

# The Inadvertent Aortopexy

James Jeffries, MD, George Zaleski, M.D, Jeffrey Leef, MD

*University of Chicago*

## CASE SUMMARY

A 66-year-old male initially presented as a stroke activation for left upper extremity weakness. Medical history was significant for laryngeal squamous cell carcinoma, including prior neck dissection and chemoradiation. In addition, he was fully anticoagulated with IV heparin.

A carotid stenosis was discovered, which was amenable to intravascular stenting by neurointerventional radiology (NIR). General anesthesia was required because the case was classified as a difficult intubation. The primary service and anesthesiologist requested interventional radiology (IR) to place a push-type gastrostomy tube (PEG) at the same sitting so that multiple intubations and extubations could be avoided. Heparin could not be terminated for the PEG tube procedure, owing to the recent stroke and the stent placement.

## CLINICAL AND IMAGING FINDINGS

Per standard protocol, the stomach was insufflated and the overlying soft tissues anesthetized with 1% lidocaine.

Under fluoroscopy, a T-fastener needle was advanced, the deflection of the gastric bubble observed, and contrast injected to confirm position.

However, contrast extravasation and blood return from the needle were observed. The needle was withdrawn and a repeat contrast injection confirmed intraluminal location. The T-fastener was deployed. Under fluoroscopy a distortion of the gastric bubble was noted.

The second T-fastener needle was advanced. Fluoroscopy again demonstrated blood return and contrast extravasation. Multiple re-directed attempts were made to gain access into the stomach. When it was judged that an intraluminal location was confirmed, a second T-fastener was deployed. A third was placed in similar fashion.

Following dilatation over an Amplatz wire, a 16 Fr, balloon-retained gastrostomy tube was advanced and contrast injected. Gross extravasation of contrast was seen with the presumption that the balloon was inflated anterior to the gastric wall (Figure 1).

A new gastrostomy tube subsequently was placed and contrast imaging confirmed appropriate position with no further extravasation.

At this time, the patient experienced a sudden drop in blood pressure, owing to suspected hemorrhage because the patient was fully anticoagulated and there was known puncture of the posterior wall of the stomach. The patient was immediately transferred from IR to the CT suite for emergent computed tomography angiography (CTA).

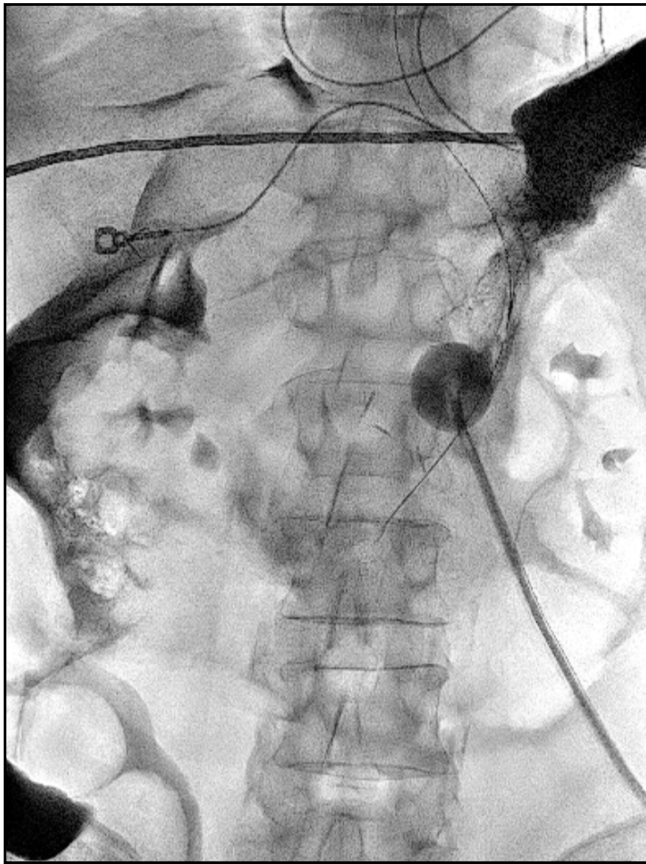
CTA revealed active extravasation from a large, unusually ectatic superior mesenteric artery, which coursed posteriorly to the stomach (Figures 2,3). This was associated with a large hematoma posterior to the stomach.

Also noted was aneurysmal dilatation of the abdominal aorta measuring 3.5 cm in diameter (Figure 4). A T-fastener was seen near, if not within, the aorta itself (Figure 5). The patient was immediately transferred back to IR to the 4D-CT hybrid suite, which was made available for emergent angiogram and embolization.

