

Gastric Imbrication: The Future or Fantasy?

Expert Panel Meets To Discuss Major Questions About New Procedure for Weight Loss
by Daniel Cottam, MD

The Third National Health and Nutrition Examination Survey (NHANES III), conducted from 1988 to 1994, found that 21% of men and 31% of women are considered obese according to their body mass index (BMI). This figure is alarmingly high, and until recently, treatment options have been underwhelming, with evidence showing diet, exercise and medication often fail.

Now, however, new treatment options are emerging, that promise to improve patient outcomes. On Feb. 16, 2011, the FDA expanded the use of the lap-band to include individuals with a BMI of 30 to 34 kg/m² who also have an existing condition related to their obesity. And now another procedure has appeared on the horizon—the gastric imbrication or total vertical gastric plication (TVGP).

I was recently invited to dinner with a group of surgeons who have collectively done more than 300 gastric imbrications. In addition to myself, physicians in attendance were Carmen Calleja, MD, Juan Antonio Lopez Corvala, MD, Mahendra Narwaria, MS, FIC, Galvao Neto, MD, Almino Ramos, MD, and Robert Snow, DO. As we ate, we tried to come to some consensus about the procedure: how it is done and what the future holds for it. The following Q&A-style article reveals the topics we discussed and the conclusions we reached.

What is the best title for the surgical technique?

The most popular name for the procedure currently is the laparoscopic greater curve plication (LGCP). However, many surgeons feel this title is overly verbose. Other simpler terms include gastric pleat, gastric imbrication and gastric plication. Because there may be many different types of plication performed, it is far too early to start naming a procedure that is actively changing how it is done and measured. Surgeons will gradually come to a single term in the literature (or the editors of our journals will choose one). For this piece, I use gastric imbrication.

What is attracting patients around the world to gastric imbrication?

The main drivers in our practices are to lower costs, improve outcomes and reduce side effects. Patients seem to intuitively understand that there should be fewer leaks with this technique over, say, a gastric bypass (LRYGBP) or a sleeve gastrectomy (LSG). They also find it appealing that there is no resection of the stomach and there is no foreign body. This eliminates band fills and slips, and reduces the chances for vitamin deficiency. Some other patients see the possibility of reversion as a good reason to do the procedure.

Gastric imbrication tends to be cheaper than other procedures. Gastric imbrication costs around \$11,000, which is cheaper than gastric bypass, which costs approximately \$19,000,

sleeve gastrectomy, which costs about \$18,000, and lap-band surgery, which costs \$13,000 (all prices are for the United States and represent the cash price with one-year follow-up). According to the surgeons at dinner, prices for the procedure vary widely; in general, prices in the United States are higher than elsewhere in the world.

What are the patient selection criteria for gastric imbrication?

In general, selection criteria for gastric imbrication are very similar to those for sleeve gastrectomy. In Brazil, surgeons do not perform gastric imbrication on patients with a BMI greater than 50 kg/m² because they feel that without malabsorption the patients will not be able to lower their high BMIs to acceptable levels. In Mexico, India and the United States, surgeons tend to agree with the Brazilians, but do not automatically exclude patients with a BMI over 50 kg/m². The procedure selected is largely driven by patients' ability to change their eating behaviors.

For older patients, gastric imbrication is preferable to LSG as there are fewer expectations for the procedure. Surgeons, however, are divided on which procedure adolescents should receive. All surgeons at dinner agreed that gastric imbrication would be an ideal surgery for patients in the 30 to 35 kg/m² BMI range, and would come without the major complications associated with bands, such as slippage, erosion and port problems.

Are there any differences in postoperative diet requirements for gastric imbrication versus sleeve gastrectomy?

Although the postoperative diet recommendations within the group vary from country to country and from practice to practice, the group collectively felt that there was no reason to change the postoperative diet instruction from LRYGBP or LSG.

How do postoperative morbidity and complications for gastric imbrication compare with those for sleeve gastrectomy?

We agreed that there is more nausea and vomiting associated with gastric imbrication, especially in the first 24 hours. We also agreed that it is harder to twist a gastric imbrication sleeve. However, gastric imbrication is not a leakproof procedure. All surgeons who perform this procedure have seen or treated a leak. Yet, leaks are much easier to manage in gastric imbrication than in LSG and usually don't necessitate taking down the entire suture line to fix the problem. Hematomas are another risk factor that can occlude the lumen and cause blood loss, although they are no more likely to occur than with the LSG.

Is the sleeve best created with interrupted versus uninterrupted sutures?

We all agreed that at least two rows of sutures are required and certainly more than one. Our collective opinion was that it's difficult to shape or fashion the sleeve with a running suture on the first row. It is preferable to create the first row with interrupted stitches to attain the desired sleeve shape and to stabilize the new stomach. The first eight to 10 stitches set the tone for the sleeve, and one can stop and look before each successive interrupted stitch. The subsequent imbrications can then be created with a running stitch. If the two rows are run, it creates a relatively avascular fundus and there have been at least two cases of fundal necrosis seen around the world. In each case, the rows were running sutures.

