BARIATRIC MEDICINE ALERT

A monthly survey of developments in bariatric medicine

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INSIDE

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Laparoscopic Transgastric Endoscopy after Roux-en-Y GB

ABSTRACT & COMMENTARY

By Namir Katkhouda, MD, FACS

Synopsis: *Laparoscopic transgastric endoscopy is a safe and minimally-invasive approach for the evaluation of the gastric remnant, duodenum, and biliary tree in patients who have undergone Roux-en-Y gastric bypass.*

Source: Ceppa FA, et al. Laparoscopic transgastric endoscopy after Roux-en-Y gastric bypass. *Surg Obes Relat Dis*. 2007;3:21-24.

BACKGROUND: ACCESS AND ENDOSCOPIC EVALUATION OF THE bypassed stomach is difficult after laparoscopic Roux-en-Y gastric bypass. Ceppa and colleagues propose a minimally-invasive technique to access the bypassed stomach for endoscopic diagnosis and treatment after Roux-en-Y gastric bypass.

Technique: A carbon dioxide pneumoperitoneum was established to a pressure of 12-15 mm Hg. Next, 12-mm umbilical, 5-mm right upper quadrant, 5-mm left lower quadrant, and 15-mm left upper quadrant trocars were placed. A purse-string suture was placed on the anterior wall of the stomach. A gastrotomy was made using ultrasonic shears, and the 15-mm trocar was placed into the stomach. The endoscope was then inserted through the 15-mm trocar, and the pneumoperitoneum was decreased to 10 mm Hg. Once the evaluation was complete, the gastrotomy was closed with a running suture or linear stapler.

Results: Ten patients have undergone laparoscopic transgastric endoscopy. Five patients had biliary pathology findings. Four of these patients underwent successful endoscopic retrograde cholangiopancreatography and papillotomy; the procedure in the fifth patient was unsuccessful because of stone impaction at the ampulla. Three patients were evaluated for gastrointestinal bleeding. One was diagnosed with a duodenal gastrointestinal stromal tumor, one with a bleeding duodenal ulcer, requiring surgical exploration, and the third had negative endoscopic findings. Two patients evaluated for chronic abdominal pain had negative endoscopic findings. No complications developed following this technique.

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Conclusions: Ceppa et al conclude that laparoscopic transgastric endoscopy is a safe and minimally-invasive approach for the evaluation of the gastric remnant, duodenum, and biliary tree in patients who have undergone Roux-en-Y gastric bypass.

COMMENTARY

Access to the gastric remnant is important following Roux-en-Y gastric bypass. There are 2 big indications: biliary problems (more specifically, stones in the common bile duct) and peptic ulcer disease and its complications.

Some surgeons, in that effect, have proposed a systematic analysis of the Helicobacter status of perioperative patients with an upper GI endoscopy to rule out an active peptic ulcer; although this is not widely done.

Some have proposed the use of a pediatric colonoscope, but the technique is difficult, as it has to pass several segments of bypassed GI tract. The success rate is 68%.

The technique described here is straightforward. It is considered safe, as no complications were reported and it allowed the performance of all ERCPs, with a success rate of 80%, which is quite high. Three patients had an upper GI bleed, with a negative endoscopy. A cause was found in 2 of the 3 (bleeding ulcer and a bleeding tumor) patients. The technique, therefore, is effective but requires reoperation and general anesthesia.

In my opinion, it should be reserved for non-biliary problems, in situations where conservative measures to stop the bleeding failed.In common bile duct stone disease, a magnetic resonance cholangiopancreatography should precede any decision, as many stones pass on their own, and only patients with cholangitis should be considered for an urgent laparoscopic transgastric Endoscopic Retrograde Cholangiopancreatography (ERCP). The surgeon should make provisions to reoperate the patient through traditional open methods, should the ERCP fail in the same setting. ■

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Questions & Comments

Leslie Hamlin,
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Diagnosis and Management of Anastomotic Leaks after GB

ABSTRACT & COMMENTARY

By Namir Katkhouda, MD, FACS

Synopsis: *Lack of specificity in clinical presentation and imaging studies make diagnosing anastomotic leaks challenging, so operative exploration should be part of the diagnostic algorithm.*

Source: Gonzalez R, et al. Diagnosis and contemporary management of anastomotic leaks after gastric bypass for obesity. *J Am Coll Surg*. 2007;204:47-55.

