

ODM+ Case Study – Covert Haemorrhage and Fluid Response: 3-Year Old Child

Weight 15 kg (33 lb), height 108 cm (42.5 in), body surface area (BSA) 0.67 m².

Intraoperative. Laparotomy and resection of abdominal neuroblastoma. General anaesthetic used and ventilated.

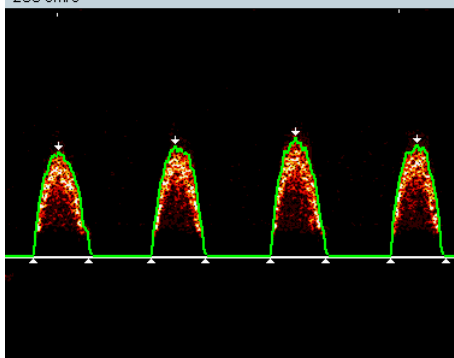
1.

At this point in surgery, **Cardiac Index (CI)**, **Flow Time corrected (FTc)** and **Peak Velocity (PV)** had reduced from previous results possibly indicating an increasing afterload, yet the urine output and **Blood Pressure (BP)** remained stable.

CO	SV	FTc
1.9 l/min	19 ml	355 ms
PV	CI	HR
86.4 cm/s	2.9	100 bpm

Flow Monitoring Mode

200 cm/s



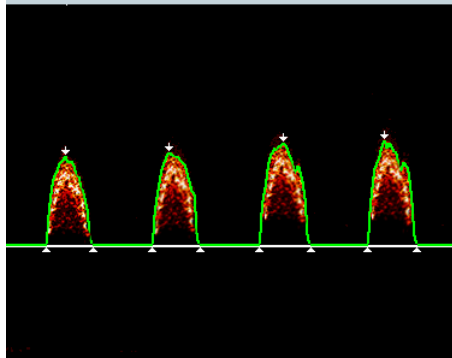
2.

During monitoring 5 minutes later, the results continued to deteriorate, and blood was then seen in the suction canister. **Stroke Volume (SV)**, **FTc**, **PV** and **CO/I** decrease suggesting further increase in afterload probably as a result of compensation to the drop in preload, together with an increase in **Heart Rate (HR)**. The waveform has also become smaller in height and width. **BP** has also started to decrease. Fluid was given, haemoglobin checked and a blood transfusion commenced.

CO	SV	FTc
1.7 l/min	15 ml	317 ms
PV	CI	HR
75.4 cm/s	2.5	112 bpm

Flow Monitoring Mode

200 cm/s



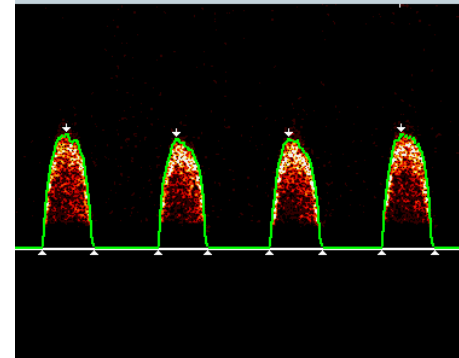
3.

Half an hour later following fluid and blood, **SV**, **FTc**, **PV** and **CO/I** have increased since preload increased as well as a reduction in afterload. HR has also reduced and the waveform has increased in height and width.

CO	SV	FTc
3.2 l/min	30 ml	425 ms
PV	CI	HR
132 cm/s	4.7	105 bpm

Flow Monitoring Mode

200 cm/s



Summary

In this scenario, the ODM+ indicated covert bleeding. The ODM+ is the only technology precise enough to see small changes in flow. Flow is very responsive to changes in circulating blood volume, whereas pressure can often be maintained due to compensation. Hypovolaemia is unlikely to be missed when flow is measured by the ODM+ because of its superior precision. Fluid can then be given safely in small amounts, thus preventing over or under filling of the patient.