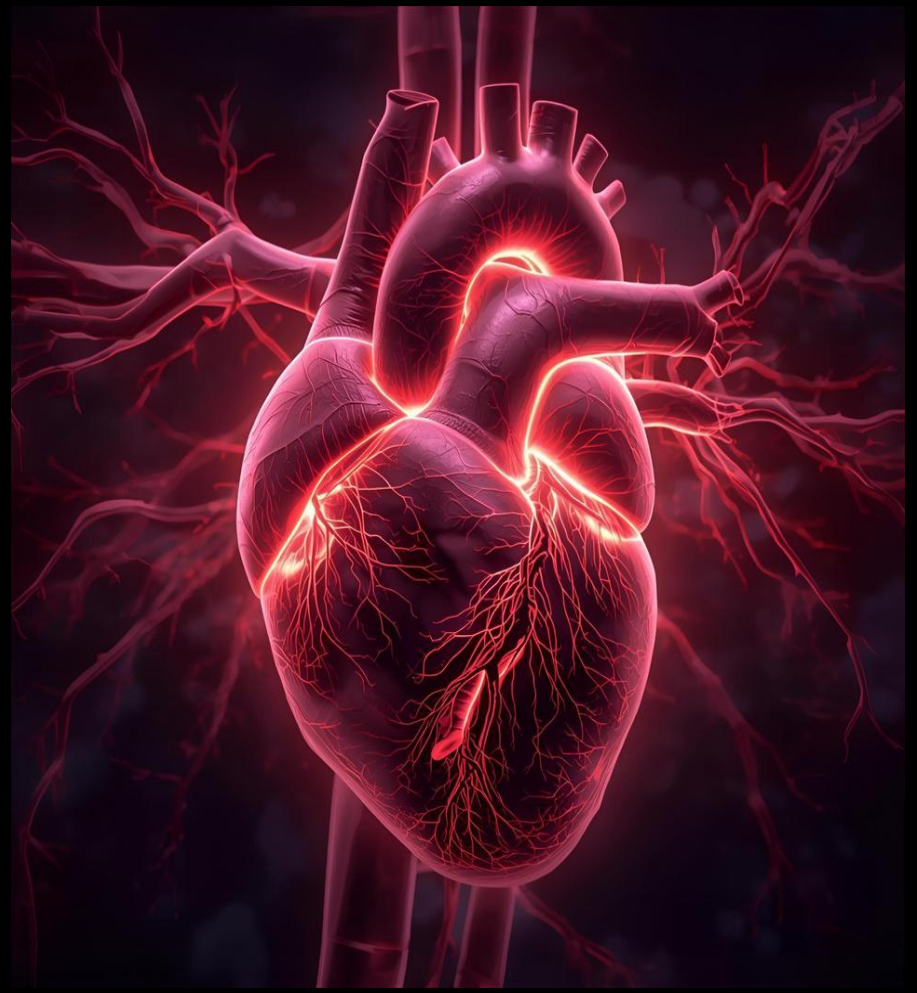
Limits of Dynamic Indices (SVV, PPV, PVI)

Limitation	Impact on Dynamic Index
Spontaneous Breathing	False +
Open Chest	False -
Sustained Cardiac Arrhythmias	False +
Low Vt/ Low Lung Compliance	False -
Increased Intra-Abdominal Pressure	False +
Very High Respiratory Rate (HR/RR < 3.6)	False -
Right Heart Failure	False +

Monnet, et al. Prediction of fluid responsiveness: an update. *Ann Intensive Care* 2016

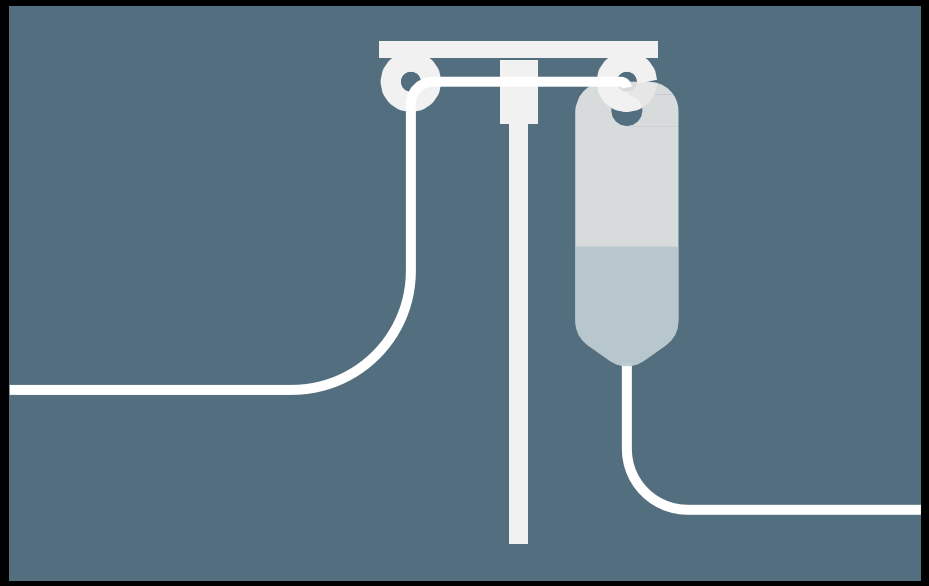
Key GDT Data Points

- SV – responsive >10%
- SVV- > 12%-higher is dryer
- Arterial compliance
- Contractility-CI, CO, dP/dt



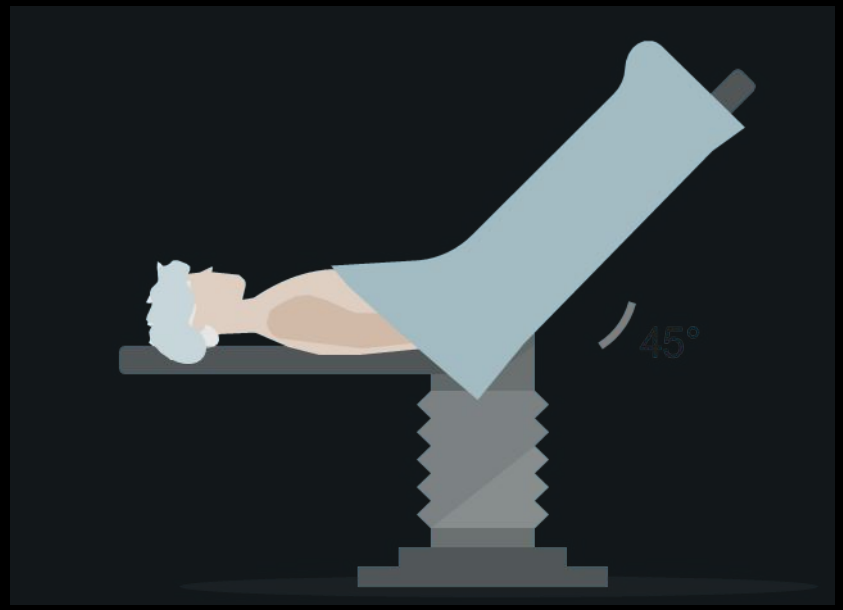
Assessing fluid responsiveness with stroke volume