BACKGROUND: ANASTOMOTIC LEAKS ARE A SERIOUS complication of bariatric surgery. The objective of this study was to describe the clinical presentation and outcomes of treatment in patients who develop anastomotic leaks after Roux-en-Y gastric bypass.

Methods: In this study, 3018 consecutive patients, from prospective databases, who underwent Roux-en-Y gastric bypass in 4 tertiary referral centers, were reviewed.

Results: Sixty-three patients (2.1%) developed anastomotic leaks (open, 2.1%; laparoscopic, 2.1%) at a median of 3 days (range 0 to 28 days) after Roux-en-Y gastric bypass. Symptoms and signs included tachycardia (72%), fever (63%), and abdominal pain (54%). Upper gastrointestinal series and CT demonstrated leaks in only 17 of 56 (30%) and 28 of 50 (56%) patients, respectively; when done jointly, both studies were negative in 30% of patients. The 68 anastomotic leaks occurred at the gastrojejunostomy (49%), excluded stomach (25%), jejunojejunostomy (13%), gastric pouch (9%), and uncertain location (4%). Forty patients (63%) required 58 reoperations for drainage of

intraabdominal collections (55%), repair of anastomotic defects (34%), or revision of the leaking anastomosis (11%), with an overall morbidity of 53% and an overall mortality of 10%. Nonoperative treatment was successful in 23 of 26 patients, with no mortality and an overall morbidity of 61% (P = NS versus operative). Operative treatment was more common in patients with hypotension or oliguria ($P < 0.01$).

Conclusions: Lack of specificity in clinical presentation and imaging studies make diagnosing anastomotic leaks challenging, so operative exploration should be part of the diagnostic algorithm. Non-operative treatment is safe and effective in a subset of patients who are known to have controlled leaks which exhibit stable hemodynamic parameters.

COMMENTARY

This study first shows that the incidence of leaks is around 2%; it is identical for open or laparoscopic surgery. The number for laparoscopy is low, and the equivalent of the open technique reflects that the operations were performed by skilled laparoscopic surgeons. Most leaks occurred on the third day, but the range shows that some can occur up to 28 days after surgery, though it is rare.

It is interesting to note that 49% of the leaks occurred at the gastrojejunostomy site, even though the anastomosis was checked intraoperatively every time using insufflation with an air underwater seal. This leads me to believe that this technique is not accurate enough to detect anastomotic imperfections. I prefer the use of methylene blue, which has the advantage of giving indication of the volume required to fill the pouch. Postoperatively, everybody agrees, and this study is no exception; the most reliable sign of a leak is Tachycardia, as defined by a pulse above 100.

One has to bear in mind that this has to be weighed by the patient's perioperative pulse rate. I have had many patients with a pulse of 105 that alarmed us for a leak, although all other vitals were normal, and some studies that were done were negative. The patients were discharged the next day without any problem. Nevertheless, a pulse of 120 postop is ominous and should prompt additional studies, unless the patient's condition warrants an immediate re-exploration (low urine output, hypotension, surgical abdomen). In all other patients, an upper GI is ordered but, in my experience, confirmed by the current study, it is of poor yield for leaks. I would suggest skipping this test, which will only falsely reassure the surgeon in most cases, and order a CT scan with oral and IV contrast.

I agree with Gonzalez and colleagues that an attempt for conservative, non-operative management can be attempted if the patient's vitals are stable. In their hands, non-operative management was successful in 23 of 26 patients without mortality. If no drain is left in during surgery, a percutaneous one placed under CT can save the day.

Now, a word about the white count. Many studies emphasize the elevated white count and the left shift. I would like to insist, and this was not mentioned in the study, that a patient can present postoperatively with a normal to low white count. Very little is mentioned about the possibility of bandemia, which would close the case in favor of an intraabdominal catastrophe.

