Central Venous Pressure – sources of error

Lateral position

The CVP should be measured with the transducer zeroed at the phlebostatic axis, in a supine position. This means that if the patient is turned to one side, or is upright, the CVP is invalid.

Thoracic pressure

You are measuring the difference in pressure between the atmosphere (where you have zeroed your transducer) and the central vein your line is resting in.

However, the actual pressure you are interested in is the transmural pressure: the difference between right atrial pressure and intrathoracic pressure.

Intravascular pressures will be equal to transmural pressures when the thoracic pressure equals zero (i.e. when it equalizes with atmospheric pressure).
Thus, CVP should be measured at the end of expiration.

Positive pressure ventilation (PEEP) and Auto-PEEP

If there is PEEP, you are never going to get a “zero” intrathoracic pressure. Indeed both PEEP and Auto-PEEP will cause the intrathoracic pressure to be raised at the end of expiration

About half of the PEEP is transmitted to the heart chambers.
Less so in people with stiff diseased lungs.
Thus, a PEEP of 10 increases the CVP by only ~ 3mmHg