



## Case History No 9



The Royal London Hospital, March 2006

# Perioperative Stroke Volume Optimisation using the CardioQ™ Oesophageal Doppler Monitoring

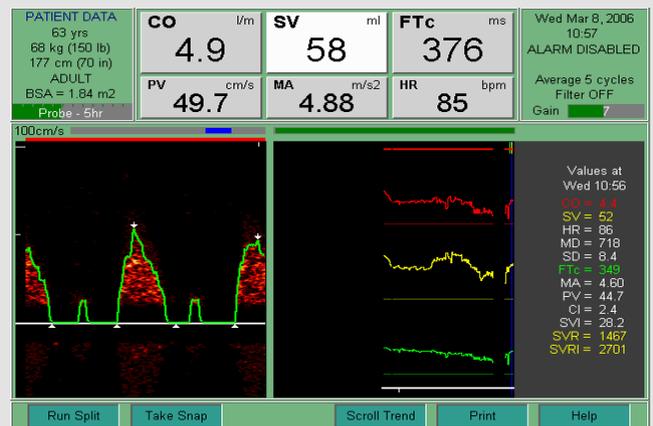
A 63-year-old patient with a previous history of myocardial infarction and lower lobe resection of the left lung 6 years previously, underwent surgery a bowel resection for remove of carcinoma.

During the first hour of surgery the patient was haemodynamically unstable with a stroke volume of around 45 ml, FTc and PV were both low at 270 ms and 45 cm/sec respectively. The patient was also tachycardic with a heart rate of 103 however the blood pressure was relatively normal at 143/90. The senior anaesthetist was concerned at this point as the patient had already received 5 lt fluid which had raised the CVP from +1 to +9, the SaO<sup>2</sup> was 91% and was starting to fall.

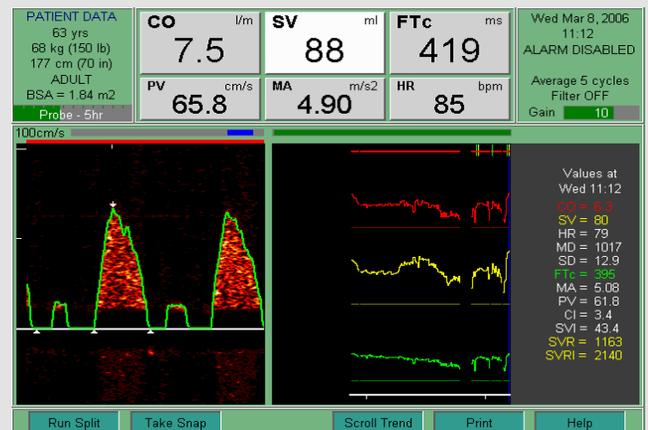
**Screenshot 1** was taken after the first hour of surgery and it is seen that the SV, FTc and PV are all improving although the cardiac output is still a little low. To test the patient's haemodynamic status a 200ml bolus was given.

Following the fluid challenge the heart rate settled at around 86 bpm; the SaO<sup>2</sup> went up to 94% whilst the blood pressure stabilised at 120 / 64; The CVP remained steady at + 9; it is interesting to note that despite an epidural the patient had an SVR 1400.

**Screenshot 1: Split screen showing the trend data along with a waveform indicating a low cardiac output state**



**Screenshot 2: Shortly after a 2nd 200ml fluid challenge showing an improving haemodynamic state**





**Screenshot 2**, taken 15 minutes later shows the effect of a second 200ml fluid challenge. SV has increased to 88ml, FTC is up to 419 ms and PV is also up to 65.8 cm/s, the patient was far more haemodynamically stable. The BP was now 130 / 77, with the SaO<sub>2</sub> up to 98%; and the SVR 1100.

Because the increase in SV and all other variables was so marked a further fluid challenge was given, in **Screenshot 3** the results can be seen as a reduction in both FTC and CO, with no significant change in SV, the heart rate has fallen slightly. This would suggest that the patient is therefore stroke volume optimised and no further fluid challenges are required at this time.

At the end of surgery the patient was haemodynamically stable with a heart rate of 88 bpm and a BP of 128 / 68. The SaO<sub>2</sub> was 97% and the SVR was 800.

### Comment

A good example of perioperative stroke volume optimisation, the senior anaesthetist, Dr Hallworth stated that:

“The Doppler once again proved extremely useful. The patient received lots of fluid and based on the CVP at +9 mmHg (up from + 1 mmHg) I was concerned about giving more fluid. The Doppler made me happy to give challenges – it makes you less concerned about giving more fluid to benefit your patient. I always feel I give plenty of fluid – the Doppler ensures I give the right amount”!

**Screenshot 3: No significant increase in SV after a fluid challenge indicates SV optimisation has been achieved**