In the event of a reoperation, Gonzalez et al insist on the placement of a gastrostomy tube for decompression, as well as early feeding through the remnant.

The closure of a gastrointestinal defect at the anastomoses will not only make matters worse, it's generally ineffective because of the amount of inflammation. A good drainage, with an omental patch, is a good option. ■

Gastric Banding for Patients with a BMI of ≤ 35 kg/m²

ABSTRACT & COMMENTARY

By Richard Peterson, MD, MPH

Clinical Instructor of Surgery, Department of Surgery, USC

Dr. Peterson reports no financial relationships relevant to this field of study.

Synopsis: *With additional study, it is reasonable to expect the weight guidelines for gastric banding to be altered to include patients with a BMI of 30-35 kg/m².*

Source: Parikh M, et al. Laparoscopic adjustable gastric banding for patients with body mass index of ≤ 35 kg/m². *Surg Obes Relat Dis*. 2006;2:518-522.

BACKGROUND: MANY MILD-TO-MODERATELY OBESE individuals (body mass index [BMI] 30-35 kg/m²) have serious diseases related to their obesity. Nonoperative therapy is ineffective in the long term, yet surgery has never been made widely available to this population.

Methods: Between 1996 and 2004, 93 patients with a BMI of 30-35 kg/m² underwent Laparoscopic Adjustable Gastric Banding (LAGB) with the LAP-BAND. All patients were referred by their primary

physician, entered into a comprehensive bariatric surgery program at one Australian center, and were operated on by one surgeon. Data on all patients were collected prospectively and entered into an electronic registry. The study parameters included perioperative age, gender, BMI, presence of co-morbidities, percentage of excess weight loss, and resolution of comorbidities.

Results: The mean age was 44.6 years (range, 16-76), the mean weight loss was 98 kg, and the mean BMI was 32.7 kg/m^2 (30-34). Of the 93 patients, 42 (45%) had co-morbidities, including asthma, diabetes, hypertension, and sleep apnea. The proportion of patients in follow-up was 79%, 85%, and 89% at 1, 2, and 3 years, respectively. The mean weight was reduced to 71 kg at one year, 72 kg at 2 years, and 72 kg at 3 years. The mean BMI was reduced to 27.2 ± 2.2, 27.3 ± 3.1, and 27.6 ± 3.7 kg/m^2, respectively, and the mean percentage of excess body weight loss was 57.9% ± 24.5%, 57.6% ± 29.3%, 53.8% ± 32.8% at 1, 2, and 3 years, respectively.

COMMENTARY

Parikh and colleagues pose an interesting concept in the treatment of obesity. They referred multiple patients during an 8-year period that, according to current National Institutes of Health (NIH) guidelines, would be ineligible for weight reduction surgery. The patients in this group all had BMI's ≤ 35kg/m^2. However, even in this "mild-to-moderately" obese population, obesity-related comorbidities can take their toll on patients. They attempted to determine if use of LAGB would prove beneficial in this set of patients.

The results in this group showed an improvement, if not complete resolution, of associated comorbidities after placement of the band and a concomitant reduction in weight. Parikh et al do discuss that, although the average weight loss of 20-25 kg (44-55 lbs) may not seem like a substantial number to justify the risk of surgery, it is a sustainable loss of weight that they perceive as the ultimate benefit. In this series, the weight loss was sustained for 3 years. This marks a major point in obesity. Patients that present for surgery are typically there as a last resort. Most, if not all patients have lost hundreds of pounds over the course of their lives, but it is sustaining the weight loss that they all grapple with.

The data in this series is also supported in the literature, showing that even with the LAGB, a reduction in Excess Body Weight Loss (EBWL) of approximately 50% has been shown to dramatically improve associated comorbidities. Most series also report a 40%-50% EBWL at one year with the LAGB.

