



Modified primary obesity surgery endoluminal (POSE-2) procedure for the treatment of obesity

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The minimally invasive endoluminal approach has evolved to become a mainstream treatment option for obesity.¹ Particularly, endoscopic remodeling of the stomach and restricting the gastric lumen by placing multiple, internal, full-thickness suture plication has been shown to affect hunger and appetite and to induce effective and sustained weight loss.²

Several devices and different endoscopic gastroplasty procedures are currently available to treat obesity. The primary obesity surgery endoluminal (POSE) approach that uses the incisionless operating platform was initially used to target the fundus and limit gastric accommodation.^{3,4} However, the insights gained from a multicenter randomized trial showed that this alone would not be sufficient to achieve significant weight loss.⁵

We altered the originally described suture pattern and placed a multiple suture plication targeting the gastric body to affect motility. The modified POSE procedure (POSE-2) aims to narrow and shorten the stomach significantly in comparison with its original size. In this video, we describe the steps and technique of performing successful POSE-2 to treat obesity ([Video 1](#), available online at www.VideoGIE.org).

THE POSE DEVICE

The POSE-2 procedure involves the use of the incisionless operating platform (USGI Medical, San Clemente, Calif, USA). It has 4 distinct components: (1) transport, (2) g-Lix, (3) g-Prox EZ, and (4) g-Cath EZ. The flexible transport (18 mm) has a control handle with 2 wheels that can be used to deflect the tip in all 4 directions. It has 4 working channels designed for deployment of the accessories, and an additional side port for insertion of an ultrathin upper endoscope.

The g-Lix is a flexible tissue anchor catheter with a helical design at the distal end used for anchoring and positioning the target tissue inside the g-Prox. The multifunctional rotatable g-Prox endoscopic grasper is used for tissue grasping and mobilization. Each distal serrated jaw is 3.3 cm in length and can capture a large amount of tissue. In the jaws, there is a suture cutting component to trim the excess g-Cath suture tail. The g-Cath tissue anchor delivery catheter is introduced through the lumen at the proximal end of the g-Prox. It is preloaded

with a dynamic snowshoe suture anchor and has a needle at the distal end. Once the target tissue is mobilized inside g-Prox, the needle penetrates through the tissue and releases the pair of preloaded suture anchors and cinches them to form a plication.

POSE-2: HOW WE DO IT

The main objective of the procedure is to restrict the gastric lumen by narrowing the anteroposterior diameter and decreasing the vertical length of the stomach.

We perform the procedure with the patient under general anesthesia and in a supine position. We perform diagnostic gastroscopy to exclude pathologic changes that would limit the performance of the procedure and administer antibiotics before the procedure and use CO₂ insufflation and water-jet function. We use a laparoscopic CO₂ insufflator to maintain constant pressure and gastric distention (10-12 mm Hg) and avoid excessive pneumoperitoneum after the procedure.

We introduce the transport, preferably through the left pyriform fossa, to gain easy access into the esophagus. On reaching the stomach, we lower the level of the bed so that the transport can be maintained in a straight position to allow easy introduction of other accessories.

We start at the distal body at the level of the incisura. We capture the target site using the g-Lix and pull the tissue inside the jaws of the g-Prox fitted with a g-Cath snowshoe anchor delivery catheter. We maneuver the g-Prox in such a manner that the jaws are oriented in the anteroposterior direction for the first plication. We apply traction to the tissue and position it between the jaws of the g-Prox. We ensure that each folded plication is approximately 6.6 cm in length. We then close the jaws, advance the needle, and release the distal snowshoe anchor. We avoid submucosal release of the anchor. Once confirming the release of the distal anchor, we retract the needle and g-Lix and open the jaws in a controlled fashion to prevent trapping of the snowshoe anchor within the jaws. Next, we release the proximal shoe and cinch to approximate the anchors together and form a tissue fold. Using the cutting system in the jaws, we cut the excess tail of the suture ([Fig. 1](#)). We introduce a new g-Cath and continue the above steps.

