

GI/GU/Thoracic/Non-Vascular Interventions Case Report

Balloon-assisted Jejunostomy Placement

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ABSTRACT

Jejunal feeding is indicated in patients with functional or physical abnormalities that prevent gastrostomy tube placement or feeding. J-tubes are most often placed using one of four techniques: Open surgical, laparoscopic, needle catheter, or direct percutaneous placement, depending on the patient needs and expertise of the surgeon. Minimally invasive techniques are considered standard of care, and thus, J-tube placement most often occurs through laparoscopic methods. While percutaneous insertion using balloon dilation rather than serial dilation has shown greater success rates, lower complication rates, and alleviates patient discomfort in G-tube placement, this procedure has not been utilized for J-tube placement. Here, we report a balloon-assisted jejunostomy placement technique utilized to replace a previous surgical jejunostomy tube that the cutaneous tract had healed over.

Keywords: Jejunal feeding tube, Jejunostomy placement, Percutaneous balloon dilation placement

INTRODUCTION

Patients unable to receive adequate nutrition through oral intake require gastroenteric tube (G-tube) feeding inserted in a nasal, percutaneous, or surgical manner, depending on the length of use.^[1,2] Jejunal (J-tube) feeding is indicated in patients with functional or physical abnormalities, such as gastroparesis or a proximal obstruction, that prevent gastrostomy tube placement or feeding.^[3] J-tubes are most often placed using one of four techniques: Open surgical, laparoscopic, needle catheter, or direct percutaneous placement, depending on the patient's needs and the expertise of the surgeon.^[3] Minimally invasive techniques are considered standard of care, and thus, J-tube placement most often occurs through laparoscopic methods.^[4] While percutaneous insertion using balloon dilation rather than serial dilation has shown greater success rates, lower complication rates, and alleviates patient discomfort for G-tube placement,^[5] this procedure has not been utilized for J-tube placement. Here, we report a balloon-assisted jejunostomy placement technique utilized to replace a previous surgical jejunostomy tube that the cutaneous tract had healed over. This technique is a modification of the procedure described by Dr. Peter Bream of Vanderbilt University utilized for gastrostomy tube placement^[5,6] by percutaneous insertion rather than the use of traditional methods.

CASE REPORT

A 72-year-old male was placed in the supine position and draped sterilely. The anterior loop of the jejunum was identified through insufflation through a nasogastric tube under fluoroscopy.

A 21 gauge micropuncture needle (Cook, Bloomington, IN; [Figure 1a]) was used to puncture the loop of the jejunum between, where the previous surgical clips were placed in the left lower quadrant of the abdomen. Contrast was hand injected under fluoroscopy to ensure position within the lumen of the jejunum [Figure 1b]. Next, a 0.018 microwire was advanced through the needle into the bowel lumen [Figure 1c]. The needle was removed, and a 4 French micropuncture dilator (Cook, Bloomington, IN) advanced over the guidewire. Next, a 0.035 Glidewire Advantage (Terumo Medical, Somerset NJ) guidewire was advanced into the jejunum [Figure 1d]. A 6 mm × 4 cm Mustang balloon (Boston Scientific, Marlborough MA) was, then, placed over the guidewire and inflated to form the tract [Figure 1e]. A 14 French jejunostomy tube (Avanos Medical Alpharetta, GA) was then advanced coaxially over the balloon and guidewire into the jejunum during balloon deflation [Figure 1f]. The guidewire and Mustang balloon were removed. The catheter was retracted against the abdominal wall. Contrast was injected through the jejunal lumen under fluoroscopy to confirm appropriate positioning.

DISCUSSION

While not typically utilized for percutaneous J-tube placement, balloon dilation appears to provide advantages

in the ease of procedure, risk of complications, and patient comfort over traditional serial dilation insertion. Balloon dilation allows for successful tract formation with a single step. In the case presented here, a short shaft balloon was used which fit nicely, eliminating the need to trim the catheter, with the added benefit of reducing the procedure time. In addition, even with prior imaging, there is often uncertainty as to the location of the prior J-tube insertion site due to multiple scars on the abdominal wall, as well as the precise location of the bowel pexy due to bowel scarring down against the abdominal wall. As such, there is a risk of over-riding the wire with perforation in serial dilation; this risk is eliminated with balloon dilation.