It is the less invasive aspect of the LAGB that is attractive to both patients and surgeons. Parikh et al present that with a BMI of 27 kg/m^2 or less, there was virtually complete resolution or improvement in associated comorbidities. They contend that patients who have previously not been considered for surgical therapy of their obesity (BMI 30-35 kg/m^2) should be considered, given the efficacy of the procedure. ■

Post-GB Hyperinsulinism with Nesidioblastosis

ABSTRACT & COMMENTARY

By Richard Peterson, MD, MPH

Synopsis: *The risk of recurrent symptomatic hyperinsulinism after limited pancreatectomy is significant, and relative euglycemia may be achieved with subtotal or total pancreatectomy.*

Source: Clancy TE, et al. Post-gastric bypass hyperinsulinism with nesidioblastosis: Subtotal or total pancreatectomy may be needed to prevent recurrent hypoglycemia. *Gastrointest Surg*. 2006;10:1116-1119.

Symptomatic hyperinsulinemic hypoglycemia and pancreatic nesidioblastosis have recently been described in a small series of patients after gastric bypass surgery for morbid obesity. In the limited published reports of patients with this condition, hyperinsulinism and nesidioblastosis have been managed by distal or subtotal pancreatectomy.

Clancy and colleagues present a very interesting paper, which includes 2 cases from their institution, showing their approach to management. Nesidioblastosis is a rare disorder in and of itself, being far less common than insulinoma (which itself is rare) as a cause for hyperinsulinemic hypoglycemia. However, now there are 11 patients reported in the literature (2 from this series). To this point, there has not been an established causal link between nesidioblastosis and gastric bypass, although the incidence appears more common than in the general population. This brings forward a concern, as the popularity of gastric bypass surgery for morbid obesity continues to rise.

The proposed mechanism is that rapid delivery of food to the distal ileum after bypass surgery may result

in elevated systemic levels of glucagons-like peptide 1 [GLP-1], or another intestinal hormone, leading to hyperplasia of the pancreatic islet cells. Clancy et al, in their review, discovered that other reports have recently found hyperinsulinemic hypoglycemia after gastric banding, and have suggested that weight loss reduces insulin resistance in the setting of islet hypertrophy and hyperfunction, which is often seen in obesity. A third suggestion of the mechanism is that hyperinsulinism may be masked in some obese patients. The theory that the anabolic nature of insulin, coupled with the relief of hypoglycemic symptoms from eating, might lead to obesity in a population of patients with primary hyperinsulinism who are subsequently rendered hypoglycemic because the protective mechanism of a high-carbohydrate diet is removed. It is only with the increase in obesity surgery that these patients are now being "noticed."

COMMENTARY

Clancy et al also discuss the fact that the role of surgery in the treatment of nesidioblastosis in the post-gastric bypass patient is not well defined. Clancy et al were required to perform pancreatectomies for 80-95% of their patients in order to resolve their symptoms. Clancy et al also recognize that one management strategy may not be appropriate for all cases, but it is the recognition of this problem within a growing pool of postoperative patients that needs to be realized. ■

Sleeve Gastrectomy: Mother of All Bariatric Procedures?

ABSTRACT & COMMENTARY

By Amir Mehran, MD, FACS

Assistant Clinical Professor of Surgery; Director, Bariatric Surgery, Section for Minimally Invasive and Bariatric Surgery, Department of Surgery, UCLA

Dr. Mehran reports no financial relationships relevant to this field of study.

Synopsis: *The Magenstrasse and Mill procedure is the simplest and most physiological gastroplasty yet described.*

Source: Johnston D, et al. The Magenstrasse and Mill operation for morbid obesity. *Obes Surg*. 2003;13:10-16.

Laparoscopic sleeve gastrectomy (LSG) has attracted widespread attention in the bariatric surgery community. Originally advocated as part of a staged approach to high-risk patients, some now tout it as a one-shot operation of choice. LSG's origin dates back to the mid-1990's.

