Endoluminal Bariatric Techniques: Current Therapies and Outcomes

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The rapidly growing problem of obesity is associated with severe medical conditions, such as diabetes, obstructive sleep apnea, hypertension, and dyslipidemia. Surgical weight reduction is effective in considerably reducing these co-morbidities. Transoral and endoluminal techniques have been developed and refined for both revisional and more recently, primary bariatric procedures. These techniques are relatively novel, so current randomized controlled trials are sparse. Much of the information in this review was obtained from personal knowledge, case reports or manufacturers.

The Roux en Y gastric bypass is still considered the gold standard of care as far as bariatric surgery operations. However, up to 10% of patients re-gain significant weight five years after surgery and 20% of patients re-gain weight 10 years after surgery with the procedure. While it is still controversial, the anatomical causes of weight gain are thought, at least partially, to occur because of dilation of the gastric pouch or gastro-jejunostomy. Restoration of the pouch to a pre-dilated size has been hypothesized to result in loss of some of the re-gained weight. Historically, StomaphyX has been used for revision of the gastric pouch (Figure 1 and 2). The device has demonstrated promising initial weight loss in patients, but durable long-term effects were disappointing, with patients re-gaining weight.
The results of a randomized controlled trial comparing the StomaphyX to sham procedures are under review for publication by the authors.

**Figure 1 - StomaphyX: Endoscopically placed plications in the gastric mucosa, causing decrease in size of a gastric pouch after Roux en Y gastric bypass.**

USGI Medical developed the Incisionless Operating Platform for revisional purposes (Restorative Obesity Surgery, Endoluminal, ROSE, Figure 3). This device uses anchors to create tissue plication to reduce stoma and pouch size. The Incisionless Operating Platform demonstrated a mean loss of 32% of re-gained weight after six months in 116 patients.6

**Figure 3 - Incisionless Operating Platform: Endoscopic Instrument used to place sutures for plication of gastric mucosa. There are several instruments available with this platform, including a grasper, and suture anchors. Seen in this image is a suture passer at the end of the endoscope.**

Currently an investigational device by BaroNOVA called the transpyloric shuttle is being trialed. It has been proposed for both revisional and primary bariatric indications. It is positioned at the pylorus, and causes an intermittent obstruction, causing delayed gastric emptying and increased satiety. This device is currently undergoing clinical trial testing and no outcome data is available.

The Apollo Overstitch is currently the only device available on the market for bariatric revisional surgery. It is an endoscopic suturing device, which passes a suture back and forth through gastric tissue and is used to reduce pouch or stoma size (Figure 4). Research presented at the 2012 Society of
American Gastrointestinal and Endoscopic Surgeons (SAGES) meeting provided initial data on 15 patients who underwent gastro-jejunostomy revision with the Apollo Overstitch and lost a mean of 61% of regained weight at 2 months.7 Below are pictures before and after a gastrojejunostomy reduction (Figure 5). Also, I have recently reported the use of this device for performing endoluminal plication as a revisional surgery for weight re-gain following laparoscopic sleeve gastrectomy.

More recently, endoluminal or transoral techniques have been attempted for primary bariatric procedures. Performing sole endoscopic procedures may be beneficial for patients deemed high risk for operative intervention or as a staged approach for super-obese patients. Satiety Inc. devised the TOGA procedure, which mimics the vertical banded gastroplasty (Figure 6). Initial outcomes were promising, with an average of 44.8% excess weight loss after 12 months. The device is no longer available on the market due to insolvency of the parent company as FDA approval was not granted.8

Fogel et al. studied 64 patients who underwent endoluminal vertical gastroplasty using the Bard EndoCinch Suturing System (Figure 7). A continuous stitch was run from the fundus to the distal body, resulting in a gastroplasty. After 12 months, patients had a significant reduction in BMI (39.9 vs. 30.6, p<0.001). Patients lost 21.1%, 39.6%, and 58.1% of their excess weight at one, three, and 12 months, respectively. No adverse events occurred.9
Figure 7 - EndoCinch: Endoscopically placed plications of the fundus and body of the stomach results in a restrictive gastroplasty.