Infection may cause delays in feeding time as the bowel must heal before feeding can occur, thus, post-procedural infection concerns are an important consideration. The primary infection risk in both balloon and serial dilation is dislodging the bowel. Balloon dilation creates radial force, decreasing the risk of bowel dislodgement versus the longitudinal force of sequential dilation;^[5,6] however, as there is no guarantee of the efficacy of the bowel pexy, there always exists a potential risk of bowel motion. Balloon placement also has the potential to lower procedure time, although in our case, the time was not extremely different. Increased use of this technique may yield a more significant decrease in procedure time as

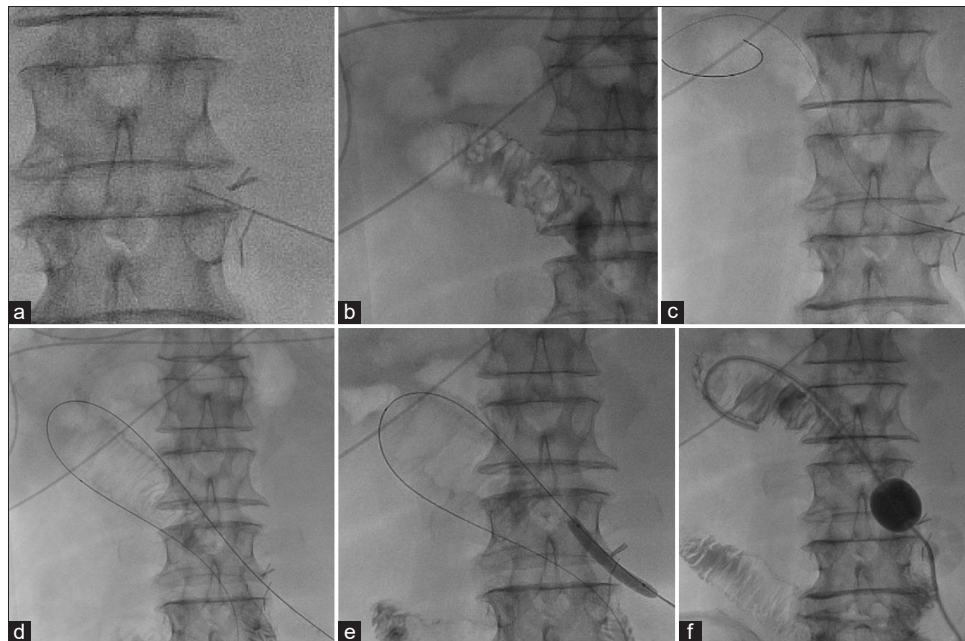


Figure 1: A 72-year-old male presented for placement of a feeding jejunostomy through balloon dilation technique. (a) Fluoroscopic image highlighting the 21 gauge micropuncture needle observed puncturing the jejunum between two T-fasteners previously placed in the jejunal wall. (b) Fluoroscopic verification of intraluminal location through contrast injection. (c) Fluoroscopic image of 0.018 guidewire advancement through the micropuncture needle into the lumen of the jejunum. (d) Fluoroscopic image of 0.035 guidewire placement following dilation of the jejunostomy site. (e) Fluoroscopic image of the balloon dilation of the tract. (f) Fluoroscopic image of jejunostomy tube following retraction of guidewires and balloon dilator.

expertise develops. The previous studies have also shown that percutaneous gastrostomy may be performed with only local anesthetic instead of moderate sedation, which has also proven true for balloon-assisted jejunostomy.^[7] Avoiding general anesthesia and sedation may prevent comorbidity-related complications including, but not limited to, cardiorespiratory and renal dysfunction. In addition, serial dilation has been noted to be a painful procedure for the patient, whereas balloon insertion appears to diminish the reported pain, reducing the need for analgesic use.^[5,8]

Post-procedural leakage excoriates the skin, may lead to abdominal wall cellulitis, and often results in feeding delays. This leakage is painful for the patient, often necessitates bandaging, and may even require an ostomy. Serial dilation with a stacked telescopic dilator/peel-away sheath (Avanos Medical Alpharetta, GA) actually requires overdilation to advance the jejunostomy catheter successfully through the peel-away component, increasing the risk of leakage. The balloon-assisted technique avoids this over-dilatation, thus, reducing the probability of leakage.^[6]

While the balloon dilation technique may be successfully applied to the placement of jejunostomy feeding tubes, many surgical teams may prefer the laparoscopic approach for jejunostomy insertion. When percutaneous jejunostomy tubes are placed in a primary manner, difficulty is noted in maintaining adequate bowel access after the puncture, increasing the risk of intraperitoneal leakage.^[8] While the balloon dilation percutaneous technique appears to be a viable alternative to the laparoscopic approach, more research needs to be done to determine complication rates and outcomes, not only in patients that have been surgically pexied but also those in whom primary J-tube placement was completed with this balloon dilation technique. Successful evaluation of the efficacy of this procedure will require cooperative coordination between surgery and interventional radiology to determine the best procedure for optimal patient outcomes.

CONCLUSION

Percutaneous jejunostomy tube replacement using a single balloon dilator provides an alternative to serial dilation that

may reduce procedure time, post-procedural complications such as infection and leakage, and improve outcomes in patients requiring nutrition support.

Declaration of patient consent

The Institutional Review Board (IRB) permission obtained for the study.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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