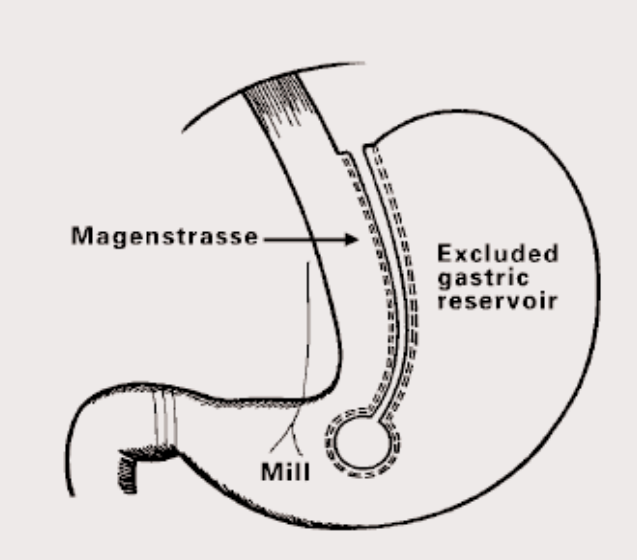
In 2003, Johnston and colleagues published their 6-year, 130-patient experience with what they coined the "Magenstrasse & Mill" (M&M) operation for morbid obesity.[1] The Magenstrasse, or "street of the stomach," is a long narrow tube fashioned from the lesser curvature, which conveys food from the esophagus to the antral "mill." Normal antral grinding of solid food and antro-pyloroduodenal regulation of gastric emptying and secretion are preserved (*see Figure 1*). No anastomoses are created, and common complications, such as strictures, internal hernias, and nutritional deficiencies can therefore be avoided. The mean excess weight loss in this group was 60%. With the exception of gastroesophageal reflux disease in 28% of the patients, the complication profile was otherwise very favorable.

Since then, several papers have been published about both the M&M operation, as well as its more commonly accepted variation, the sleeve gastrectomy. In 2003, Regan and colleagues first described their early favorable experience with LSG as part of a 2-stage operation in high-risk, super obese patients.[3] One of the largest and most widely referenced papers is published by Cottam and colleagues.[4] Over 4 years, 126 consecutive LSGs were performed at the University of Pittsburg under an IRB protocol. The patients were typically older, male, with a high BMI, and several severe co-morbidities. They reported only one late death, a 14% major complication rate, and a 46% excess weight loss at one year. In the vast majority of patients, co-morbidities had either improved or were completely resolved. With their American Society of Anesthesiology risk classification levels down-staged dramatically, 30% of the patients subsequently underwent a gastric bypass.

Laparoscopic sleeve gastrectomy has also been compared to other popular restrictive procedures: the BioEnterics intragastric balloon (BIB) and the adjustable gastric band (AGB). Gagner and colleagues matched 20 LSG patients with 57 historical controls from 2 other BIB series.[5] At 6 months, 7% of the balloons had to be removed, and the excess weight loss results were 50% lower than the LSG patients. The LSG group had sustained no complications, leading Gagner et al to conclude that it was a superior first-stage procedure for the super obese compared to the BIB. In a randomized, prospective study, the only one of its kind published about the LSG, Himpens and col-

Figure 1

M & M Operation



Adapted from reference #2

leagues compared the sleeve gastrectomy with the AGB.[6] With only 40 patients in each arm, the LSG group demonstrated higher excess weight loss results (66% vs 48%) and better hunger control (47% vs 3%) at 3 years. Even though complications with the AGB were more frequent, LSG's complications tended to be more severe.

All of the above papers can be criticized on the basis of improper design, inadequate power, or short-term follow-up. To date, no large, prospective, randomized studies have been published comparing LSG to other weight loss procedures. This problem, however, has not stopped the bariatric surgical community from offering it, or from the patient population demanding it. Free of insurance and other regulatory issues, for example, surgeons in Mexico have been aggressively marketing LSG on their web sites, which are geared towards Americans. Patients, themselves, have been driving much of the increased demand, including perceived excellent weight loss results, yet 'safer' than the Roux-en-Y gastric bypass (RYGB) or the duodenal switch (DS), and devoid of the hassles of maintaining the adjustable band.