Another restrictive apparatus is the Teris (Trans-Oral Endoscopic Restrictive Implant System, a currently investigational device, by Barosense Inc (Figure 8). The Teris creates gastric restriction via implant of a silicon barrier.

Figure 8 - Teris: Endoscopically placed silicone device with 10 mm orifice, resulting in gastric restriction. This is anchored by five transmural plications.

Allergan developed the BioEnteric Intragastric Balloon (BIB) for early satiety and gastric restriction (Figure 9). Initial experience demonstrated limited efficacy. Ponce et al. conducted a randomized controlled trial with 30 patients using this system, and the treatment group lost more weight than the control group; however, the weight loss was not significant after 48 weeks. 10

Figure 9 - BioEnteric Intragastric Balloon: A soft, inflatable silicon balloon is inserted endoscopically into the stomach, reducing stomach capacity and creates the sensation of satiety.
Besides restrictive procedures, there have been attempts to re-create malabsorption. Cook Medical created endoluminal magnets, which can be used to create gastroenteric anastomosis. Trials are currently ongoing for bariatric indications.

The duodenal jejunal bypass sleeve, which has both restrictive and malabsorptive properties, has received recent interest. The ValenTx endoluminal bypass sleeve, a 120 cm sleeve delivered from the stomach to the proximal jejunum, is currently in clinical trials (Figure 10). Sandler et al. studied this system; after 12 weeks, patients lost an average of 39.7% of their excess weight and lost an average total of 16.8 kg. Though laparoscopy was used for this trial, it is possible that continued innovation may make laparoscopy unnecessary.\textsuperscript{11}

The EndoBarrier by GI Dynamics, currently in clinical trials in the United States, is on the market in Europe (Figure 11). This device also mimics the duodenal-jejunal exclusion seen with Roux-en-Y bypass. Escalona et al. demonstrated a 47% (+4) loss of excess body weight and 19.9% of total body weight in one year in 39 subjects.\textsuperscript{12} Early studies also demonstrate metabolic improvements with this device, as de Moura et al. demonstrated significant reduction in fasting blood glucose, fasting insulin, and HbA1c levels one year after implantation.\textsuperscript{13}
The obesity pandemic will likely continue. Though great strides have been made in minimally invasive bariatric procedures, the results are not always durable, and revision is not uncommon. Endoluminal approaches to bariatric surgery revisions may spare patients from another invasive operation and potential added morbidity, but long term results are inconclusive. Endoluminal techniques as primary bariatric procedures are new, but initial studies show some promise. As endoluminal approaches carry significantly less risk than laparoscopic approaches, perhaps outcomes should be tempered to reflect this. Both revisional and primary endoluminal approaches need additional prospective, randomized studies to evaluate their long term safety and efficacy for durable weight loss.

References

Introduction

There is now accumulating evidence favoring the role of bariatric surgery as an emerging and powerful tool in the treatment of morbid obesity and associated metabolic syndrome. Lessons learned from the currently practiced bariatric surgical procedures has paved the path for the development of more novel surgical procedures. These procedures are often the product of the pioneering work of surgeons/interventional gastroenterologists with a view to improving clinical outcomes and/or make procedures less complex and acceptable to patients.

Laparoscopic gastric plication has recently emerged as a new bariatric procedure with promising early results. It has the advantage of avoiding gastric resection and/or anastomosis and use of prosthetic materials. The current literature provides encouraging results with % EWL ranging from 60% to 67.1% at 1 year with minimal complications.

The principles of this procedure gave birth to a new procedure known as Laparoscopic Adjustable Gastric Banded Plication (LAGBP).

This article will outline the position statement, proposed and agreed by the majority of the bariatric surgeons from the Asia-Pacific region who attended the International Excellence Federation for Bariatric & Metabolic Surgery meeting on April 11th, 2013 in Kaohsiung, Taiwan. It specifically defines the current status of LAGBP as a treatment option for morbid obesity. The recommendations are based on currently available published scientific evidence and expert opinion. The statement, however, is not intended and should not be interpreted as stating or establishing a standard of care at any level.
Rationale and Evolution of Technique

Laparoscopic Adjustable Gastric Banded Plication is a new bariatric procedure which was inspired from laparoscopic gastric plication, which has the same restrictive concept as laparoscopic sleeve gastrectomy (LSG)\(^3\),\(^4\).

