Case History No 3

DELTEX MEDICAL

Charite Hospital, Berlin, 23rd May 2006

Haemodynamic Monitoring during Laparoscopic Surgery
Oesophageal Doppler Monitoring

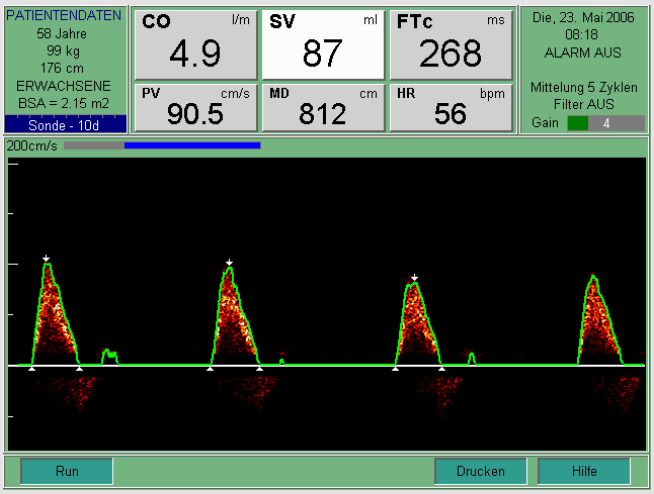
A 58-year-old patient was monitored with the CardioQ Oesophageal Doppler Monitor during a laparoscopic large bowel resection for cancer.

Following induction of anaesthesia a DP 240 oesophageal Doppler probe was inserted orally and the descending aortic waveform located.

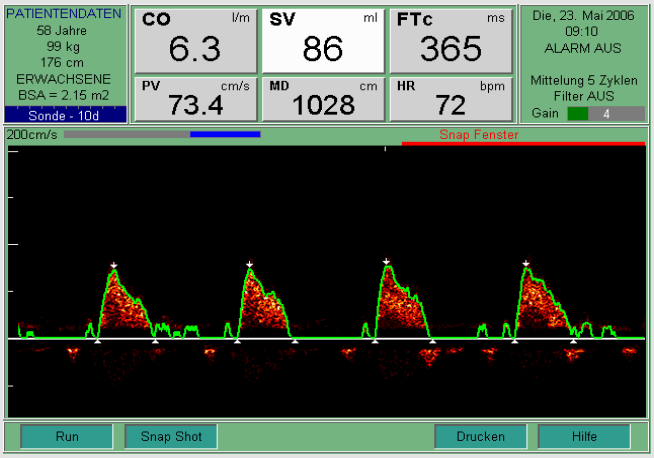
Screenshot 1 taken a few minutes after probe placement shows a flow time corrected (FTc) of 268 ms which is below the accepted normal range of 330 – 360 ms. This low FTc may be an indication of insufficient intravascular volume. 500 ml of colloid was given over the next 30 minutes.

In Screenshot 2, it can be seen that the FTc has increased significantly (36%). However, the increase in intra-abdominal pressure caused by insufflation for laparoscopic access has resulted in a reduction of the peak Velocity (PV). The reduction in peak velocity has resulted in no apparent change in stroke volume but cardiac output has increased due to a compensatory change in heart rate. The heart rate has increased Cardiac Output (CO) from 4.9 to 6.3 l/min. Simply, the insufflation pressure is confounding the attempt to improve stroke volume by way of colloid fluid challenges, making further fluid delivery difficult to monitor.

Screenshot 1: Post induction of anaesthesia and prior to abdominal insufflation



Screenshot 2: After colloid challenge



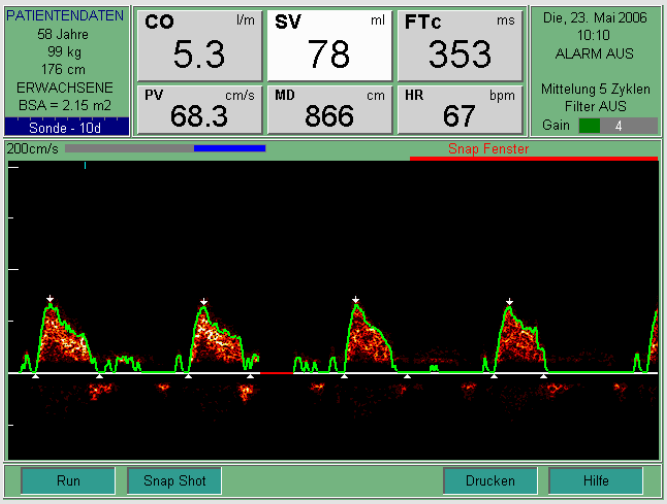
One hour into the procedure (Screenshot 3) and the effects of abdominal insufflation can be clearly seen as the increased afterload, and the reduced preload reduce the size of the descending aortic waveform, PV has been further reduced to 68.3 cm/s.

Screenshot 4 was taken shortly after deflation of the pneumoperitoneum, with the resulting reduction in pressure preload increases and afterload decreases such that FTc and the PV both increase. The subsequent increase in stroke volume and heart rate results in a 28% rise in cardiac output.

Comment

Due to the confounding effects of abdominal insufflation for laparoscopic surgery it is recommended that stroke volume optimisation is completed prior to insufflation.

Screenshot 3: Effects of abdominal insufflation pressure



Screenshot 4: Shortly after deflation of the pneumoperitoneum