Fluid challenge



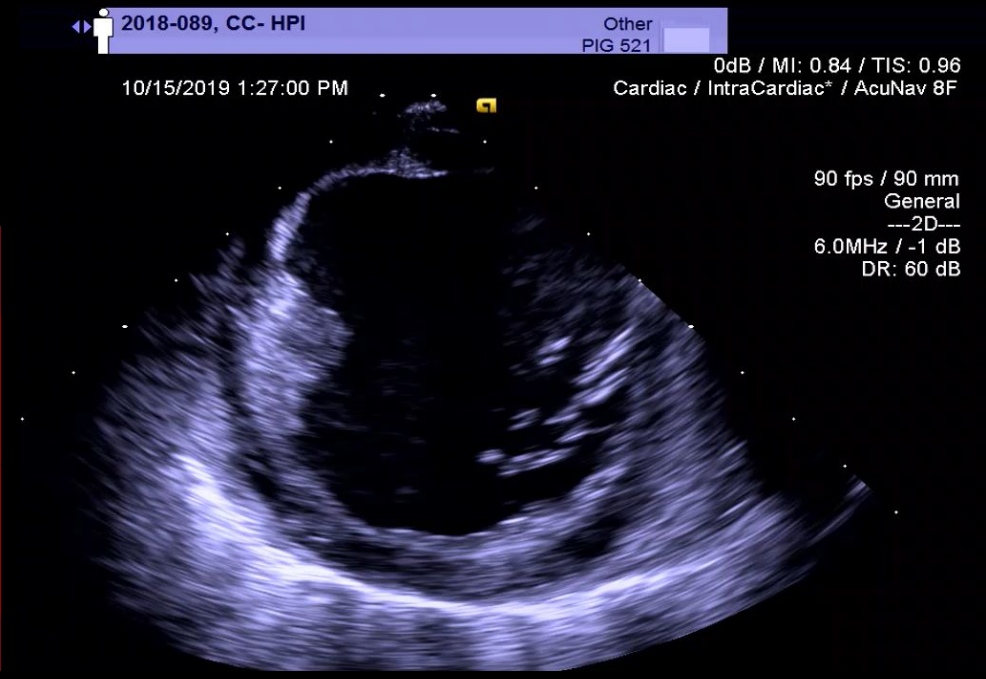
Goal-directed haemodynamic therapy during elective total hip arthroplasty
Cecconi 2011 Simple Physiologic Algorithm for Managing Hemodynamics Using SV and SVV Effects of GDFT Based on Dynamic Parameters on Post Surgical Outcome
Benes 2014 Truijen et al. Noninvasive Continuous Hemodynamic Monitoring. Journal of Clinical Monitoring and Computing. 2012

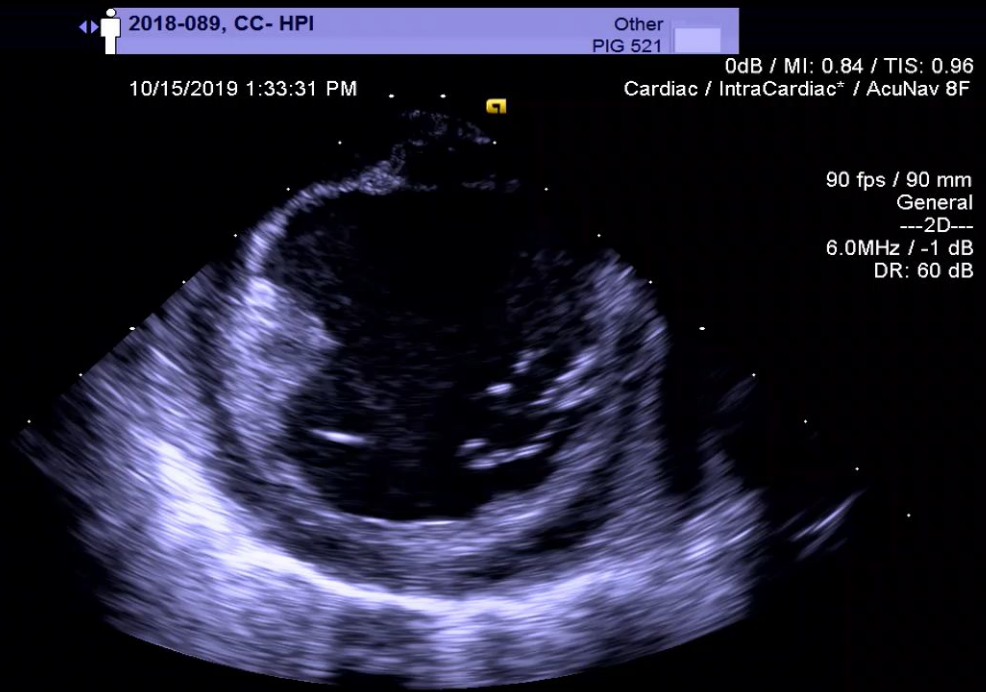
Passive leg raise (PLR)



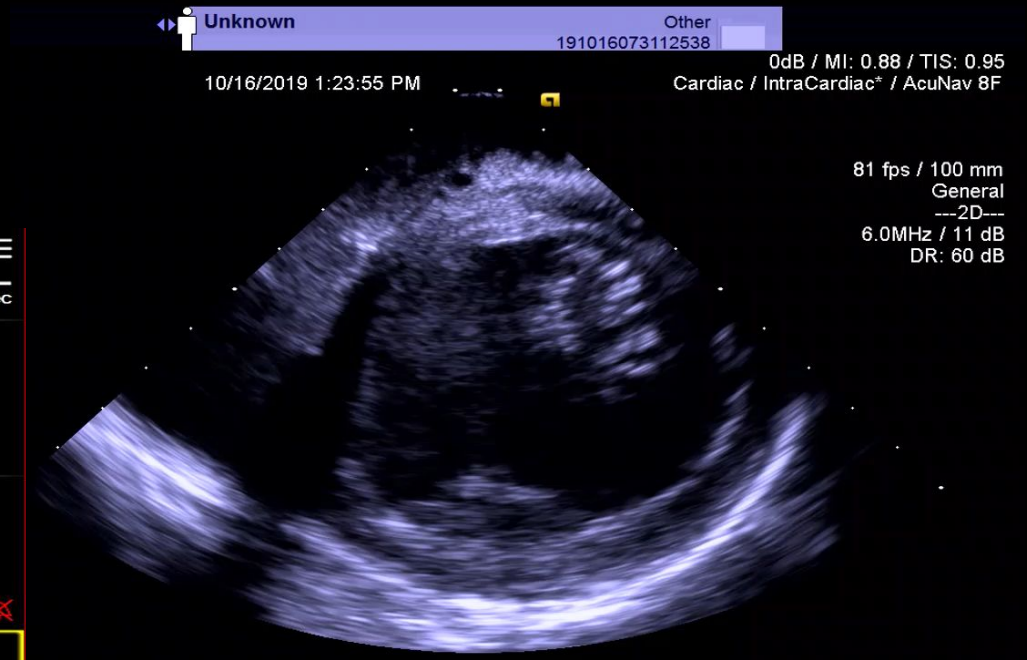
Monnet X and Teboul JL. Passive leg raising: five rules, not a drop of fluid! Critical Care 2015
Truijen et al. Noninvasive Continuous Hemodynamic Monitoring. Journal of Clinical Monitoring and Computing. 2012