The technique involves suture plication of the greater curvature of the stomach to form a narrow calibrated gastric sleeve. The second part of the surgery entails placement of an adjustable gastric band over the plicated stomach. The procedure can be completely performed laparoscopically. The rationale behind this surgery is that the plication “switches on” the initial weight loss process. Subsequently, adjustment of the gastric band further initiates the second phase of weight loss and weight maintenance through serial band adjustments. In addition to quicker weight loss compared to gastric plication there are significantly less band adjustments necessary to induce satiety compared with patients having the adjustable gastric band alone. The procedure may also reduce band-related complications as a result of the less band adjustments required. LAGBP essentially could provide the benefits of both the gastric band and greater curvature plication. Table 1 summarizes the benefits associated with LAGBP.

**Table 1: Benefits of Laparoscopic Adjustable Gastric Banded Plication**

<table>
<thead>
<tr>
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<th>Benefit</th>
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<tbody>
<tr>
<td>1</td>
<td>Potentially Reversible</td>
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<td>2</td>
<td>Obviates the need for GI resection or anastomosis</td>
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<td>3</td>
<td>Obviates the need for intestinal bypass and future malabsorption</td>
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<td>4</td>
<td>Can provide a bi-phasic restrictive effect</td>
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<tr>
<td>5</td>
<td>Combines benefits of adjustability of gastric band and quick weight loss of gastric plication</td>
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<tr>
<td>6</td>
<td>Reduces the need of frequent band adjustments</td>
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Data

A literature search on Pubmed for ‘gastric plication’ yielded a total of 10 clinical studies on humans (6 laparoscopic gastric plication and 4 laparoscopic gastric banded plication). These studies are presented in Table 2.

**Table 2: Clinical studies in humans of Laparoscopic Gastric Plication (LGP) and Laparoscopic Adjustable Gastric Banded Plication (LAGBP)**

<table>
<thead>
<tr>
<th>Author</th>
<th>Procedure</th>
<th>Year Published</th>
<th>Number of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Talebpour M et al (^2)</td>
<td>LGP</td>
<td>2007</td>
<td>100</td>
</tr>
<tr>
<td>Ramos et al (^5)</td>
<td>LGP</td>
<td>2010</td>
<td>42</td>
</tr>
<tr>
<td>Brethauer SA et al (^6)</td>
<td>LGP</td>
<td>2011</td>
<td>13</td>
</tr>
<tr>
<td>Skrekas G et al (^7)</td>
<td>LGP</td>
<td>2011</td>
<td>135</td>
</tr>
<tr>
<td>Gebelli J P et al (^8)</td>
<td>LGP</td>
<td>2011</td>
<td>15</td>
</tr>
<tr>
<td>Hii MW et al (^10)</td>
<td>LGP</td>
<td>2012</td>
<td>1</td>
</tr>
<tr>
<td>Huang CK et al (^3)</td>
<td>LABGP</td>
<td>2011</td>
<td>1</td>
</tr>
<tr>
<td>Huang CK et al (^4)</td>
<td>LABGP</td>
<td>2012</td>
<td>26</td>
</tr>
<tr>
<td>Goel R et al (^9)</td>
<td>LABGP</td>
<td>2012</td>
<td>2</td>
</tr>
<tr>
<td>Huang CK et al (^11)</td>
<td>LAGBP</td>
<td>2013</td>
<td>30</td>
</tr>
</tbody>
</table>
Laparoscopic Adjusted Gastric Banded Plication

