Claims

1. A system for determining congestion in a blood vessel comprising:

a sensor in the vessel, the sensor configured to obtain a first signal indicating a first area measurement, a1, of the vessel prior to patient manoeuvre and a second signal indicating a second area measurement, a2, of the vessel after a patient manoeuvre;

a processor configured to determine the congestion in a blood vessel of the vessel based on the first and second signals.

2. The system of claim 1 wherein the processor is further configured to provide a notification of the fluid status.

3. The system of claim 1 wherein the processor is further configured to provide a notification indicating an action for reducing congestion in the blood vessel.

4. The system of claim 3 wherein the action comprises a drug treatment schedule.

5. The system of claim 3 wherein the action comprises a medical treatment schedule.

6. The system of claim 5 wherein the medical treatment schedule comprises at least of a diuretic or vasodilation schedule, a modification to a medical device such as vascular pump, drug pump, dialysis or auto-filtration machine, pacing device or extracorporeal membrane oxygenation (ECMO) machine.

7. A method for determining congestion in a blood vessel comprising:

obtaining a first signal indicating a first area measurement, a1, from a sensor in a blood vessel prior to performing a patient manoeuvre;

performing the patient manoeuvre;

obtaining a second signal indicating a second area measurement, a2, from the sensor in the blood vessel after performing the patient manoeuvre;

determining the congestion in a blood vessel of the vessel based on the first and second signals.

8. The method of claim 7 wherein the patient manoeuvre is a Valsalva manoeuvre.

9. A system for determining cardiac output, O_c, comprising:

a sensor deployed in the inferior vena cava, IVC, the sensor configured to obtain a first area measurement, Area1, of the IVC at a time t1;

the sensor configured to obtain a second area measurement, Area2, of the IVC at a time t2;

a processor configured to determine the cardiac output based on area changes of the IVC derived from the first and second area measurements;

10. The system of claim 9 wherein the processor is further configured to determine a heart rate from analysis of the area changes of the IVC.

11. The system of claim 9 or 10 wherein the processor is further configured to provide a notification of the cardiac output.

12. The system of claim 11 wherein the processor is further configured to provide a notification indicating an action for adjusting the cardiac output.

13. The system of claim 12 wherein the action comprises a drug treatment schedule.

14. The system of claim 12 wherein the action comprises a medical treatment schedule.

15. The system of claim 14 wherein the medical treatment schedule comprises at least of a diuretic or vasodilation schedule, a modification to a medical device such as vascular pump, drug pump, dialysis or auto-filtration machine, pacing device or extracorporeal membrane oxygenation (ECMO) machine.

16. A method for determining cardiac output comprising:

obtaining a first area measurement, m1, from a sensor deployed in the inferior vena cava, IVC, at a time t1;

obtaining a second area measurement, m2, from a sensor deployed in the IVC, at a time t2;

determining the cardiac output based on an area change of the IVC derived from the first and second area measurements.