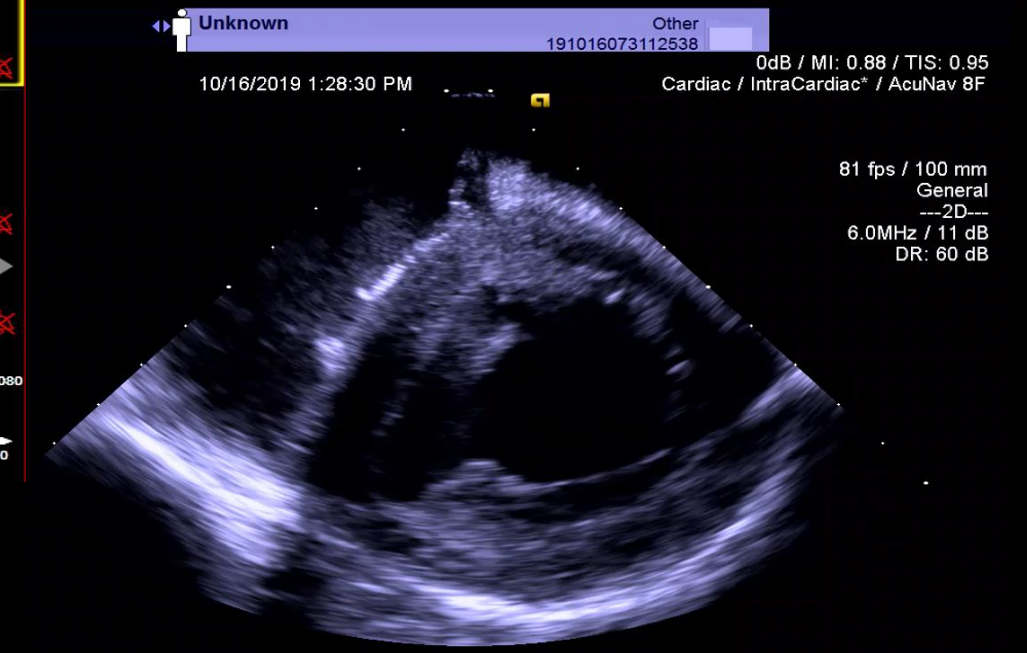
Esmolol Effect



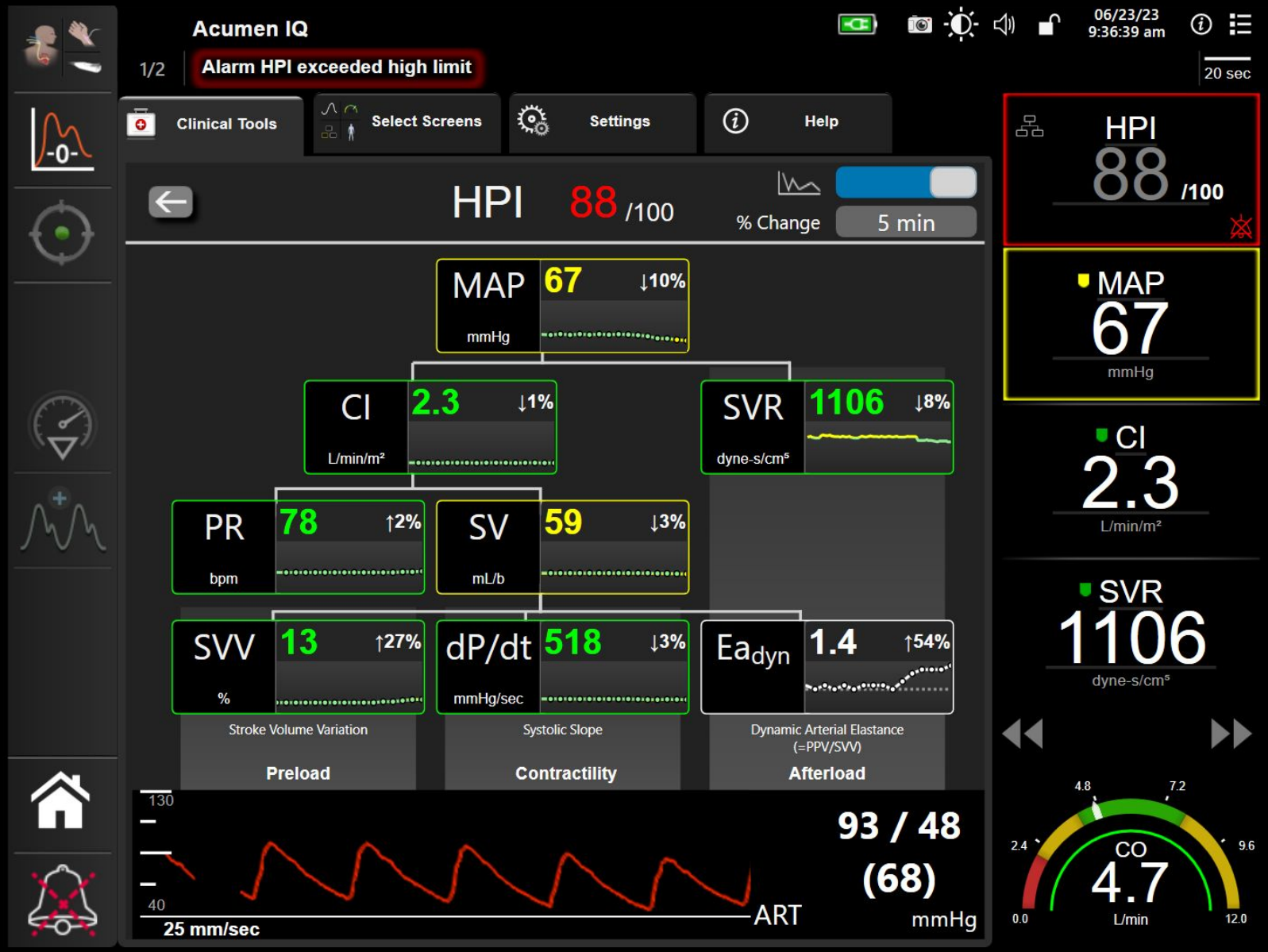


Dobutamine Effect

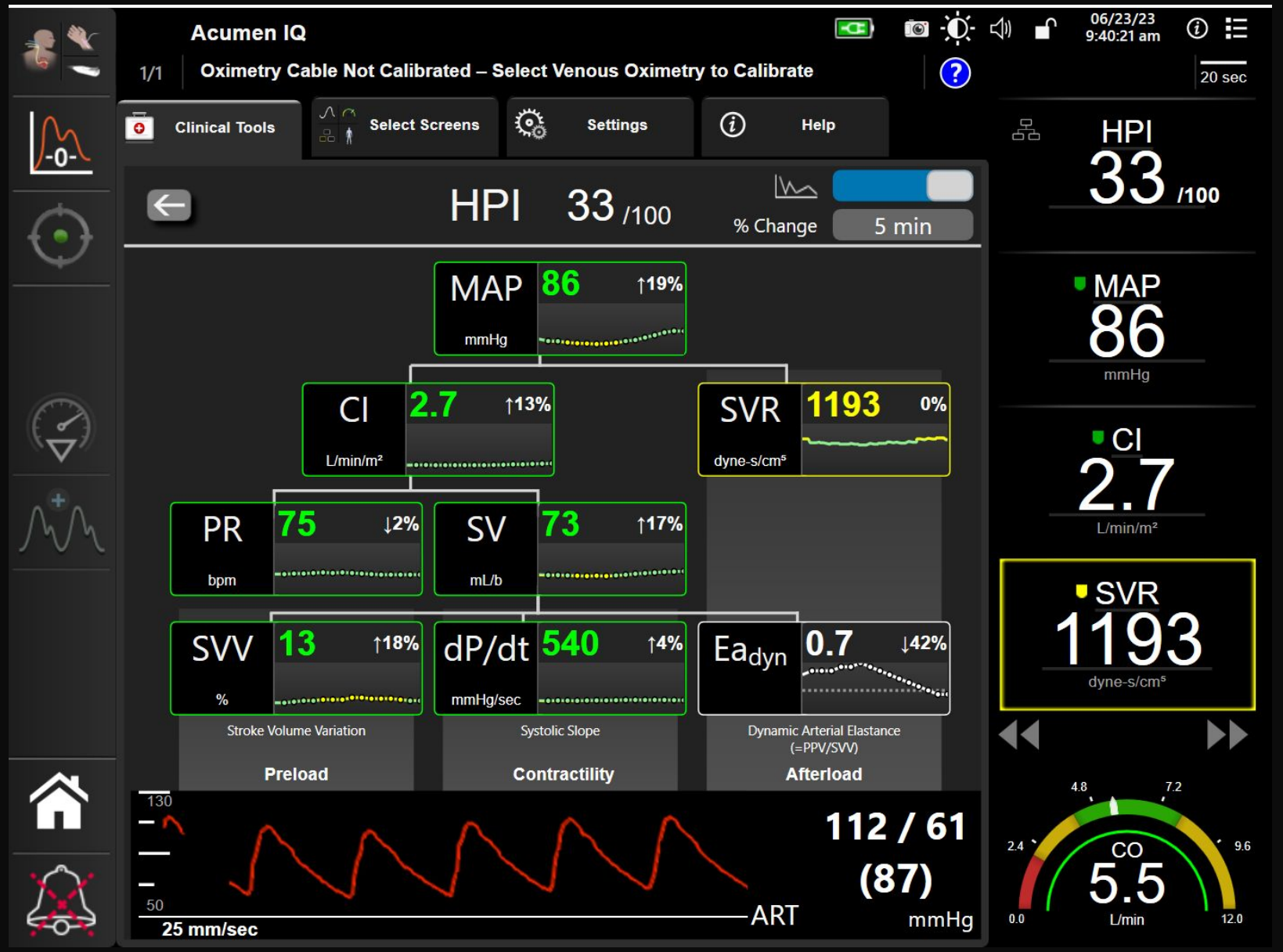




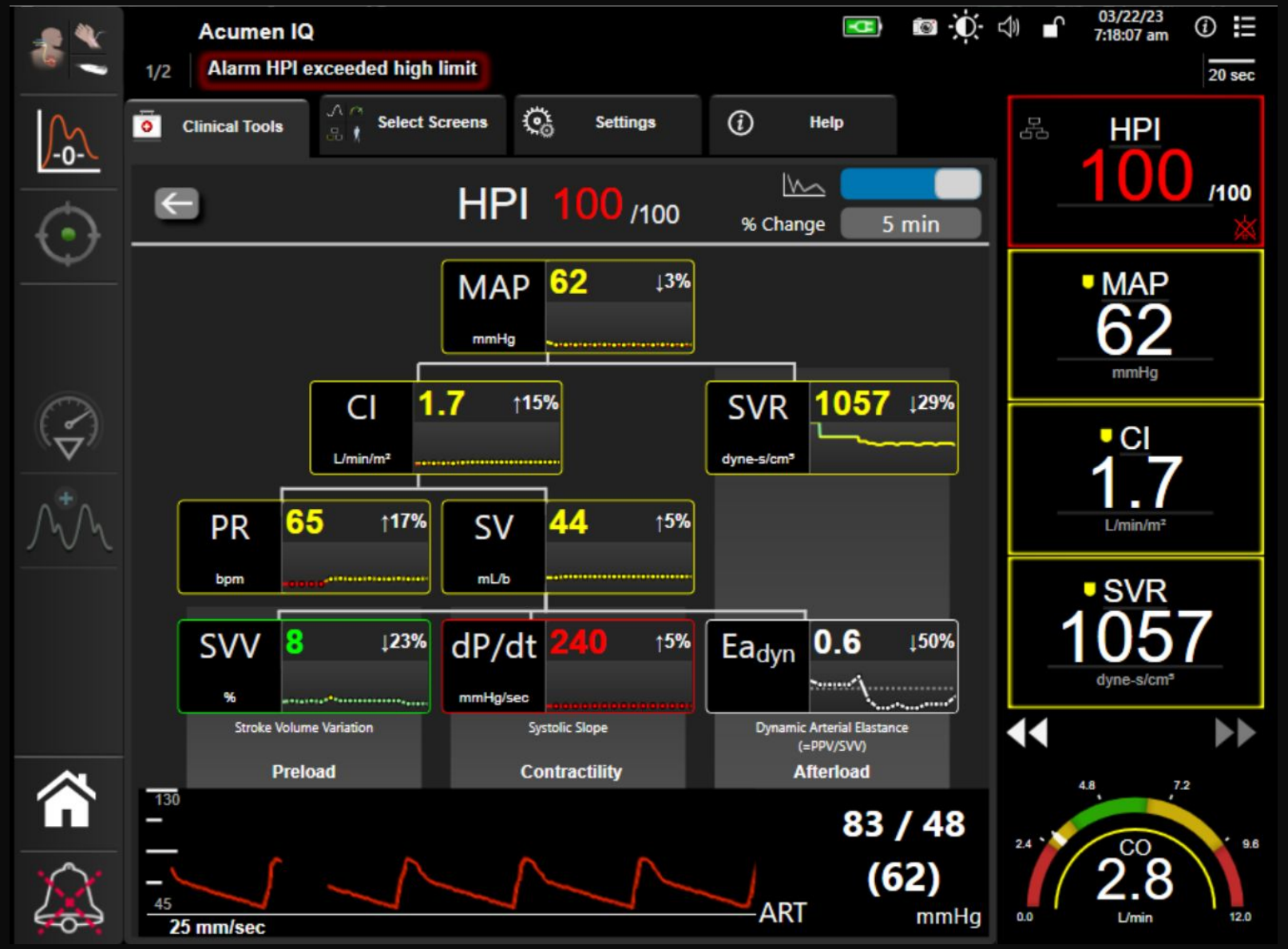
CASE EXAMPLE – 1 HOUR POSTOP



CASE EXAMPLE – POST FLUID BOLUS



CASE EXAMPLE – 3 DAYS LATER



ERAS and POQI

Clinical Review & Education

JAMA Surgery | Special Communication

Guidelines for Perioperative Care in Cardiac Surgery
Enhanced Recovery After Surgery Society Recommendations

Daniel T. Engelman, MD; Walid Ben Ali, MD; Judson B. Williams, MD, MHS; Louis P. Perrault, MD, PhD; V. Seenu Reddy, MD; Rakesh C. Arora, MD, PhD; Eric E. Roselli, MD; Ali Khoynezhad, MD, PhD; Marc Gerdisch, MD; Jerrold H. Levy, MD; Kevin Lobdell, MD; Nick Fletcher, MD, MBBS; Matthias Kirsch, MD; Gregg Nelson, MD; Richard M. Engelman, MD; Alexander J. Gregory, MD; Edward M. Boyle, MD

Goal directed fluid therapy is recommended to reduce postoperative complications.

