

## Vascular air embolism: A silent hazard to patient safety.

[Brull SJ<sup>1</sup>](#), [Prielipp RC<sup>2</sup>](#).

### [Author information](#)

### Abstract

#### **PURPOSE:**

To narratively review published information on prevention, detection, pathophysiology, and appropriate treatment of vascular air embolism (VAE).

#### **MATERIALS AND METHODS:**

MEDLINE, SCOPUS, Cochrane Central Register and Google Scholar databases were searched for data published through October 2016. The Manufacturer and User Facility Device Experience (MAUDE) database was queried for "air embolism" reports (years 2011-2016).

#### **RESULTS:**

VAE may be introduced through disruption in the integrity of the venous circulation that occurs during insertion, maintenance, or removal of intravenous or central venous catheters. VAE impacts pulmonary circulation, respiratory and cardiac function, systemic inflammation and coagulation, often with serious or fatal consequences. When VAE enters arterial circulation, air emboli affect cerebral blood flow and the central nervous system. New medical devices remove air from intravenous infusions. Early recognition and treatment reduce the clinical sequelae of VAE. An organized team approach to treatment including clinical simulation can facilitate preparedness for VAE. The MAUDE database included 416 injuries and 95 fatalities from VAE. Data from the American Society of Anesthesiologists Closed Claims Project showed 100% of claims for VAE resulted in a median payment of \$325,000.

#### **CONCLUSIONS:**

VAE is an important and underappreciated complication of surgery, anesthesia and medical procedures.

Copyright © 2017 Elsevier Inc. All rights reserved.

#### **KEYWORDS:**

Air embolism; Central venous catheters; Cerebrovascular circulation; Intravenous infusion; Pulmonary circulation

PMID:

28802790

DOI:

[10.1016/j.jcrc.2017.08.010](https://doi.org/10.1016/j.jcrc.2017.08.010)