

Open Versus Closed Intravenous Systems

Worldwide, there are two types of IV fluid containers in use: a collapsible plastic container that requires no external venting for the bag to empty (a closed infusion container) and a noncollapsible container (glass bottle or semirigid plastic bottle or burette) that must be vented externally to allow air to enter and the fluid to egress (an open infusion container).^{*} Open infusion systems have a higher risk of contamination during initial setup and administration than closed systems. Open systems were in use worldwide for more than 75 years, until a nationwide outbreak occurred in the United States in 1971, caused by *Enterobacter cloacae*. This outbreak was ultimately traced to intrinsic contamination of the screw cap closures on the glass IV fluid bottles of one US manufacturer.[†] By the early 1980s North America and Western Europe had universally adopted the use of closed infusion systems. These closed systems have been shown to significantly reduce the incidence of CLABSIs. Open infusion systems, however, are still in use in many parts of the world, including Eastern Europe, Germany, Asia, Africa, and Latin America.^{*,‡,§,||,#,**} A study conducted in four countries that switched from an open infusion container to a closed infusion container observed that the incidence of CLABSIs decreased from an overall rate of 10.1 infections per 1,000 central line–days (open infusion system in use) to 3.3 infections per 1,000 central line–days (closed infusion system in use), for an overall 67% reduction in CLABSI rates.^{*} Another group of researchers found the switch from an open to a closed infusion system to be a cost-saving strategy by reducing the rate of CLABSIs without increasing hospital costs.^{||} Graves et al. analyzed the impact of the introduction of a closed infusion system in the ICUs of two Latin American cities and found that the closed system not only reduced CLABSI rates but also reduced costs and deaths.[‡]

Other benefits of using closed infusion systems, in addition to those just described, include greater container durability, less breakage, reduced weight, and easier disposal than the open systems.[‡]

References

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