Class (Strength) of Recommendation	Class I (Strong)
Level (Quality) of Evidence	Level B-R (Randomized)

CARDIOVASCULAR

Perioperative Quality Initiative consensus statement on goal-directed haemodynamic therapy

Mark R. Edwards[1,*], Gudrun Kunst[2], Lui G. Forni[3], Desirée Chappell[4], Timothy E. Miller[5], and PeriOperative Quality Initiative 11 (POQI-11) Group Members[†]

[1]Perioperative and Critical Care Theme, NIHR Southampton Biomedical Research Centre, University Hospital Southampton/University of Southampton, Southampton, UK, [2]Department of Anaesthetics and Pain Therapy, King's College Hospital NHS Foundation Trust and School of Cardiovascular and Metabolic Medicine & Sciences, King's College London, UK, [3]Department of Clinical & Experimental Medicine, Royal Surrey County Hospital NHS Foundation Trust, School of Medicine, University of Surrey, UK, [4]NorthStar Anesthesia, Irving, TX, USA and [5]Department of Anesthesiology, Duke University School of Medicine, Durham, NC, USA

*Corresponding author. E-mail: mark.edwards2@uhs.nhs.uk
[†]For the full list of members of the POQI-11 meeting see Appendix 1.

Protocol considerations

Patient risk

- History
- Comorbid Conditions
- Risk stratification (ASA, STS)

Procedure considerations

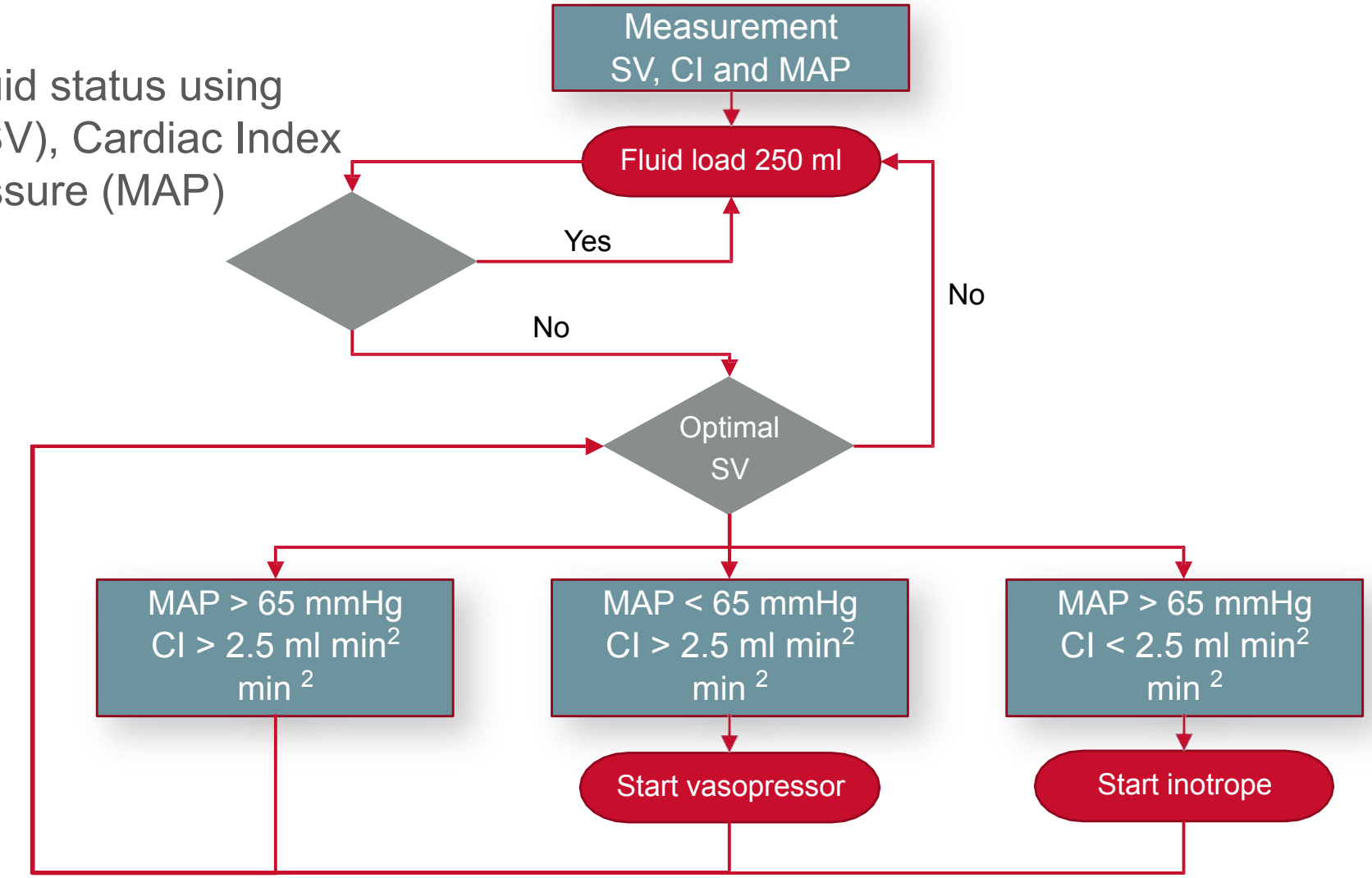
- Duration
- Complexity
- Experience

Department considerations

- Location
- Equipment
- Culture

Example PGDT protocol

Goal: Maintain adequate fluid status using change in Stroke Volume (SV), Cardiac Index (CI), and Mean Arterial Pressure (MAP)

