Hemodynamic status

Whilst the measurement of blood pressure, heart rate and pulse oximetry are routine, do these really tell us much about the true hemodynamic picture?

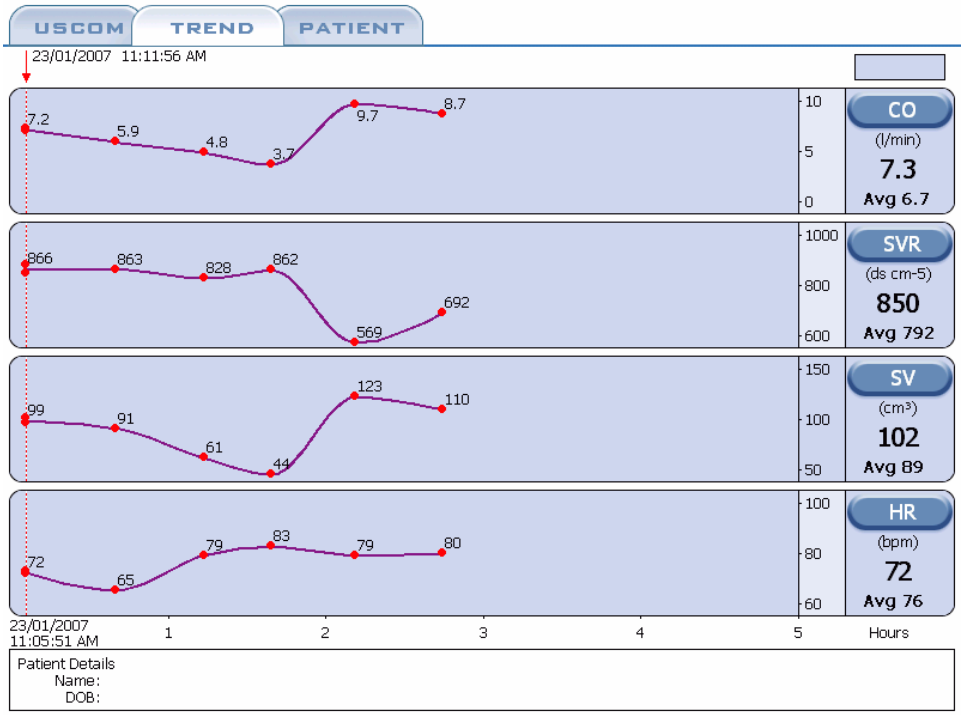
Let's consider the average patient undergoing major surgery.

- Firstly, they may be on a host of medications for pre-existing conditions with heart disease, hypertension and diabetes being particularly prevalent.
- Patients may well have been given a bowel prep, which can cause significant loss of fluid from the body, as can pre-operative vomiting.
- Even in an elective case, the patient will have been fasted for many hours or even overnight before their operation.
- The anesthetist will then use a plethora of drugs which have significant cardiovascular activity, ranging from myocardial depression to vasodilation.
- There may be blood loss or evaporative loss of fluid from the open abdomen.
- There may be antibiotics given intravenously which can have vascular activity.
- An epidural or spinal anesthetic may be used.
- What if the patient has pain, what will that do to their hemodynamics?

Given all of the above, it is then hardly surprising that major changes in the patient's hemodynamic status occur during surgery.

USCOM 1A examination

Here is a typical example of the hemodynamic trends of a patient undergoing left hemicolectomy.



Observations

Throughout the procedure, which was carried out under a combination of general anesthesia with intermittent positive-pressure ventilation (IPPV) and a thoracolumbar epidural, the blood pressure and heart rate stayed within normal limits, and pulse oximetry and capnography were also normal.

Look at the significant changes in the hemodynamics shown. In particular, measurement points 3 and 5, at 1 hour 15 minutes and 2 hours 15 minutes respectively, where the heart rate is the same at 79 bpm.

The heart rate gives no indication that the cardiac output (CO) and stroke volume (SV) have more than doubled, whilst the Systemic Vascular Resistance (SVR) plummeted. The blood pressure also gave little indication of these profound changes.

Summary

The ease of using the USCOM 1A in anesthetized patients and the data that it provides, gives the anesthesiologist a much clearer picture of just what their ministrations are actually doing to the patient, and also tells them exactly which way to go to correct the situation, should a problem occur.