Central Venous Pressure – physiology

The significance of the CVP in terms of right ventricular preload

The CVP, as measured in the SVC, should be the same pressure as in the right atrium; and if the tricuspid valve is doing its job properly, the right ventricular end-diastolic pressure should be equal to the CVP (because after all the right ventricle fills with the blood from the right atrium, under right atrial pressure)

Thus, CVP = right ventricular diastolic pressure... ...right?...

Influence of ventricular compliance on the relationship of filling volume and filling pressure

Increasing the pressure which fills a poorly compliant fibrotic ventricle will not result in much more filling.

Conversely, a supple young ventricle will respond to increasing pressure by gladly filling with more blood.

End-diastolic pressure only predicts preload when right ventricular compliance is normal.

Changes in end-diastolic pressure only predict changes in preload when right ventricular compliance is constant.

Relationship of central venous pressure to central venous volume

When you measure your CVP, this is really what you are interested in. It all comes down to the same old question:

Can I give my patient more fluids?

Turns out, CVP is really bad at predicting this. There are too many variables governing central venous pressure; it is never a perfect picture like this graph, where central venous compliance is predictable and constant.

The first fluid challenge finds the patient volume depleted, and does not rehydrate them adequately. The CVP does not change very much.

The second fluid challenge finds the patient well filled; the CVP rises dramatically because the central venous compartment is already well filled. The CVP changes significantly.