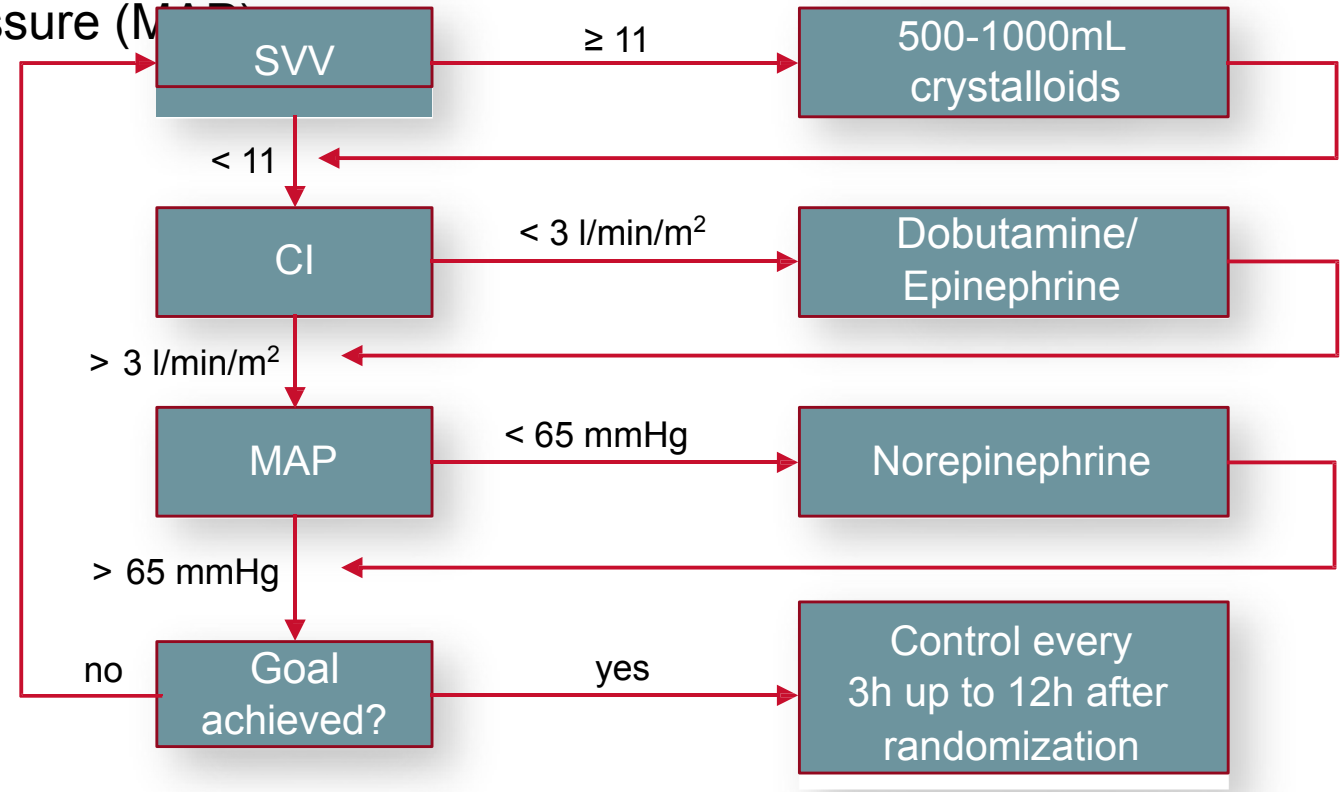


1. Calvo-Vecino, J. M., et al. Effect of goal-directed haemodynamic therapy on postoperative complications in low-moderate risk surgical patients: a multicentre randomized controlled trial (FEDORA trial). BJA, 2018. Multi-center randomized controlled trial at Hospital Universitario Infanta Leonor, Madrid; Hospital Universitario Ramon y Cajal, Madrid; Hospital Cli´nico Universitario Lozano Blesa, Zaragoza; Hospital de Vinalopo, Alicante; and Hospital de Torrevieja, Alicante.

Example PGDT protocol

Goal: Maintain adequate fluid status using Strove Volume Variation (SVV), Cardiac Index (CI), and Mean

Arterial Pressure (M



1. Meersch, M., et al. Prevention of cardiac surgery-associated AKI by implementing the KDIGO guidelines in high risk patients identified by biomarkers: the PrevAKI randomized controlled trial. Intensive Care Med, 2017. Single-center trial at Department of Anesthesiology, Intensive Care and Pain Medicine University, Hospital Münster, Münster, Germany.

Our Why

In 2019, guidelines for cardiac surgery enhanced recovery after surgery (ERAS) were published, listing GDT as a class 1 recommendation.

Evidence has been building for GDT since early 2000s

Plan-initiate in the CSICU

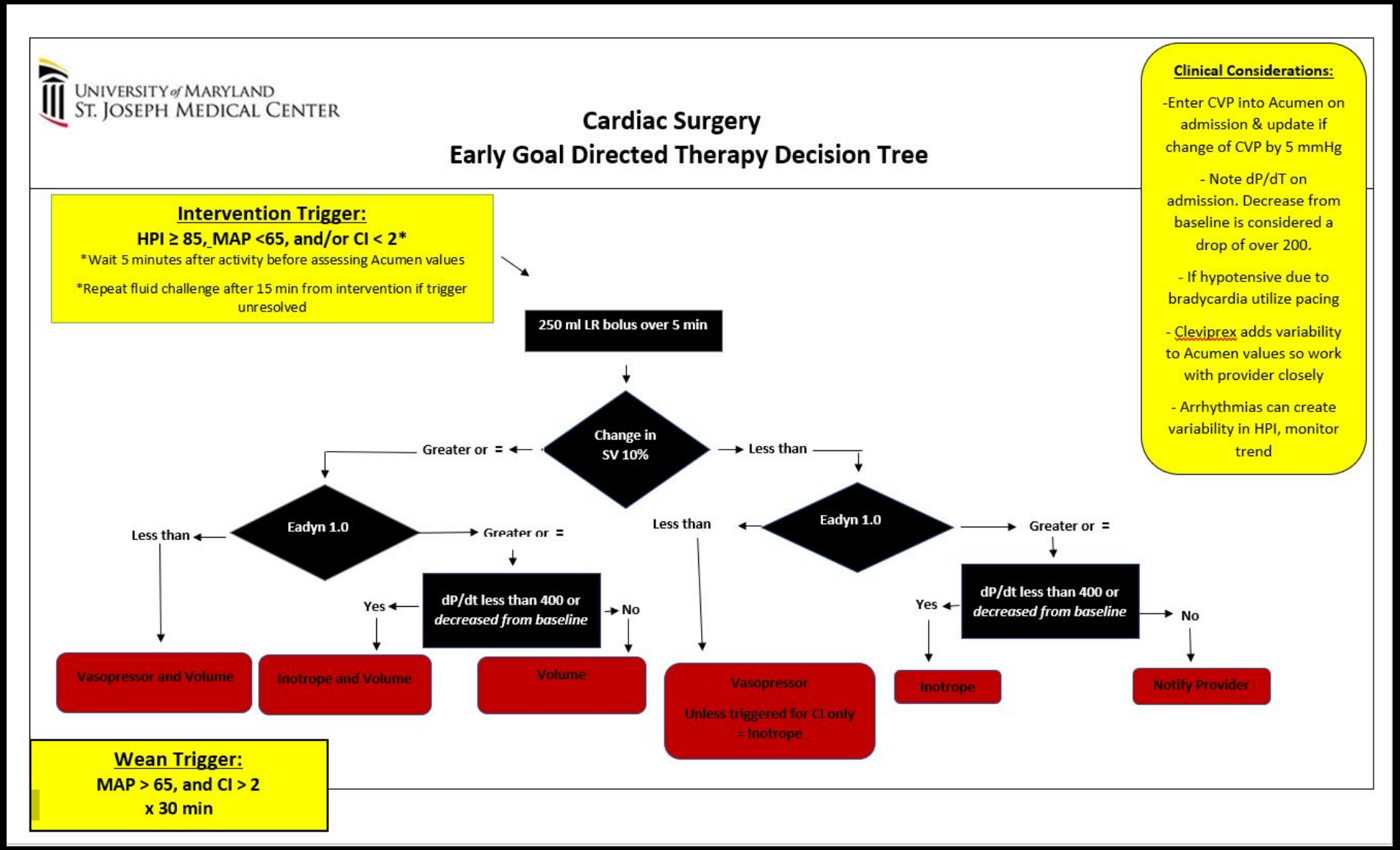
Patient Criteria- Iso CABG EF ≥45%

Our goals-to reduce readmissions, AKI, ICU and total LOS. Secondary goal of afib reduction

Impact on Team

- Nurse driven protocol-autonomy
- Initial struggles with integrating new technology
- Improve understanding of the pathophysiology

UMSJMC Nurse Driven Algorithm



Implementation Barriers

Implementation Barriers

- Satisfaction with status quo
- Loss of autonomy/flexibility
- Interruption of workflow
- Cognitive overload
- Temporary incompetence
- Proving to the C suite the value

Potential Solutions

Potential Solutions

- Preliminary data audit, compare results
- Early and continuous stakeholder input
- Comprehensive education/discussion sessions
- User-friendly, pragmatic, and non-threatening GDT algorithm without variation

	Retrospective Control Isolated CABG EF ≥45%	GDT Cohort Isolated CABG EF ≥45%	%
N	246	233	--------
Average POD 2 AKI	6.9%	2.1%	-4.8%
Average POD 7 AKI	5.3%	1.3%	-4.0%
Average D/C AKI	3.3%	0%	-3.3%
Average Afib	36.2%	30.4%	-6.0%

