Using the CardioQ Monitor in the ICU

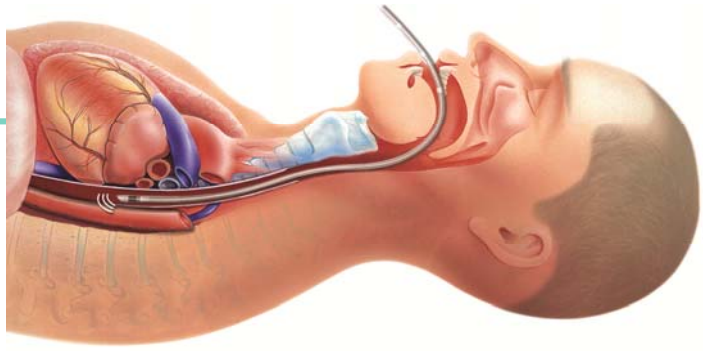
1. Turn on the CardioQ *(use the switch at the back of the monitor).*

2. Attach a probe to the interface cable.

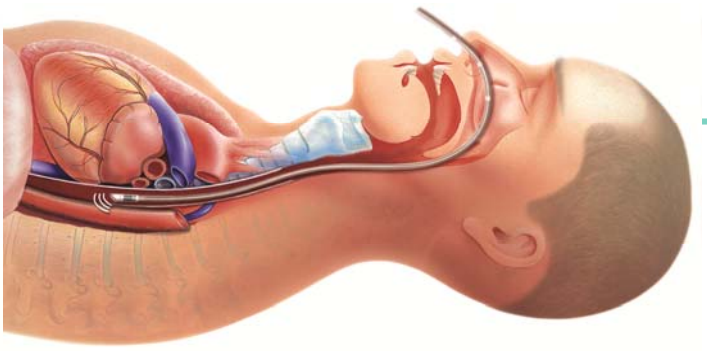
3. Input patient data (age, weight, height). *Use Control Knob to input data and press enter, check and then accept data.*

4. Apply water-based lubricant to distal part of probe.

5. Insert probe, bevelled edge upwards *(patient incisors usually between distal & middle markers for oral insertion or middle & proximal for nasal insertion).*



Oral Insertion

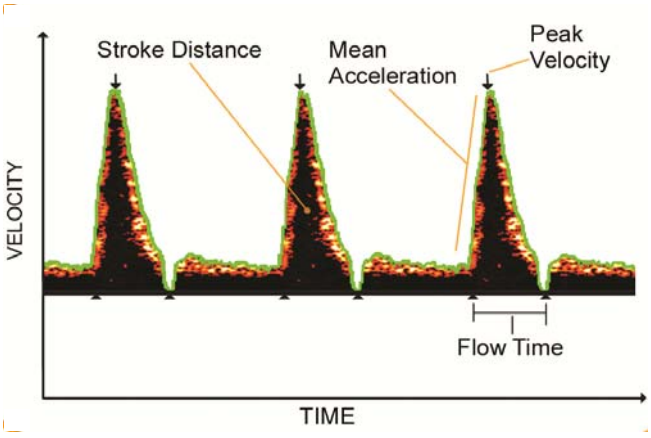


Nasal Insertion

6. Locate descending aortic waveform *(gently rotate or adjust depth as necessary).*

7. Optimise waveform *(sharpest sound, tallest peaks, spectrum of colours).*

8. Use Auto gain if necessary.



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The CardioQ Waveform

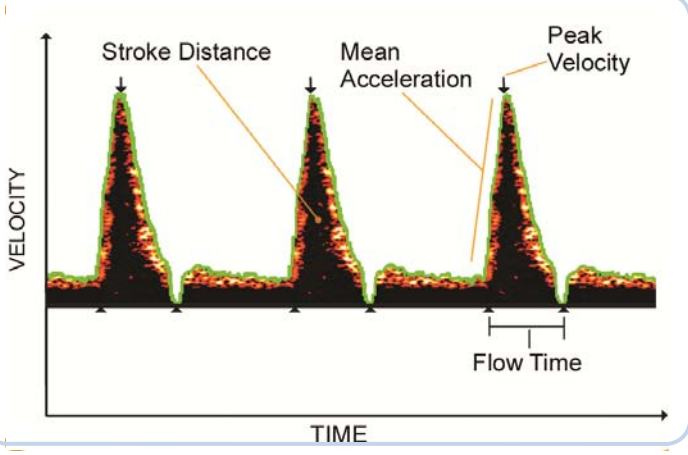
The **green line** indicates the velocity/time envelope which the monitor uses to make calculations. The **white arrows** indicate time and velocity values used for CardioQ™ calculations.

The Stroke Distance (SD) is the area under the waveform and is the basic measured parameter upon which calculations of Stroke Volume (SV) and all other Cardiac Output (CO) and indexed measurements are made. Stroke Volume is the parameter of choice for fluid management protocols, however changes in Stroke Distance (SD) or Stroke Volume Index (SVI) can also be utilised.

The waveform base, (flow time) depends on heart rate, left ventricular filling and afterload. The flow time corrected to a heart rate of 60bpm (FTc) is inversely correlated with the systemic vascular resistance (SVR).

