

# USCOM in the Emergency Department: Clinical Case 2

## Collapse? Pulmonary Embolus



The measure of life.

Rapid evaluation of haemodynamics is carried out in every emergency department in the world every single day. In the main however, this usually consists of looking at some general parameters such as blood pressure, pulse rate and perhaps oxygen saturation. Some clinical evaluation of perfusion may also be made, but how much better would it be if we knew exactly what the haemodynamics were doing. Because of the non-invasive nature of the USCOM, and the speed with which such data can be acquired, the USCOM is beautifully suited to the emergency environment. Let's take a look of a case that was presented in our own emergency department and see just how the USCOM improves clinical management of the patient.

24 year old female 58kg. Previously fit and well. Only medication is oral contraceptive pill. Brought in by ambulance as "collapse". Patient very confused and little history available.

- 📄 GCS 5-6
- 📄 BP 73/42
- 📄 Pulse 80
- 📄 Temp 38.3 °C
- 📄 SpO<sub>2</sub> 92%
- 📄 on 4 l/min O<sub>2</sub>
- 📄 Resps 26
- 📄 Sweaty++
- 📄 Right calf and foot visibly swollen
- 📄 CXR - unremarkable. ECG – sinus rhythm. Blood glucose 4.3m M/L

Initial diagnosis was right-sided DVT with pulmonary embolus.



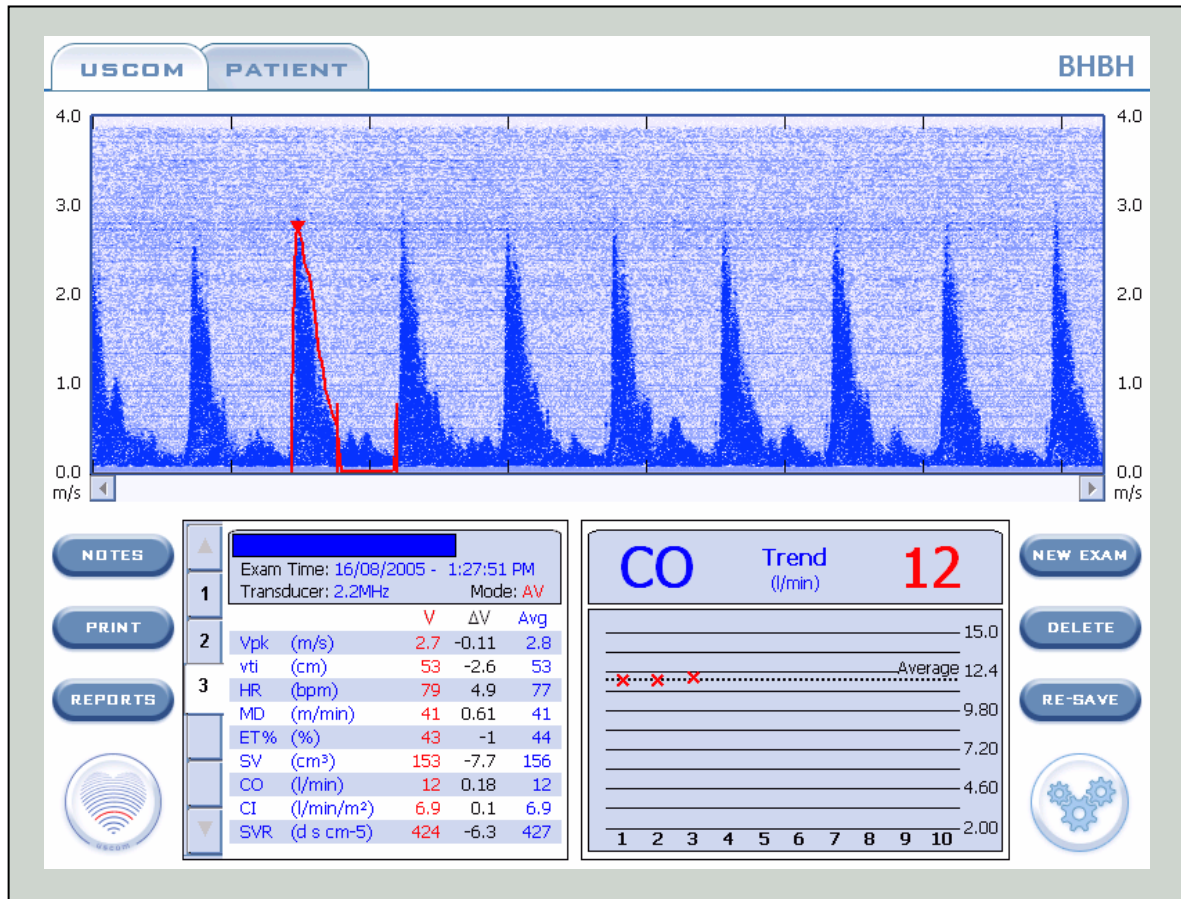
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Here is her USCOM. What do you see?

This is indeed an odd pulmonary embolus! Her Cardiac Output is 12 l/min with a Cardiac Index of almost 7. It would be a very strange blood clot in the pulmonary artery that allowed such a large volume of blood to flow past it and yet rendered the patient prostrate!

The Vpk shows that her myocardial contractility is excellent, her heart rate is not elevated, the MD shows that the circulation is hyperdynamic and she has a Stroke Volume of around 2.5 ml/kg.

So what's going on here?

The answer is immediately apparent when we look at SVR. At just 424, this is about one-third of normal.



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We are looking at peripheral vascular collapse with a hyperdynamic circulation and high Cardiac Output.

What is your diagnosis now?

Closer clinical examination revealed an 8 x 5cm patch of cellulitis on the upper inner right thigh with small ischaemic areas within. Inguinal lymphadenopathy was present on the right. The diagnosis must be septicaemia.

She was treated with IV antibiotics, IV fluids, and phenylephrine, an alpha-agonist (vasoconstrictor). Dopamine or noradrenaline would also be reasonably logical choices.

BP increased within 30 minutes to 105/60. She regained full consciousness and was able to report that the patch on her thigh had appeared one day earlier "like an insect bite". It had increased in size overnight. She had intended to see her GP "later today after work" but had not felt well enough to go to work so went to bed instead. She woke up in ED!

Her temperature settled over 36 hours, vasopressor infusion was required for 18 hours. She needed 4 l of fluid in the first 2 hours, but only 3 litres over the next 24 hours. She required 28-35% oxygen for 18 hours until PaO<sub>2</sub> readings stabilised.

Subsequently (4th day) she required skin-grafting of a sloughing lesion of the right thigh for necrotising cellulitis. The infection was confirmed as streptococcus from wound swabs and the same organism was found in her blood cultures. She made a full recovery.



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