

TABLE 5. Complications of vascular catheters.

Immediate	Delayed
Central venous catheter and pulmonary artery catheters	
Bleeding Retroperitoneal hematoma (with femoral approach) Arterial puncture Arrhythmia Air embolism Thoracic duct injury (with BRW or left IJ approach) Catheter malposition Pneumothorax or hemothorax	Infection Venous thrombosis (pulmonary embol) Catheter migration Catheter embolization Myocardial perforation Nerve injury
Arterial catheters	
Bleeding Retroperitoneal hematoma (with femoral approach)	Infection Thrombosis Limb ischemia Cerebral embolization Nerve injury Pseudoaneurysm Aortic aneurysm rupture

BRW, brachial wrist; IJ, internal jugular.

Table 6. Comparison of the cost of various technologies<sup>a</sup>.

	Cost of the equipment	Cost of the consumables
Edtrac/Vigileo	EC1000 Clinical Platform, Paced (101 to 114,000) Vigileo Monitor, Paced (101 to 16,995)	Edtrac system (EC1000)-dependent upon volume/consumption
PVI	11,995	Finger sensor costs 16 per patient
Esophageal Doppler (GARD90Q-ODM for 5, 12, 24, 72, 240-hour use)	112,000	A range of probes is available ranging from 475–496. Additionally, longer duration probes are available (ranging from 1,116–1,128)
USCOM	116,000	No consumables required
NICOX	1,495	Disposable patient sensors. Cost varies depending on quantity—if 200 bought, then cost is 140 per patient

<sup>a</sup>Information in this table obtained from the UK NHS Technology Adoption Centre; adoption pack 2012. [http://www.nhs.uk/about/FILES/USOM\\_Adoption\\_pack.pdf](http://www.nhs.uk/about/FILES/USOM_Adoption_pack.pdf) [filed 12.pdf].

require continuous real-time measurement of SV (or CO). This is, EAC with cCO, PICOX, Edtrac/Vigileo, USCOM or NICOX, or alternatively, its surrogate, that is, aortic blood flow velocity measured by esophageal Doppler US or femoral artery blood flow velocity measured by Doppler US. Moreover, a FLR maneuver cannot be used in patients with IAH or pelvic fractures.

Use of respiratory variation in CVP to predict preload responsiveness requires that the inspiratory effort be significant enough to cause a 2 mmHg drop in PAWP, and therefore in the absence of a PAC to confirm such a significant respiratory effort the technique becomes subjective and dependent on observing the patient. Moreover, in a patient who is using expiratory abdominal muscles the release of

abdominal muscle contraction may be confused for an inspiratory fall in CVP.

An actual fluid challenge maneuver may not be appropriate in some clinical situations where an intravenous fluid bolus may prove harmful, for example, severe ARDS or anoxic ATN.

(4) Lastly, it is important to keep in mind that the “dynamic” parameters based on respiratory variation in the venous or arterial circulation, that is, IVC or SVC diameter, FPG, SVV, ΔP<sub>flth</sub>, PVL, aortic or brachial artery blood flow velocity, can still be used to predict preload responsiveness in a ventilated patient if the ventilated patient is temporarily

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