The most common cause of a short FTc (<330 ms) is hypovolaemia. If a short FTc (<330 ms) does not increase after an appropriate fluid challenge, other causes of vasoconstriction, (eg excess vasopressors, cold temperature, or obstructed circulation such as pulmonary embolus) should be considered. A long FTc (>360 ms) is seen in conditions associated with a low SVR eg sepsis, pregnancy, vasodilators and some anaesthetic agents.

Peak Velocity (PV) and Mean Acceleration (MA) are markers of left ventricular contractility. Changes in afterload will also affect the PV and MA - both decrease with an increase in afterload, and vice versa. Changes in preload predominantly affect the FTc and only affect PV and MA at extremes.



Typical Parameter Values

(These values should not be confused with a physiological target)

Flow Time Corrected (FTc)

330 - 360 milliseconds

NB -The effects of vasodilating drugs may elevate the FTc (see above).

Peak Velocity (PV)

20 years 90 - 120 cm/s
30 years 85 - 115 cm/s
40 years 80 - 110 cm/s
50 years 70 - 100 cm/s
60 years 60 - 90 cm/s
70 years 50 - 80 cm/s
80 years 40 - 70 cm/s
90 years 30 - 60 cm/s

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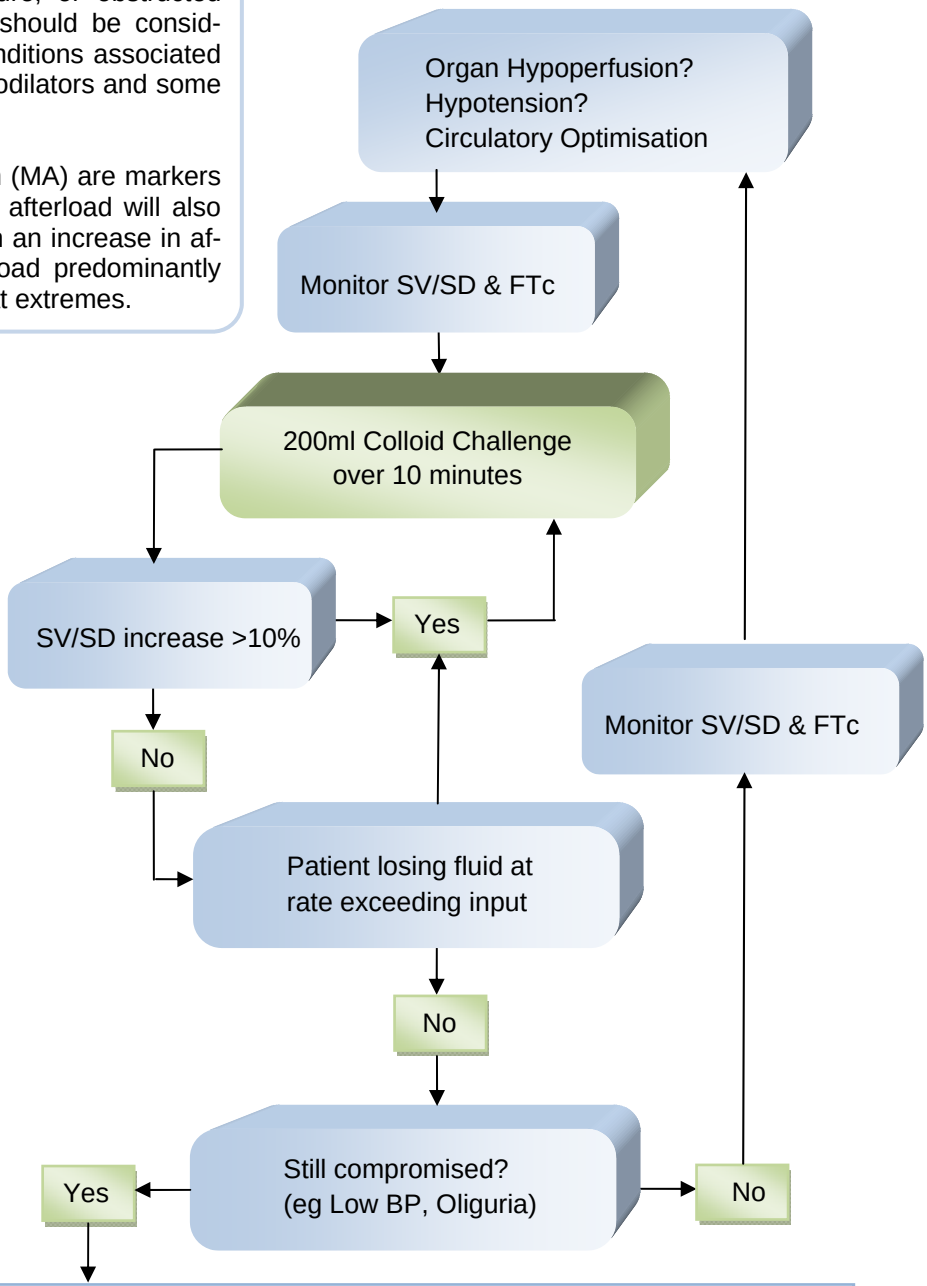
Treatment Algorithm



Other therapies as appropriate eg:
Dilators (+ more fluid) if low FTc, low PV and BP acceptable.
Inotropes if low PV and low BP.
Vasopressors if high FTc, high SV and low BP.

Treatment Algorithm suggested by Prof. M. Singer, University College London