- Isolated CABG patients with EF ≥45%

	Retrospective Control Isolated CABG EF ≥45%	GDT Cohort Isolated CABG EF ≥45%	%
N	246	233	--------
Average Albumin (ml)	538ml	313ml	-225ml
Average IVF (ml)	3896ml	5253ml	+1356 ml
Average Vasopressor (hrs)	38.7 hours	40.5 hours	+1.9hrs

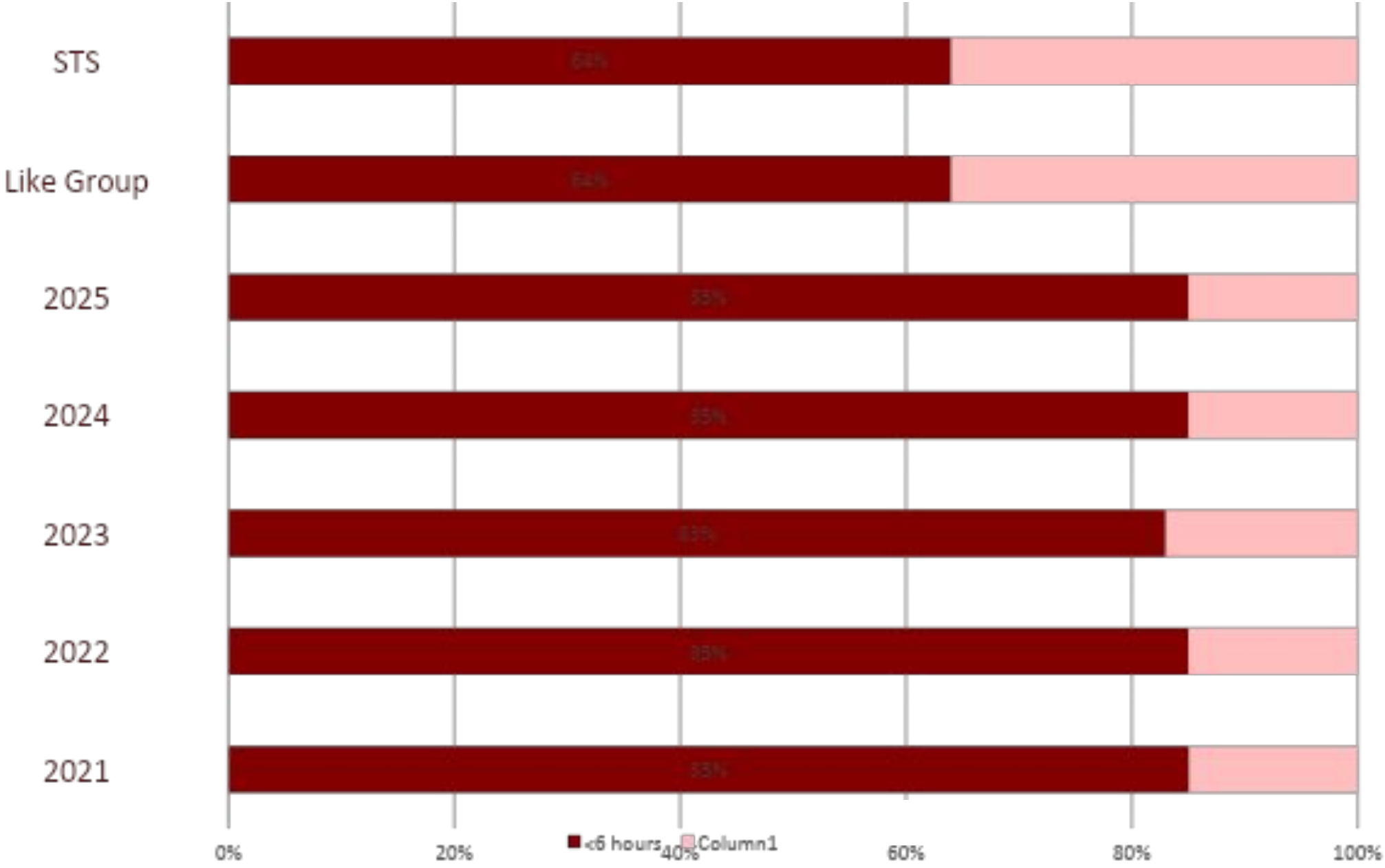
- Isolated CABG patients with EF ≥45%

	Retrospective Control Isolated CABG EF >45%	GDT Cohort Isolated CABG EF >45%	
N	246	233	--------
Average ICU LOS (hrs)	40hrs	35hrs	-5 hours
Average ICU Readmission	4.9%	3.4%	-1.5%
Average Post-op LOS (days)	5.4	4.9	-0.5 days
Average Hospital Readmission	11%	6.4%	-4.6%

