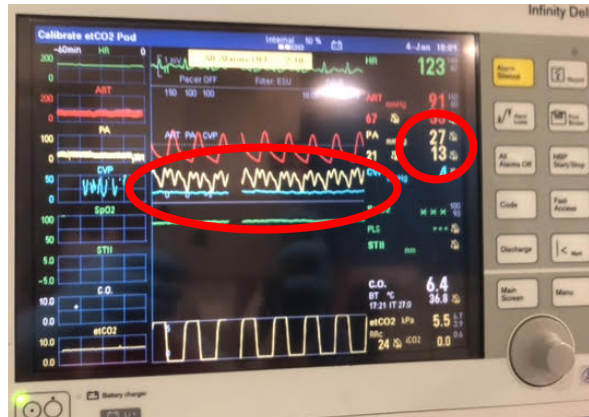


Pulmonary Artery Catheters- how to perform and interpret cardiac output studies in CICU with Dräger Monitoring

For insertion guide see *One Heart- Pulmonary Artery Catheter Insertion*

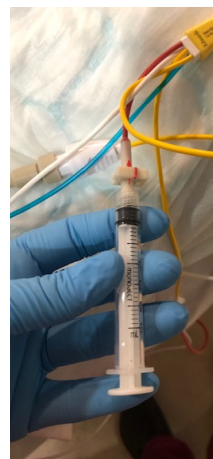
How to perform cardiac output studies

Ensure the bedside monitor is displaying a pulmonary artery catheter trace and measurement.

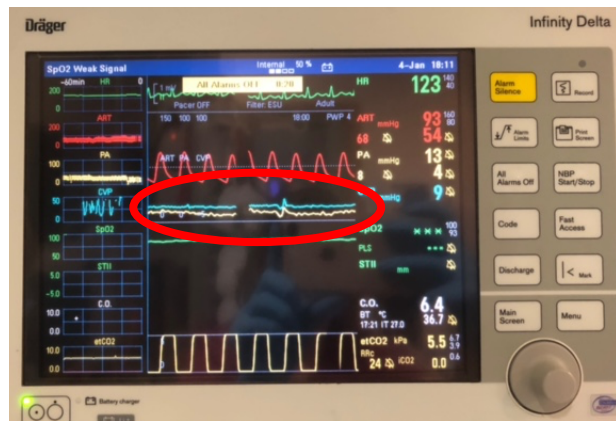


You will first need to wedge the pulmonary artery catheter.

1. Inflate the balloon (red port) with up to 1.5ml of air and lock it.



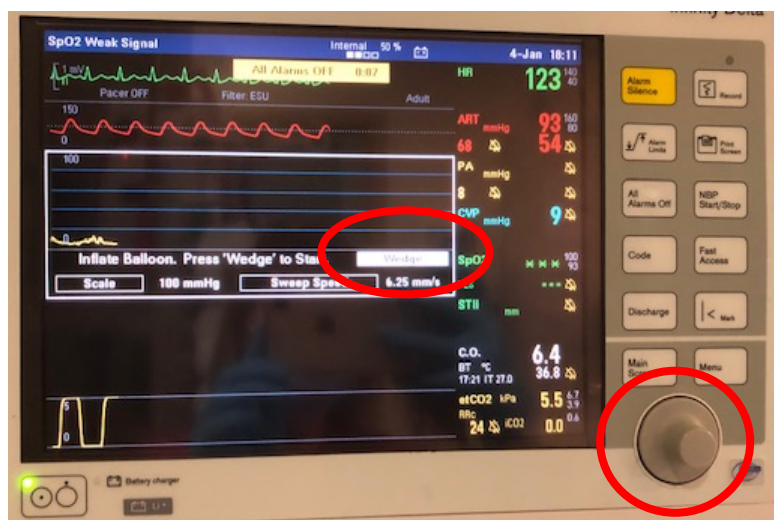
2. Slowly advance the catheter using the sterile sheath until a wedge trace is achieved on the screen. This is usually 2-10 mmHg at 40-50 cm distance if SCV/ IJ insertion.



- Press 'Wedge' on the bedside console to start the process.