Similar to the perennial and never-ending AGB vs RYGB vs DS arguments, LSG has indeed been the topic of hot discussion at various conferences around the country. On March 16th, 2007, Ethicon Endo-Surgery held one such symposium at its corporate headquarters in Cincinnati, Ohio. The course was moderated by Drs. Philip Schauer and Samuel Szomstein from the Cleveland Clinic of Ohio and Florida, respectively, and included a live telesurgery from the latter location. The various surgical techniques and pearls, indications, complications, patient selection criteria, insurance reimbursement hurdles, etc., were all fully discussed. A diverse group of bariatric surgeons from around the country were in attendance. Even though most had successfully performed this operation, there were a few dissenting voices who were appropriately concerned about subjecting patients to 2 operations and 2 separate sets of risks. By the end of the session, however, there was uniform agreement that the laparoscopic sleeve gastrectomy should not be offered as a one-stage operation, except in unusual circumstances, such as inflammatory bowel disease, extensive intra-abdominal adhesions, and the like, where intestinal surgery can be fraught with numerous complications.

As its current president, Dr. Schauer discussed the American Society for Bariatric Surgery's goal to provide a position statement about the sleeve gastrectomy at its next meeting in June 2007. Until then, as he put it, the jury is not yet out. It is a relatively easy operation with very good short-term results. However, until more long-term data are published, bariatric surgeons should limit its use to high-risk patients as part of a staged approach. In the current environment, where bariatric surgery is under a thick microscope, any potentially negative publicity about LSG outcomes or complications would be detrimental to our community. ■

References

1) Johnston D, et al. The Magenstrasse and Mill operation for morbid obesity. *Obes Surg*. 2003;13:10-16.
2) Carmichael AR, et al. Effects of the Magenstrasse and Mill operation for obesity on plasma plasminogen activator inhibitor type 1, tissue plasminogen activator, fibrinogen and insulin. *Pathophysiol Haemost Thromb*. 2002;32:40-43.
3) Regan JP, et al. Early experience with two-stage laparoscopic Roux-en-Y gastric bypass as an alternative in the super-super obese patient. *Obes Surg*. 2003:13:861-864.
4) Cottam D, et al. Laparoscopic sleeve gastrectomy as an initial weight-loss procedure for high-risk patients with morbid obesity. Surg Endosc. 2006:20:859-863.
5) Milone L, et al. Laparoscopic sleeve gastrectomy is superior to endoscopic balloon as a first stage procedure for super-obese patients. Obes Surg. 2005;15: 612-617.

6) Himpens J, et al. A prospective randomized study between laparoscopic gastric banding and laparoscopic isolated sleeve gastrectomy: Results after 1 and 3 years. *Obes Surg*. 2006;16:1450-1456.

Does Perioperative Weight Loss Affect Liver Size?

ABSTRACT & COMMENTARY

By Nicole R. Basa, MD

Clinical Instructor, Department of Surgery, UCLA Division of Minimally Invasive and Bariatric Surgery

Dr. Basa reports no financial relationships relevant to this field of study.

Synopsis: *This study demonstrates that preoperative weight loss via a low-carbohydrate diet may decrease liver size and friability. It provides a more favorable operative environment by decreasing the incidence of liver injuries due to difficulty in retracting a large fatty liver in bariatric and foregut surgery.*

Source: Benjaminov O, et al. The effect of a low-carbohydrate diet on the nonalcoholic fatty liver in morbidly obese patients before bariatric surgery. *Surg Endosc*. 2007 [Epub ahead of print].

BACKGROUND: MORBID OBESITY OFTEN CAUSES NONalcoholic fatty liver disease (NAFLD), which can complicate gastric bypass and other foregut surgery.

Method: Fourteen candidates for bariatric surgery underwent a very low-carbohydrate diet for 4 weeks. A CT scan was performed before and after the diet period.

Results: CT scans of the liver showed an increase in mean liver density ($P = 0.06$) and a decrease in mean liver volume ($P = 0.01$). The mean density increase was greater in the left than in the right lobe.

Conclusions: Four weeks of a low-carbohydrate diet decreases the liver fat content and liver size, most notably in the left lobe. This reduction can facilitate the ease of bariatric and foregut procedures.

