

CASE REPORT

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Stomach Rupture by Infusion Pump and Foley Catheter

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ABSTRACT: A nine-month-old girl who had successfully undergone surgery for esophageal atresia sustained a rupture of the stomach when an infusion pump was inadvertently connected to the balloon port of a Foley catheter being used as a gastrostomy tube. A strong similarity in appearance and feel of the balloon port and the drainage port of the catheter was created when a clear plastic adapter was inserted in the drainage port for connection of the pump tubing. Other factors contributing to the accident were poor lighting at the time of the connection, failure of the infusion pump occlusion alarm to activate at pressures low enough to prevent injury, and the reduced size of the child's stomach following surgery.

KEYWORDS: pathology and biology, catheters, gastrostomy, accidents, iatrogenic injury, stomach rupture, esophageal atresia, enteral feeding, infusion pump, indwelling urinary catheter

Injuries to infants and children caused by the inflatable balloon of Foley catheter gastrostomy tubes have occurred. Haws et al [1] reported a fatal injury in an infant when a misplaced Foley catheter gastrostomy tube ruptured the lower esophagus; Abrams and Kiely [2] related a similar nonfatal incident. Both cases were associated with changing of the gastrostomy catheter. Frech et al [3] noted two secondary ruptures of the esophagus caused by vomiting and obstruction when Foley catheter gastrostomy tubes entered the pyloroduodenal region. Fonkalsrud [4] along with Curianino and Vottler [5] have observed three cases of intestinal obstruction in infants caused by prolapse of Foley catheter gastrostomy tubes into the duodenum. To these previously reported cases, we would like to add a fatal case involving the use of a Foley catheter gastrostomy tube and a volumetric infusion pump.

Case Report

A baby girl presented at birth with long-gap esophageal atresia, a condition in which the cervical esophagus is widely separated from the portion of the esophagus leading to the stom-

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ach. Physicians found no communication between the baby's esophagus and trachea. Shortly after birth, pediatric surgeons made an opening on the left side of her neck into the cervical esophagus to drain mucous and prevent aspiration; they also made an opening into her stomach for feeding.

At age nine months, the infant returned to the hospital for surgery to reconstruct her esophagus using stomach tissue. In this procedure, surgeons fashioned a portion of the greater curvature of the stomach into a tube, brought it up behind the breastbone, and connected the stomach and cervical esophagus (Figs. 1 and 2). They left the mucous stoma on the left side of the neck open and placed a 18F Foley catheter with 5-cm³ balloon (Bardex® 165-V) through the opening in the stomach as a self-retaining feeding tube.

Fever and foul smelling discharge complicated the initial postoperative course. These abated after treatment with antibiotics and saline lavage. Nurses administered continuous drip feedings via an Imed® model 927 volumetric infusion pump through the Foley catheter into the stomach. Late at night 19 days after surgery, on the planned eve of discharge, hospi-

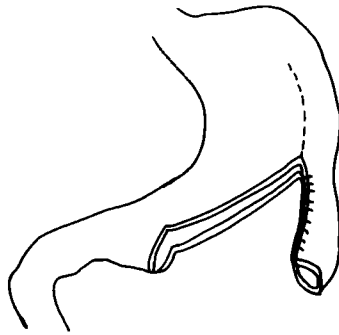


FIG. 1—Diagram of reversed gastric tube procedure for esophageal replacement. Incisions are made on the front and back of the stomach; the resulting flap is sutured in stages to form a tube.

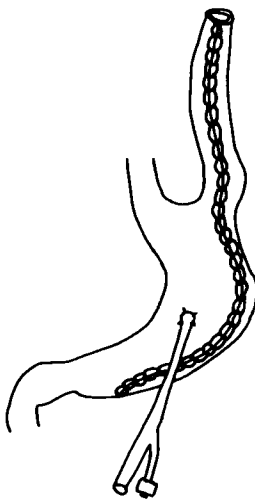


FIG. 2—Diagram of reversed gastric tube procedure for esophageal replacement. Following construction of the tube, the new greater curvature of the stomach is sutured, and a gastrostomy is constructed on the front of the stomach.

tal personnel inadvertently connected the infusion pump to the balloon port of the Foley catheter. Following the infusion of 80 cm³ of formula into the catheter balloon (Fig. 3), the infant began to scream and nurses discovered the error. They quickly withdrew the liquid from the balloon and removed the catheter from the baby's stomach. Hospital personnel noted no apparent injury to the stomach at the time, placed a new catheter in the stomach, and resumed feedings. Twelve hours later, the infant developed a tense abdomen, guarding, absence of bowel sounds, and a temperature of 39.5°C (103°F). A Gastrografin® X-ray study showed a perforation of the stomach. Surgeons explored the abdomen, repaired a rupture of the antral portion of the stomach, and lavaged the abdominal cavity with saline. Four hours after surgery the infant developed cyanosis followed by cardiac arrest and death.

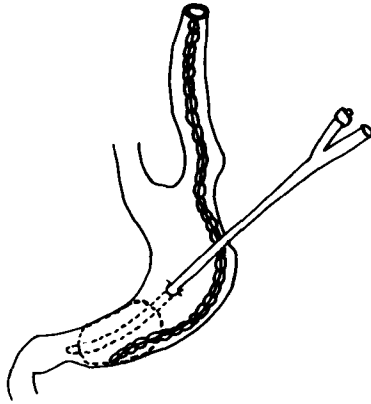


FIG. 3—The overexpanded balloon of the Foley catheter gastrostomy tube stretches and compresses the antrum of the stomach.

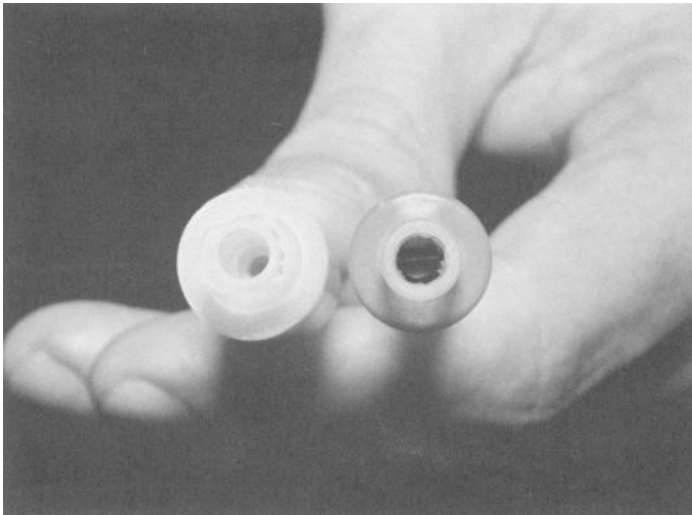


FIG. 4—Note similarity of drainage port (left) and balloon port (right) of Foley catheter following insertion of plastic adapter for connection of infusion pump tubing.

Discussion

Several factors interacted to produce the tragic outcome in this case. Hospital personnel had placed a plastic adapter in the lumen of the drainage port of the Foley catheter to connect the infusion pump tubing. With the adapter in place the appearance and feel of the balloon port and drainage port were quite similar (Fig. 4). Lighting at the time of the connection was poor. The infusion pump occlusion alarm was not designed to activate at pressures low enough to prevent injury to the gastrointestinal tract. Finally, the stomach surgery may have made it more vulnerable to injury.

This case calls attention to the previously unrecognized potential for injury to the gastrointestinal tract that arises when a high-pressure volumetric infusion pump is used with a Foley catheter for enteral feeding. Gravity or a passive infusion control device would have probably sufficed for feeding this infant and would have lessened the chance of injury [6].

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