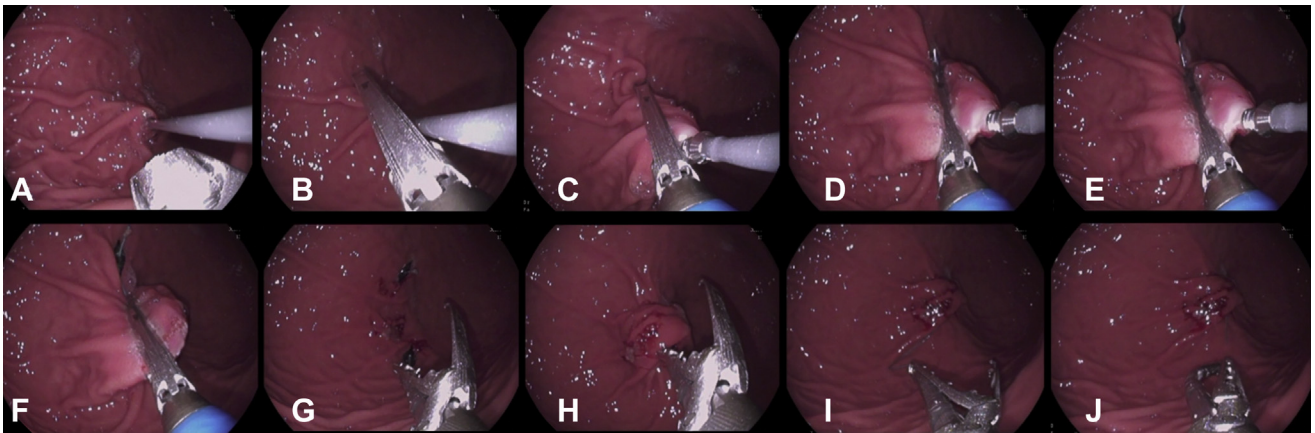


Figure 1. POSE-2 suturing technique. **A**, We insert the transport with the patient in a supine position and use a laparoscopic CO₂ insufflator. We maintain a neutral position throughout the procedure so that the accessories are aligned at a 5 o'clock to 6 o'clock position. We advance the g-Lix and capture the tissue at the distal body. We make sure the g-Lix can be pulled easily and is not capturing adjacent structures. **B**, We open the jaws of the g-Prox and orient it in an anteroposterior direction for the first plication in the distal body. **C**, We traction the helix, and at the same time advance the g-Prox so that the tissue fills the space between the jaws to ensure capturing 6.6 cm of tissue. We then close the jaws of the g-Prox to hold the tissue. **D**, We advance the needle through the tissue fold. **E**, We release the distal snowshoe anchor. **F**, We retract the g-Lix. **G**, We open the jaws of the g-Prox in a controlled fashion and avoid trapping of the distal anchor at the tip of the jaw. We release the proximal snowshoe anchor. **H**, We cinch the anchors together to form a plicated fold. **I**, We create a suture excess by gently removing and reloading the g-Cath. **J**, We then cut the excess suture using the cutting mechanism at the distal end of the g-Prox. We follow these steps and place 16 to 18 plications throughout the body of the stomach to reduce its size and volume.

We created 2 symmetrical rows, with 4 to 5 folded plication per row, in the distal body. This will narrow the anteroposterior diameter and shorten the stomach. We progress to the proximal body, and at this time we orient the jaws

in the direction of the gastric rugal folds, predominantly to reduce the vertical length of the stomach (Fig. 2). We create 1 row of 4 to 5 folded plications. After this, we narrow and shorten the stomach further by creating