- A box will appear on the monitor indicating it is ready to perform a wedge pressure. The monitor will then prompt you to press 'Wedge' to start using the rotary knob.



- The computer will record the wedge pressure and then prompt you to deflate the balloon and save.



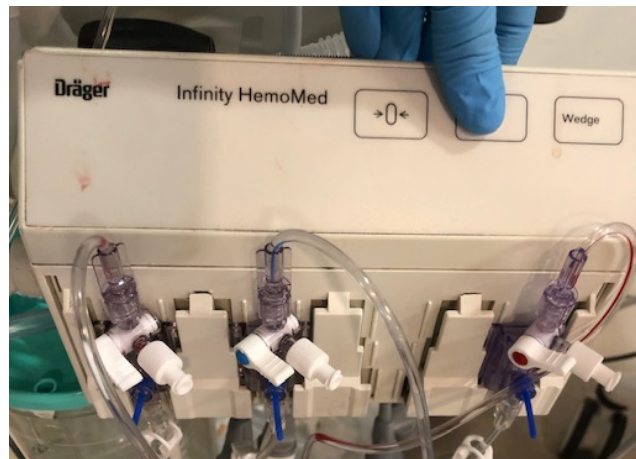
- Ensure you deflate the balloon, lock the syringe, and pull back the pulmonary artery catheter 1-2 centimetres to prevent inadvertent wedging. Note the change from wedge to PA trace on the monitor. Leaving the catheter wedged can cause arterial rupture.

You are now ready to perform cardiac output studies.

1. You will need an ice bucket to cool the sterile water used to perform the studies.



2. Ensure the transducer is level with patients left atrium and the line is zeroed. Press C.O. on the bedside console.



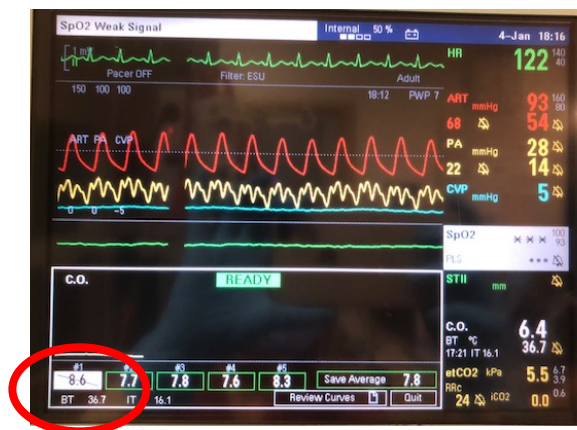
3. A box on the monitor screen will appear indicating it is ready for you to perform thermodilution cardiac output studies.



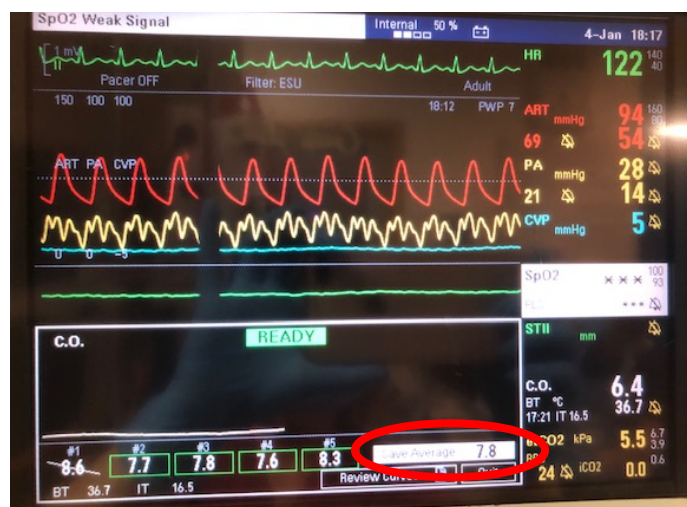
- Draw back 10ml of ice-cold water, remove bubbles and rapidly inject (usually via the blue port, but you can also use the white port) watching the monitor to ensure a cardiac output thermodilution curve and figure are obtained. Ideally perform at end expiration so there is the least effect of pleural pressure on intracardiac pressures.