- Isolated CABG patients with EF ≥45%

Other Outcome Data Slides

Isolated CAB Early Extubation



Mobility

n=331

Median time to extubation

220 minutes
or
3 hours 40 min

Median time from extubation to OOB

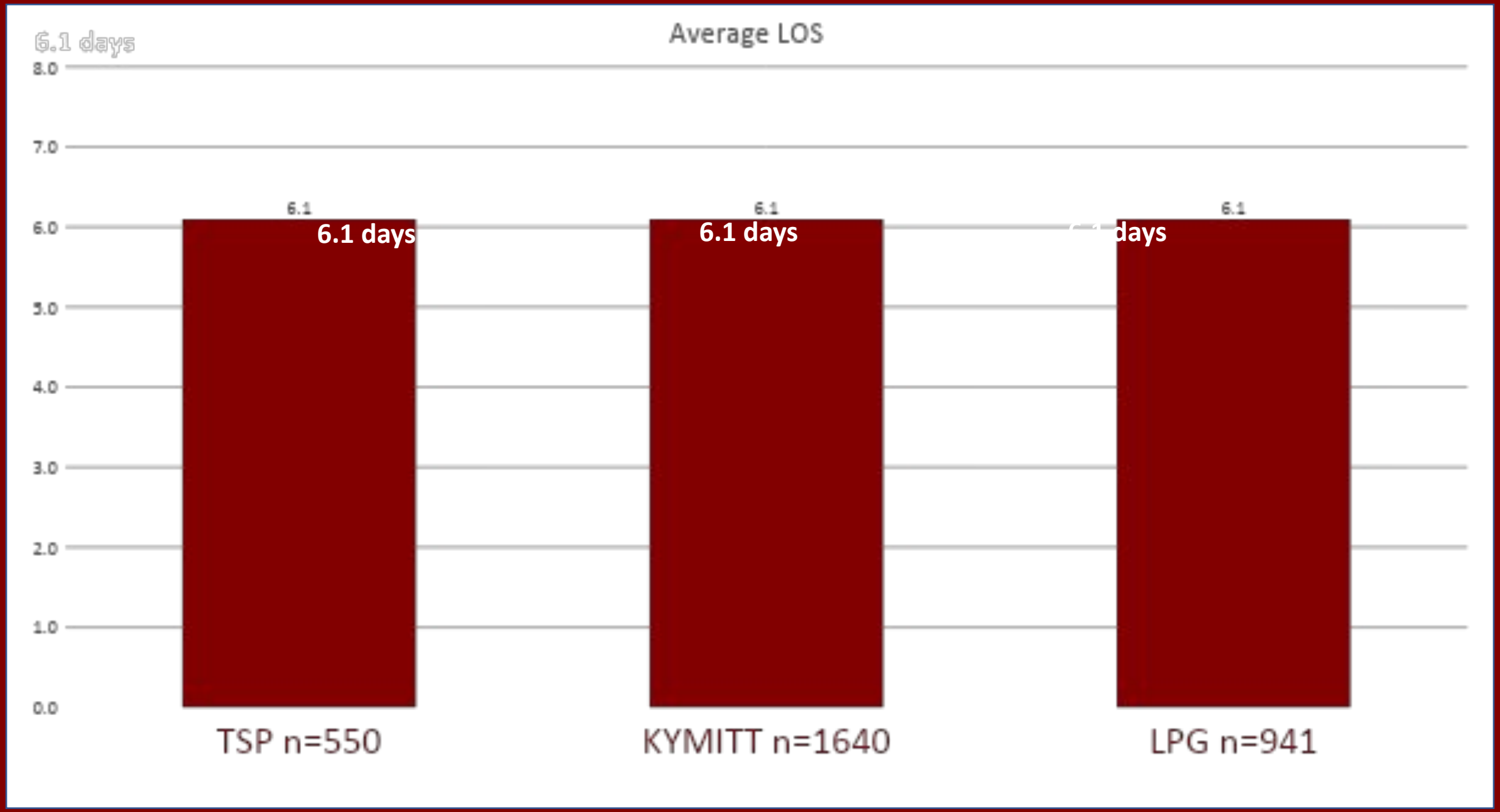
74 minutes
or
1 hour 14 min

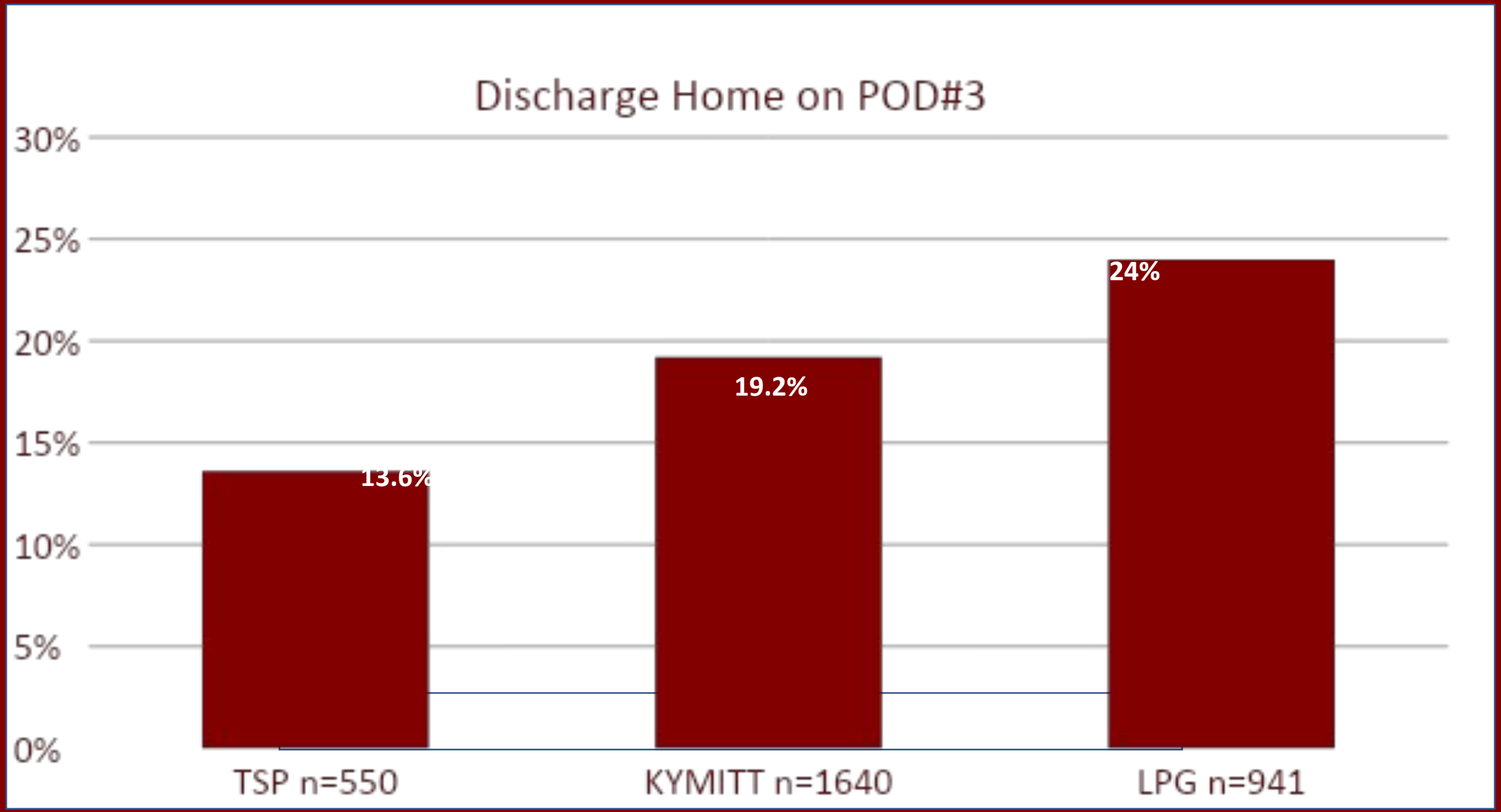
Median time OOR to OOB

299 minutes
or
5 hours

Includes: CABG, valve, combination and aortic cases

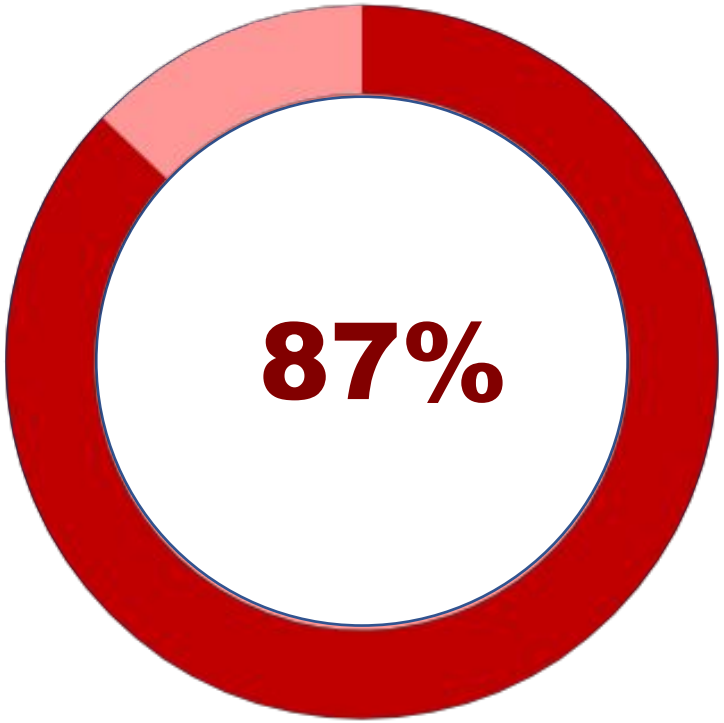
OOB Exclusion reasons: IABP, active bleeding, unstable hemodynamics, open chest, central ECMO


6.1 days
Average LOS
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
6.1
6.1 days
6.1
6.1 days
6.1
days
TSP n=550
KYMITT n=1640
LPG n=941


Discharge Home on POD#3
30%
25%
20%
15%
10%
5%
0%
13.6%
19.2%
24%
TSP n=550
KYMITT n=1640
LPG n=941

Discharge Disposition

Percentage of Patients Discharged to Home vs Rehab



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