Mushroom Gastrostomy

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Gastrostomy is performed by surgeons, gastroenterologists, and interventional radiologists. Compared with surgical methods, percutaneous routes tend to have slightly lower complication rates and are generally preferred in many hospitals. Percutaneous fluoroscopic gastrostomy can be performed using a variety of methods reflecting the varying retention mechanisms of different catheters. Although both pigtail and balloon-retained gastrostomy catheters are the easiest to insert, both tubes suffer from poor long-term patency and are less secure than mushroom-retained catheters. These latter tubes are the most durable and best catheters in terms of overall performance. In my hospital, mushroom-retained tubes are the tubes of choice except in patients with high-grade oropharyngeal or esophageal obstruction.

PROCEDURE

After intravenous administration of 1 mg glucagon, the stomach is inflated using an indwelling nasogastric tube (Fig. 1A). An ~5- to 10-mm incision is made along the intended puncture site. The midbody of the stomach is punctured and a single retaining suture (T-tack) is deployed to hold the stomach against the anterior abdominal wall (Fig. 1B). The esophagus is catheterized using a 0.035-inch Rosen guide wire and 10-French sheath (Fig. 1C). In some cases, a directional 5-French catheter such as a RC-1 is used.

Once the esophagus has been catheterized, the guide wire is advanced cephalad to the mouth. Occasionally, it is helpful to turn the patient's head slightly to the left or right. Using direct fluoroscopic guidance, the wire is then directed out of the mouth and grasped with a hemostat (Fig. 1D).

A snare included in the mushroom gastrostomy kit is then advanced over the wire from the sheath in the stomach, up the esophagus, and out of the mouth. The guide wire is then pulled out of the patient from the mouth and the gastrostomy tube is attached to the snare. After lubricating the tube with antibiotic

ointment and Surgilube, the tube is pulled from the mouth down the esophagus and out of the stomach. After the mushroom is pulled into the stomach, the tacking suture is released, and the dilator is cut off of the tube. A feeding port is attached to the tube and the site is dressed (Fig. 1E). The tube can be used 24 hours later per routine protocol.

DISCUSSION

In my experience, mushroom-retained, balloon-retained, and pigtail-retained gastrostomy procedures have virtually identical procedures and early complication rates. However, mushroom-retained tubes have significantly fewer short- and long-term tube complications due to their superior retention mechanism and durability. In a review of 520 published gastrostomy catheters in my hospital, mushroom gastrostomy catheters had a tube complication rate of 2 to 5% versus 36% for pigtail catheters and 34 to 68% for balloon catheters.¹⁻⁴ Gastrojejunostomy catheters also have higher tube complication rates due to the length of the tube and its inherent propensity to become kinked or occluded.

There are two types of mushroom-catheter deployment kits: pull-type and push-type. As the name implies, the pull-type catheter is attached to a snare and the snare is used to pull the catheter from the mouth into the stomach. The gastrostomy catheter is attached to a short tapered dilator that exactly matches the diameter of the tube (Fig. 1F). The dilator expands the puncture site as the catheter is pulled out of the stomach. Once the mushroom tip has been pulled into the stomach, the dilator is cut off the tube and a feeding adaptor is attached. The push-type kit has a longer semirigid dilator attached to the tube. This dilator-catheter assembly is pushed over a guide wire from the mouth, down the esophagus, and out of the stomach. Once the dilator tip exits the stomach, it is grasped and the remainder of the tube is pulled into the stomach. The dilator is cut and a feeding adaptor is attached to

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Figure 1 Mushroom retained gastrostomy. (A) Fluoroscopic image shows stomach inflated via 5-French nasogastric catheter. (B) Fluoroscopic image shows the stomach has been punctured and a 10-French vascular sheath has been inserted into the stomach. (C) Fluoroscopic image shows retrograde catheterization of the esophagus using the sheath and guide wire. (D) Fluoroscopic image shows catheter and guide wire in the oropharynx. (E) Final fluoroscopic image shows 20-French mushroom-retained catheter in the stomach. (F) Photograph of pull-type gastrostomy tube.

the tube. Mushroom tips are composed of either soft rubber or firm plastic. The soft rubber mushroom tips can be removed by compressing the tip in the stomach and quickly pulling the tube out. The firm plastic type must be removed endoscopically.

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