Should the imbrication take place from the gastroesophageal junction down or from the pylorus up?

The group expressed some different opinions. Some prefer to start in the middle with interrupted sutures and move out in both directions. Others start the interrupted sutures from the angle of His down. All groups run the final row from the angle of His down.

How do you size the sleeve?

Some surgeons use a 32F bougie. Others use an Allergan band catheter for the first row followed by EndoFLIP (Crospon) sizing for the second row. One surgeon uses the EndoFLIP alone for sizing.

Do medications differ when performing gastric imbrication versus sleeve gastrectomy?

Some surgeons felt there is no difference. One surgeon at the table said he doesn't use Reglan when performing EndoFLIP to size the sleeve. Several surgeons cautioned against using motility-altering drugs. Some recommended using anti-emetics prophylactically to reduce the risk for suture disruption from emesis. Decadron also seems to reduce edema, but promotes nausea; however, the surgeons disagreed on the dose. They agreed that Levsin seems to help with the stomach spasms.

How do you feel patient satisfaction differs between gastric imbrication and sleeve gastrectomy?

Hunger disappeared at least in the first several months after the imbrications but this effect does not last as long in imbrication patients as in sleeve patients. However, it also appears that patients can tolerate more food types postoperatively and less food gets stuck with imbrication than with LSG or LRYGBP.

How do surgeons deal with the possibility of reflux after LSG and gastric imbrication?

There is little to no difference in how surgeons deal with the possibility of reflux with LSG and gastric imbrication. All surgeons treat potential and actual hiatal hernias aggressively just as they do in sleeve and band surgery.

What percentage of excess weight loss can a patient expect following this procedure?

Opinions differ on the percentage of excess weight loss a patient should expect. The percentage depends on bougie size. The limited evidence to date suggests a 10% to 15% improved percentage of excess weight loss for LSG versus gastric imbrication; it's possible this difference occurs because gastric imbrication produces a more compliant sleeve. The gastric imbrication procedure is likely to be positioned somewhere between the gastric band and LSG in terms of percentage of excess weight loss. Trials underway will help surgeons develop a more informed opinion.

How long does gastric imbrication usually take?

Gastric imbrication and LSG take between 60 and 75 minutes. If postoperative nausea can be controlled, recovery time should be shorter by several days for gastric imbrication compared

with that for LSG, but if the sleeve is oversewn during sleeve gastrectomy, the two procedures should take about the same amount of time.

Gastric imbrication is physically more demanding if the plications are done using hand suturing. This is less the case if using a suturing device such as Endostitch (14-15 stitches required). Equipment manufacturers currently are working on devices to reduce the time it takes to perform imbrications.

What are the biggest surgical errors that can be made with gastric imbrication?

The most common error is to narrow a sleeve at the angularis, imbricating too closely to the pylorus or causing excessive imbrication at the fundus (which can cause prolonged nausea when imbrication occurs into the esophagus). Some of these are the same issues that arise with the sleeve gastrectomy procedure. However, a big advantage for the gastric imbrication procedure is that any of the above can be undone in the weeks after surgery.

Is there a role for gastric imbrication in bariatric revision versus primary surgery?

Currently, gastric imbrication is being used for patients who have failed band surgery and who don't want to undergo other, more common choices. It has also been used to plicate the gastric pouch in the bypass. Although, in theory, gastric imbrication should reduce the size of a sleeve, no surgeon at the table has tried this. Perhaps the most common revision for this procedure will be to decide how to size gastric imbrication.

Is there a difference in revision rates?

All surgeons agree it is too early to say whether there is a difference in revision rates for both the gastric imbrication and LSG. The rates of revision for LRYGBP are far under-reported for both complication of the LRYGBP and for inadequate weight loss.

What is the learning curve for the procedure?

The consensus is that the learning curve for gastric imbrications is 10 to 15 procedures for surgeons who have done many stomach surgeries. However, prior experience with gastric banding alone is likely inadequate preparation for gastric imbrication. Surgeons should have prior experience with LSG or LRYGBP, ideally with experience oversewing the staple line. An absolute must is for surgeons to have advanced laparoscopic suturing skills. Without this experience, the surgery should not be attempted.

What training and certification issues arise with gastric imbrication?

The panel felt that the history of sleeve gastrectomy provides useful guidance for the introduction of gastric imbrication. Although the LSG appears easy on the surface, mastering it has proved difficult for many surgeons.

Although both Johnson & Johnson and Covidien championed the sleeve, there currently is no industry sponsor for gastric imbrication. It is unclear who will drive the certification aspects of the procedure. Formal specialized training and proctoring will be essential for the long-term safety and efficacy of this procedure.

Although it is still too early to pronounce the long-term success of gastric imbrication, all the participants at the table have been impressed with the initial results.

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