Angiogram revealed gross extravasation from an enlarged middle colic artery (Figure 6). This was successfully embolized with multiple micro-coils (Figure 7).

Repeat angiogram revealed continued extravasation from the proximal-most main descending superior mesenteric artery (Figure 8). A covered stent graft was successfully placed, with repeat angiogram revealing excellent stent positioning with no further extravasation (Figure 9).

The attending anesthesiologist reported immediate improvement in hemodynamic status. The hemodynamically



**FIGURE 1.** Fluoroscopic image demonstrates gross extravasation of contrast pooling under the diaphragm and in peritoneal spaces.

stable patient was transferred to the surgical intensive care unit with no signs of peritonitis.

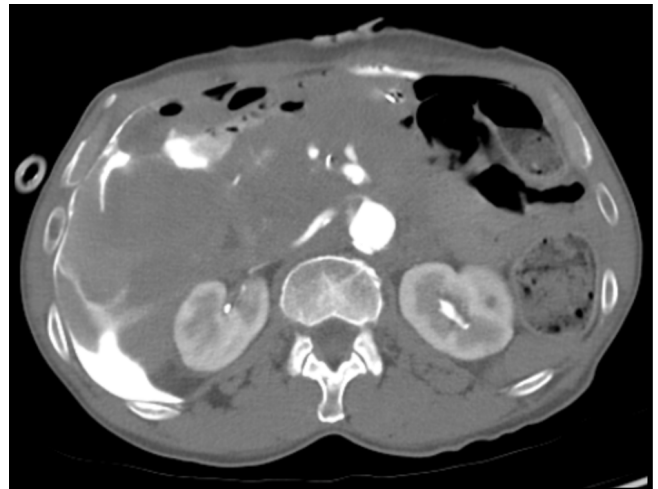
Although the patient's clinical status remained stable, the attending surgeon performed exploratory laparotomy the following day, which uncovered neither active bleeding nor gastric perforation. Consistent with the CTA findings, a suture representing part of the T-fastener arose from the aortic aneurysm. The surgeon affixed the string so that the metal portion of the "T" was tethered to the aortic wall and would not embolize. Gastropexy and evacuation of the hematoma were also performed. The patient recovered without further sequelae.

#### DIAGNOSIS

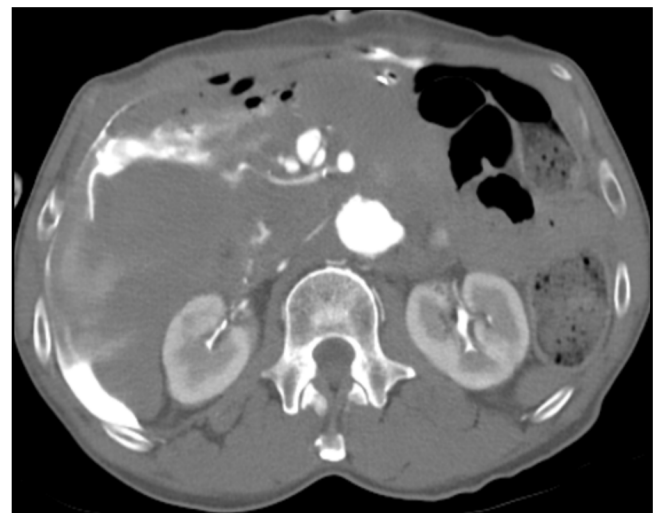
Vascular injury during PEG placement

#### DISCUSSION

Surgical gastrostomy, first described in the 1800s,<sup>1</sup> remained the principal method of enteral feeding until percutaneous endoscopic gastrostomy was introduced in 1980.<sup>2</sup>



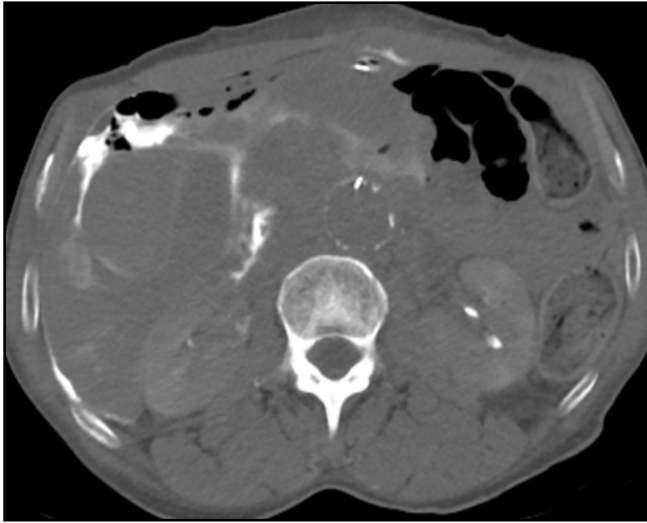
**FIGURE 2.** CTA image demonstrates active extravasation from the middle colic artery.



