Near Miss Venous Air Embolism Due to a Buretrol® Malpositioned Shut-Off Valve

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Venous air embolism (VAE) is a life threatening emergency. Extensive causes of air embolism have been described in the literature. Embolisms from peripheral intravenous (IV) infusions are extremely rare (1-3); but, they can still occur and be fatal (4). We present a potential cause of VAE due to a malpositioned Buretrol® shut-off valve that has yet to be described in the literature.

At our institution, Buretrols® are attached to Normal Saline (NS)/Lactated Ringer’s Solution (LR) 500 ml collapsible bags for IV fluid administration in children less than nine years old (Figure 1). A shortage of NS/LR 500 mL bags prompted the use of NS 1000 mL bags. During this period of time, fluids were administered to pediatric patients undergoing MRI scans using the NS 1000 ml bag setup. As shown in Figure 2, the NS 1000 mL bag caused the Buretrol® to hang at an angle which in turn led to a malpositioned shut-off valve (Figures 2 and Diagram). Theoretically, if all the fluid in the Buretrol® had been administered and the Buretrol® vent was open, the Venturi effect at the venous access site would have allowed for fluid and air in the IV tubing to enter the circulation and potentially cause a VAE (Diagram). If the Buretrol® vent is closed, fluid and air is prevented from reaching the patient since no more air can enter the Buretrol® chamber. Fortunately for our patient, the vent at the Buretrol® end was closed, preventing air from eventually reaching the venous circulation.

We describe the mechanics of a potential VAE due to the vent setting, the shut-off valve angle and the Buretrol® positioning. And in order to avoid venous air embolism, we encourage having the vent closed at the Buretrol® and recommend that the Buretrol® is always hanging perpendicular to the floor (straight) if the healthcare giver does not have direct visualization of the Buretrol® chamber while fluids are being administered.

References:
