**Abstract**
Disinfection caps are increasingly being used to prevent catheter-associated bloodstream infections (BSIs). These devices, designed for continuous passive disinfection of catheter hubs, are typically small and often brightly colored. As such, they have the potential to become pediatric esophageal foreign bodies. We report two patients who developed esophageal foreign body ingesting ingestion of disinfection caps. Given the increasing use of these devices, it is imperative that healthcare providers be aware of this potential iatrogenic problem. We propose that the use of disinfection caps may not be appropriate in pediatric patients with risk factors for foreign body ingestion.

**Background**
Foreign body ingestion is primarily a pediatric problem, with approximately 75% of cases occurring in patients less than 4 years of age. In children, esophageal foreign body impaction typically occurs as a result of accidental ingestion of a small object, most commonly a coin. Foreign body ingestion may also occur in the hospital setting. Medical device ingestion, for example, is a known potential complication of oral cavity and oropharyngeal procedures.

The ensuing report describes two patients who developed esophageal foreign body following ingestion of a disinfection cap, a small device designed for continuous passive disinfection of Luer access valves on intravenous (IV) lines. These patients presented following implementation of a hospital-wide protocol mandating routine application of these caps to catheter hubs in an effort to reduce the incidence of catheter-associated BSI.

**Case 1**
A 3-year-old male underwent elective outpatient adenotonsillectomy for adenotonsillar hypertrophy and sleep-disordered breathing. At the conclusion of the operative procedure, the patient was extubated. During emergence, a disinfection cap was removed from the IV line hub prior to medication administration to treat acute emergence agitation. The patient suddenly jerked his arm, upon which the disinfection cap was mishandled and fell into the patient’s open mouth. The patient was noted to swallow, and subsequent examination of the oropharynx revealed no foreign body.

An intraoperative roentgenogram of the chest and abdomen showed no radiopaque foreign body. The patient was admitted for observation and experienced no drooling or intolerance to oral diet. On postoperative day 1, the patient had emesis, which ejected the disinfection cap into the patient’s open mouth. The patient was noted to swallow, and subsequent examination of the oropharynx revealed no foreign body.

**Discussion**
Ingestion of disinfection caps may occur in the hospital setting as a consequence of patient-initiated behavior or inadvertent provider actions. Both patients in our series required additional intervention due to foreign body ingestion. In both cases, disinfection caps were applied to peripheral IV lines with the intent to minimize bloodstream infection (BSI). As more pediatric institutions adopt these devices for similar ends, it will become increasingly important for providers to weigh their benefits against their potential to be ingested.

Routine application of disinfection caps to central-line catheter hubs is associated with reduced rates of central-line associated BSI and significant health care savings. When compared to standard hub disinfection procedures, disinfection caps have the advantage of providing continuous passive disinfection when catheter hubs are not in use, thereby decreasing line contamination, bacterial density, and central-line associated BSI rates.

While there are a number of studies that support the use of antimicrobial caps on central and peripherally inserted central lines, disinfection caps appear to be less effective in reducing the risk of BSI in patients with only peripheral IV lines. A recent report found that implementation of disinfection caps on peripheral IV lines showed there was no statistically significant reduction in risk of BSI, with an absolute risk reduction of 0.0041/100 patient days.

Ingestion of medical devices is a known potential complication of oral cavity and oropharyngeal procedures. Tonsillectomy may be complicated by retained medical devices in the oropharynx, with reported examples including a broken hypodermic needle and the rubber sleeve of a Boyles-Davis retractor. Operative staff must exercise vigilance when the surgical field is situated in close proximity to these items. Alternative safety measures include avoiding this proximity altogether when possible.

**Conclusion**
Given their potential to become ingested, disinfection caps should be used with caution in hospitalized pediatric patients. There is little evidence to suggest disinfection caps significantly reduce catheter-associated BSI in patients with peripheral IV lines; it may therefore be prudent to refrain from applying disinfection caps to peripheral IV lines in patients with known history of foreign body ingestion or oral exploratory behaviors, as these patients could be at greater risk for ingestion of medical devices during hospitalization. Additionally, disinfection caps should be used with vigilance in the operative suite, particularly when the operative field is situated close to a line hub.

**References**