Huang et al from Taiwan developed the LAGBP and currently have the most experience with this procedure. In 2012, twenty-six patients undergoing LAGBP achieved satisfactory weight loss in the first year with only one complication reported. The surgical results of 80 LAGBP patients presented at the 2nd International Excellence Forum for Bariatric & Metabolic Surgery in Taiwan in 2012 were also encouraging. The band-first technique was used for 50 patients from May 2009 to June 2011 and was then changed to the plication-first technique from July 2011 to October 2011. 26 men and 54 women with a mean age of 30.8±8.7 years and a mean BMI of 38.1±4.7 kg/m² were evaluated with a mean follow-up of 10.5 months (range: 1–24 months). Average operation and hospitalization times were 93±36 minutes and 1.7±1.1 days, respectively, and there were no intra-operative complications or surgical mortality. There were 4 (8%) postoperative complications with the band-first technique: gastro-gastric intussusception (n=1), gastric fundal perforation (n=2), and gastric band failure (n=1). Only one complication was noted with the plication-first technique: umbilical hernia (n=1). Mean % EWL at 3, 6, 12, 18 and 24 months were 34.7±10.4, 42.6±13.7, 56.4±19.9, 57.6±19.9 and 65.8±17.4 respectively. Band adjustment frequency was only 2.4±2.2 times in 2 years. Three of the 4 complications in the band-first technique were derived from herniation of the gastric fundus due to incomplete plication of fundus. The reversibility of plication made these complications easier to reverse or convert to sleeve gastrectomy.

In 2013 Huang et al retrospectively analyzed data of 60 patients: 30 each receiving LSG and LAGBP between May 2009 to October 2010. Demographics, operative data, complications, % EWL, and resolution of co-morbidities were analyzed and compared. All the patients were followed for at least 1 year. LSG and LAGBP were matched for age, sex, body mass index and co-morbidity ratio. Mean operative time was significantly longer in the LAGBP group: 86.1±21.9 minutes vs. 62.5±30.1 minutes (p=0.001). Both groups had similar complication rates (6.7%) and most patients achieved significant resolution of co-morbidities. The mean %EWL was statistically significant for LSG till 18 months follow-up as compared to LAGBP but there was no difference at 2 years (p=0.97). Mean frequency of band adjustment after LAGBP within 2 years was 1.5±1.5 times. There was no significant difference in co-morbidity resolution in both groups. LAGBP is a dual restrictive bariatric procedure offering similar results to LSG at 2 years in terms of complications, % EWL, and co-morbidity resolution with potential of continual weight loss due to band adjustments.

Although LAGBP requires no resection or anastomosis, it is still technically challenging as it requires laparoscopic suturing skills for plication of the stomach. In addition adequate prior experience and skill with placements of adjustable bands is also essential. We recommend performing the full plication of the greater curvature first after dividing the greater omentum and subsequently placement of the adjustable gastric band using the pars flaccida technique.

As these are new procedures the potential complications are less known. The reported complications of gastric plication include severe nausea, prolonged vomiting, gastric obstruction, increased salivation, hemorrhage, gastric herniation between the plackation sutures, gastric perforation, peritonitis and mesenteric venous thrombosis. The complications associated with the adjustable gastric band include band slippage, erosion and port flippage. Therefore as the LAGBP combines the gastric band with gastric plication, there is every possibility that it may have the
cumulative complications of both these procedures, which is yet to be seen. Moreover a previous experience of dealing with complications associated with gastric banding is necessary to deal with unforeseen issues. There has yet to be a standardization of the various steps in the LAGBP. Such standardization is expected to improve the postoperative outcome and enable comparison between different centers. We encourage surgeons to develop standardized surgical steps in this novel procedure, including suture materials, gastric volume of plication, layers of plication, vessel dissection and adjustment frequency of the gastric band. Table 3 summarizes the current recommendations for the use of LAGBP as a surgical treatment for morbid obesity.

*Table 3 - Current recommendations for the use of LAGBP as a surgical treatment for morbid obesity*

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<table>
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<tbody>
<tr>
<td>1</td>
<td>Laparoscopic Adjustable Gastric Banded Plication (LAGBP) is a novel and investigational procedure at this time</td>
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<tr>
<td>2</td>
<td>Surgical indication should be adhered to NIH guidelines for morbid obesity or Asia-Pacific guidelines for morbid obesity. It should not be considered as one option of metabolic surgery in lower BMI patients at present</td>
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<tr>
<td>3</td>
<td>More evidence regarding the technique and outcomes should be encouraged and gathered by scientific publications and presentations</td>
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<tr>
<td>4</td>
<td>The procedure should be performed within a supervised multi-disciplinary program adhering to regulations of the ethical committee an institutional review board</td>
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<tr>
<td>5</td>
<td>Surgeons intending to start the procedures should search for training programs from surgeons, having more than 30 cases of gastric plication and band experience individually</td>
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</table>