COMMENTARY

Several bariatric programs require perioperative weight loss to reduce the liver and omental fat size to allow for an easier operation. Oftentimes with patients who have higher BMIs, the liver tends to be enlarged and friable due to fatty infiltration. These 2 components of a liver with NAFLD may lead to inadvertent injury to the liver, as it is retracted to expose the angle of the upper stomach.

There are several accounts in the literature that demonstrate a decrease in liver size with dieting. Fris and colleagues showed that a low energy diet for 2 weeks before bariatric surgery reduced liver size measured by ultrasound.[1] Nomura and colleagues demonstrated a reduction in liver volume via CT scan findings after patients were placed on a low calorie diet for 3 months.[2]

Interestingly, the type of low calorie diet may lend to more efficient early weight loss, as demonstrated by popular mainstream diets such as the Atkins and South Beach diets, which are high in protein and low in carbohydrate. Volek and colleagues reported that a low-carbohydrate diet had a greater effect than a low-fat diet on weight loss and body composition in overweight patients.[3]

This study demonstrates an objective account of the decrease in liver size after a 4-week, low-carbohydrate diet measured by CT. The left lobe, which is often retracted to expose the upper stomach, demonstrated an increased density which would be seen in a less fatty liver. The overall liver volume also decreased. In theory, these findings make a bariatric procedure safer and easier to perform.

Unfortunately, this study had only 14 patients. A larger sample size would confirm that a change in liver size occurs in most patients after a low-carbohydrate diet. Also, measuring operative parameters such as a decrease in OR time and a decreased incidence of liver injuries, would demonstrate the clinical importance of decreased liver size. Also, performing a liver biopsy intraoperatively to pathologically demonstrate a decrease in hepatic steatosis would also justify a preoperative low-carbohydrate diet. Measuring liver enzymes before and after the diet would also be good to demonstrate the decrease in liver inflammation noted by a decrease in transaminases.

This paper is a foundation for more objective evidence in the literature to demonstrate a decrease in liver size due to preoperative dieting prior to bariatric procedures. When patients are required to lose weight before a bariatric procedure, surgeons are often met with disappointment by the patient. They often respond to the request with, "if I could lose the weight I wouldn't be here to have the operation." Many surgeons note the anecdotal appearance of an easier and safer operation after the patient loses weight prior to having a bariatric procedure, and explains this to the patient. This paper lends some data that objectively demonstrates this. ■

References

1. Fris RJ. Preoperative low energy diet diminishes liver size. *Obes Surg*. 2004;14:1165-1170.
2. Nomura F, et al. Obesity-related nonalcoholic fatty liver: CT features and follow-up studies after low-calorie diet. *Radiology*. 1987;162:845-847.
3. Volek J, et al. Comparison of energy-restricted very low-carbohydrate and low-fat diets on weight loss and body composition in overweight men and women. *Nutr metabol (Lond)*. 2004;1:13.

CME Questions

8. Perioperative weight loss in bariatric surgery is useful:
a. to decrease the size of the liver.
b. to decrease the fat density of the liver on imaging studies.
c. has proven scientifically to be always effective in improving the intraoperative technical difficulties of obesity surgery.
d. is always associated with improved postoperative outcomes.

9. "Mini" gastric bypass for treatment of obesity:
a. can lead to severe malnutrition.
b. is sometimes associated with severe bile reflux.
c. is not associated with revisional surgery.
d. is supposedly faster to perform.

10. True or False. Intragastric endoscopy, following gastric bypass surgery, can be done in the office?

Answers: 8. (b); 9. (c); 10. (False)

CME Objectives

The objectives of *Bariatric Medicine Alert* are to:

• discuss the clinical implications of various types of bariatric surgery;

• discuss comorbidities resulting from obesity, as well as secondary pathologies resulting from bariatric surgery;

• review peri-operative and post-operative procedures to ensure long-term success, lower mortality from surgery, and a decrease in comorbidities;

• review current data regarding use of obesity drugs, as well as nutritional support in the fight against obesity. ■