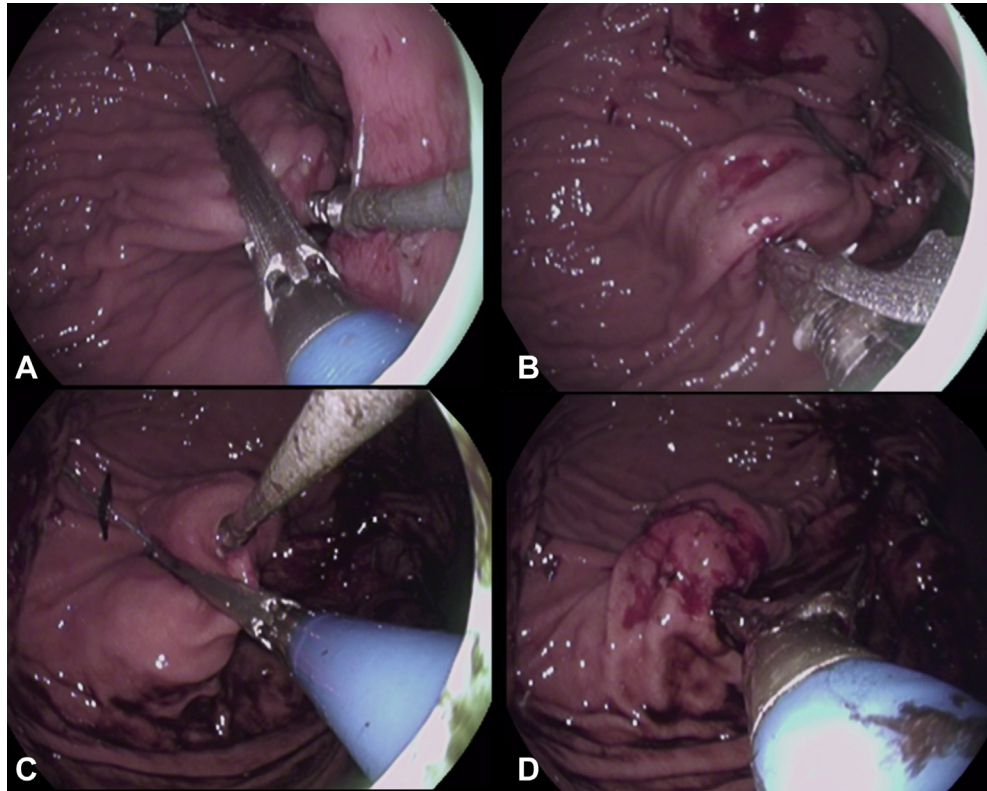


Figure 2. Narrowing and shortening of the stomach in POSE-2. **A, B**, To narrow the stomach, we orient the g-Prox perpendicular to the rugal folds along the anteroposterior diameter and create a plication. **C, D**, To shorten the stomach, we orient the g-Prox along the direction of rugal folds and create a plication.

multiple folded plications in the midbody of the stomach. We spare the fundus. We use 16 to 18 snowshoe anchors in total to restrict and narrow the stomach. After completion, we remove the transport and perform endoscopy to assess the plications and confirm hemostasis.

In our preliminary experience treating 73 obese patients, we found that no adverse events occurred after POSE-2. Motility assessment in 22 patients showed altered gastric emptying and reduced food intake in the majority of cases. At 6 months, the patients had achieved a percentage total body weight loss of 15.7%. Our early results demonstrate that POSE-2 may fulfill the American Society for Gastrointestinal Endoscopy and American Society for Metabolic and Bariatric Surgery minimum threshold of 25% excess weight loss at 12 months with a <5% rate of serious adverse events.^{6,7} However, studies comparing POSE-2 with a second treatment group or a sham control group are required to evaluate the efficacy of this new procedure further.

CONCLUSION

POSE-2 is safe and effective for the treatment of obesity. It achieves weight loss by restricting the stomach and altering gastric motility.

DISCLOSURE

Dr Lopez-Nava is a consultant for Apollo Endosurgery, USGI Medical, and Nitinotes. Dr Turró Arau is a consultant for USGI Medical. Dr Galvão Neto is a consultant for Fractyl Labs, GI Dynamics, GI Windows, Ethicon Endosurgery, Apollo Endosurgery, Medtronic, and Olympus. Dr Abu Dayyeh is a consultant for Boston Scientific, Metamodix, BFKW, and USGI Medical, receives research support from Aspire Bariatrics, GI Dynamics, Apollo Endosurgery, USGI, Medtronic, Spatz, and Cairns, and is a speaker for Johnson and Johnson and Olympus. Dr Asokkumar disclosed no financial relationships relevant to this publication.

Abbreviation: POSE, primary obesity surgery endoluminal.

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