- If one result seems erroneous this can be discarded by using the rotary knob to highlight the box and clicking on it to remove it from the final average value.

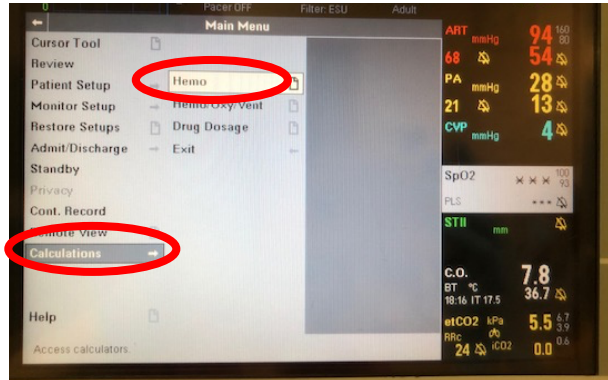


- Save the average value using the rotary knob.

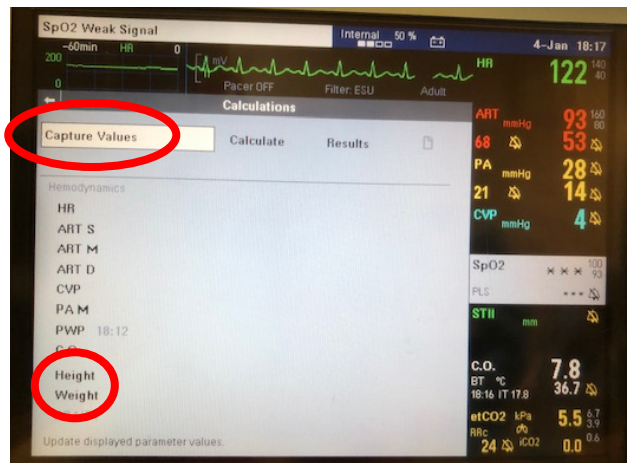


Now you can use the values obtained from your thermodilution studies to calculate various parameters to provide an indication of the patient's clinical status.

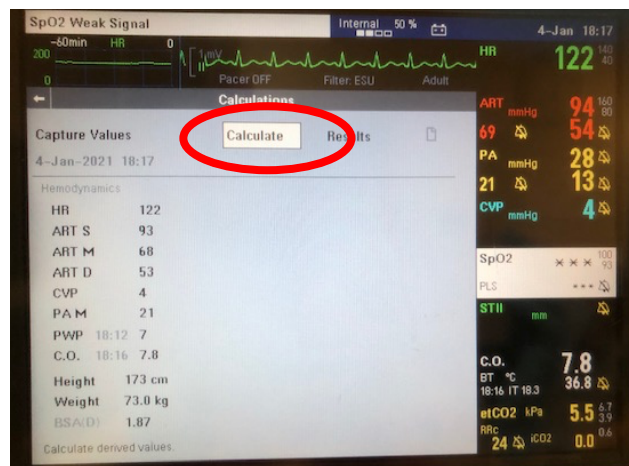
1. Press 'menu' on the patient's monitor, then use the rotary knob to scroll to 'calculations', then 'hemo' and confirm by pressing down on the rotary knob.



2. Scroll down to input the patient's height and weight then press 'Capture Values'.



3. Once the values from your thermodilution studies appear on screen you can then press 'Calculate' to obtain your results.



4. The results are displayed- you will need to scroll down to view them all.

Pacer OFF Filter: ESU Adult

Calculations

	4-Jan 17:23	4-Jan 17:26	4-Jan 18:01	4-Jan 18:17	Normal Range
HR	124	124	124	122	60 - 90
ART M	63	62	62	68	70 - 100
PA M	31	29	21	21	10 - 20
PWP	14	14	4	7	4 - 12
CVP	115	13	77	4	2 - 6
C.O.	6.4	6.4	6.4	7.8	4.0 - 8.0
SV	51.6	51.6	51.6	63.9	60.0 - 120.0
SVR	---	612	---	656	900 - 1400
PVR	212	187	212	144	70 - 180
LVSW	34.4	33.7	40.7	53.0	60.0 - 80.0
RVSW	---	11.2	---	14.8	10.0 - 15.0
CI	3.4	3.4	3.4	4.2	2.5 - 4.0
SVI	27.6	27.6	27.6	34.2	30.0 - 60.0