**FIGURE 3.** Active bleeding from the proximal SMA.



**FIGURE 4.** CT image revealing the calcified wall of the 3.5cm abdominal aortic aneurysm, which lies 7cm beneath the skin.



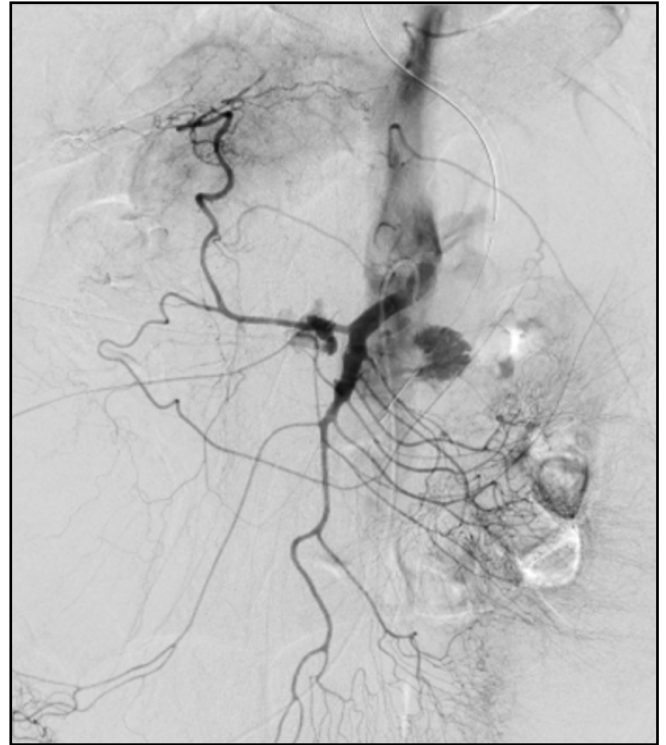
**FIGURE 5.** The dense 5-mm linear object just within the anterior wall of the aorta represents a portion of the T-fastener.



**FIGURE 7.** Post-embolization angiogram of the proximal segment of the middle colic artery with cessation of hemorrhage.

Subsequently, percutaneous fluoroscopic placement of gastrostomy tubes was proven to be both safe and effective.<sup>3</sup>

Also well documented are data showing that endoscopic and fluoroscopic placement of gastrostomy tubes have significantly lower complication rates than surgical placement.<sup>4-7</sup> Bleeding, in particular, is rare.<sup>8-13</sup>



**FIGURE 6.** Selective superior mesenteric artery angiogram (SMA) demonstrates the site of active bleeding.



**FIGURE 8.** Extravasation of contrast seen from the proximal SMA.

Contraindications to percutaneous gastrostomy tube placement include ascites, gastric malignancy, overlying peritoneal metastasis, altered gastric anatomy, and coagulopathy.<sup>4</sup>

As a result, patient selection plays a critical role in maintaining a low complication rate of percutaneous techniques.<sup>14</sup> Herein we encounter the first error in this case.



**FIGURE 9.** Post-stent graft image of the SMA shows excellent flow with no further extravasation.

Regardless of extenuating circumstances---including cases of “difficult intubation” and requests by clinical service and anesthesiologists for both procedures to be performed concomitantly, gastrostomy tube placement is not an emergent procedure. Considering the neurologic requirement for full anticoagulation, the safer route would have been surgical placement.

Nevertheless, the procedure should have been performed in the 4D-CT suite given the patient’s significantly elevated risk of bleeding.

Because the PEG tube was placed in the NIR suite, the patient had to be transported to another suite for the CTA and then returned to an IR suite, resulting in a delay of at least one hour in treatment of the patient, who was now in hemorrhagic shock. Further, had CT and/or CTA not been immediately available, imaging would have been performed after the first puncture of the stomach, when fluoroscopy alone demonstrated an unusual distortion of the gastric bubble.

This distortion represented a developing hematoma, posterior to and compressing the mid-body of the stomach. Had the patient already been in the 4D-CT suite, immediate angiography and intervention could have been performed.

Fortunately, the delay in diagnosis and treatment did not result in a worse outcome.

## CONCLUSION

This case illustrates both the critical importance of patient selection in percutaneous gastrostomy tube placement, as well as the usefulness of the ability to perform both conventional angiography and CT in the same procedure room.

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