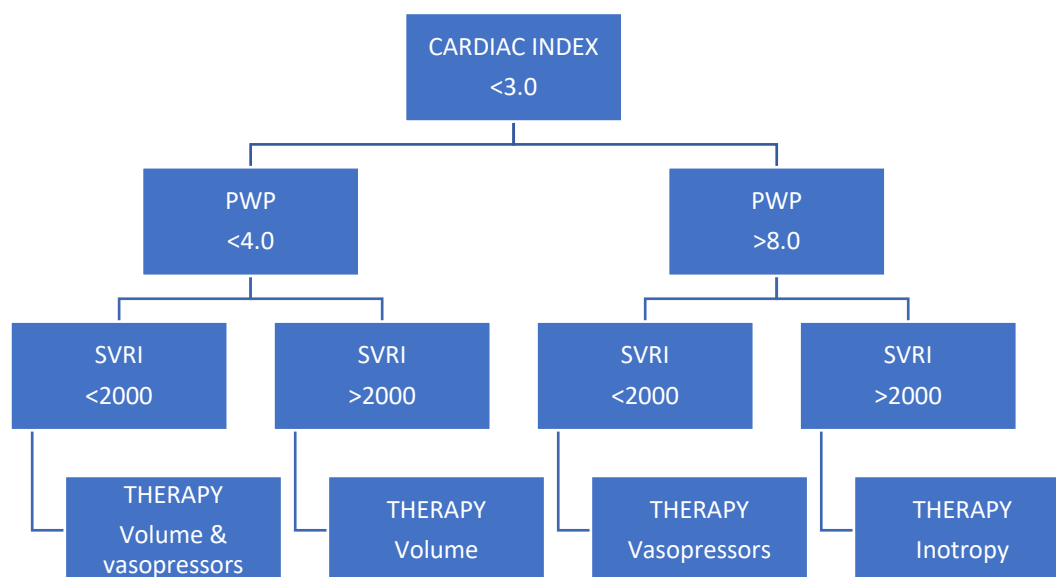
Report Save Reference View Normal Range Help

How to interpret results

Key values obtained:

Value	Reference range	Clinical Relevance
Measured values		
PWP (Pulmonary Wedge Pressure)	4-12 mmHg	Used to determine LV function; correlates LVEDP, LV preload
CVP (Central Venous Pressure)	2-6 mmHg	Used to determine volume status and RV function; correlates with RVEDP
CO (Cardiac Output)	4-8 L/min	Describes blood flow through tissues; reflects adequacy of overall cardiac function
CI (Cardiac Index)	2.5-4 L/min/m ²	CO adjusted for patient's BSA
Derived values		
SV (Stroke Volume)	60-120 ml/beat	Amount of blood ejected during systole; decreased SV indicates ventricular dysfunction
SVI (Stroke Volume Index)	30-60 ml/beat/m ²	SV adjusted for patient's BSA
SVR (Systemic Vascular Resistance)	900-1400 dynes/sec/cm ⁵	Describes state of resistance in systemic vasculature, afterload
SVRI (Systemic Vascular Resistance Index)	1700-2600	SVR adjusted for patient's BSA
PVR (Pulmonary Vascular Resistance)	70-180 dynes/sec/cm ⁵	Describes state of resistance in pulmonary vasculature
PVRI (Pulmonary Vascular Resistance Index)	150-250	PVR adjusted for patient's BSA

Very simplified flow diagram to help aid in interpretation:



Troubleshooting:

There is a separate guide on how to attach the PA catheter – often the nursing staff will know.

If a temperature does not appear when the ‘wedge’ button is pressed, the unit or cable is likely defective. Replace and try again.

Ensure the transducer is correctly positioned or it will not give an accurate result.

Check the water is well cooled by the ice bucket.