*This position statement has been prepared based on best available evidence from the world literature. It represents the efforts of The I.E.F (International Excellence Federation for Bariatric and Metabolic Surgery) in providing up-to-date information about the novel technique and its current status. This does not represent an established method of treatment. The key purpose is to provide current information in a scientific manner based on which the practitioners can tailor their treatment decisions. The final decision regarding the treatment of each patient should be individually tailored to the prevailing circumstances.*

Conclusions

Currently it is still premature to state any definitive conclusions regarding the safety and efficacy of the LAGBP owing to the limited amount of the data available. Therefore Laparoscopic Adjustable Gastric Banded Plication should still be considered investigational until further evidence is available.

References

1. International Diabetes Federation Position Statement on Bariatric Surgery 2011
Robotic Bariatric Surgery - A step forward to the future?

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Over the last two decades, minimally invasive surgery has been incorporated into standard general surgical practice. Robotic surgery, since the year 2000 through the advent of the Da Vinci Surgical System (Intuitive Surgical, Sunnyvale, CA) has also enabled many complex procedures including bariatric surgery to be performed with minimally invasive techniques.1

Bariatric surgery is currently the only evidence-based and durable treatment for morbid obesity.2 Consequently, bariatric surgery has grown, not only in terms of number of procedures but also in terms of new surgical operations and endoscopic procedures. Robotic bariatric surgery has also increased in popularity with the first reported application attributed to Dr. Guy Bernard Cadière, by the placement of a gastric band robotically in 1999.3 Moreover robotic surgery has also been used in performing sleeve gastrectomy and Roux en Y gastric bypass (RYGB).4

In the United States the Food and Drug Administration (FDA) approved the da Vinci Surgical System (Intuitive Surgical Inc, Sunnyvale, California) for use in general laparoscopic surgery in the year 2000. The robot has been used in the United States for RYGB and also in revisional bariatric surgery. The main advantages afforded by robotic bariatric surgery compared with the traditional laparoscopic approach relate to the superior imaging, freedom of movements and surgeon comfort. In addition abdominal wall thickness does not affect the surgeon because the arms of the robot overcome the torque experienced during standard laparoscopic surgery in patients with significant central obesity.

The learning curve for robotic bariatric surgery is short once competence in standard laparoscopic bariatric surgery has been attained. Indeed the robotic gastric bypass learning curve appears to be shorter compared with the traditional laparoscopic approach.1 However, current data suggests that operative times for robotic RYGB can be shortened further by the use of the robot initially for less complex surgeries such as cholecystectomy and sleeve gastrectomy before attempting more complex procedures such as gastric bypasses.5 Recent reports have also shown that once the learning curve has been overcome the robotic approach reduces blood transfusions and re-admissions alter bariatric surgery.6

The growing number of bariatric surgeries performed globally has resulted in a parallel increase in the number of patients requiring revisional bariatric surgeries for complications or weight re-gain.7 These challenging revisional bariatric surgeries have been shown to not only be feasible but also safe using the robotic assistance.8 9 This is as a result of the easier dissection using the robot especially in poorly accessible areas (such as the Angle of His) due to the greater degrees of freedom of the instruments.10

The future of robotic bariatric surgery will be dependent on the need to overcome the significant cost issues. Though robotic bariatric surgery has already been shown to be safe and feasible, prospective controlled studies will be required to determine the long-term outcomes in these patients.
Figure 1: The Da Vinci system docked while performing a bariatric procedure

Figure 2: Robotic gastroentero anastomosis for gastric bypass

References

Reactive Hypoglycaemia after Bariatric Surgery

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Incidence of Reactive Hypoglycaemia

Reactive hypoglycaemia is often considered as a feature of late dumping syndrome and an early postoperative side effect of bariatric surgery. One report suggested that following Roux-en-Y Gastric Bypass (RYGB) over 70% of patients have been shown to have reactive hypoglycaemia following a glucose tolerance test.1 The phenomenon does not completely disappear with less restrictive procedures such as sleeve gastrectomy, where a 3% occurrence has been reported.2 However, to date this potential side effect of bariatric surgery has not been formally studied, and therefore recommendations for treatment are largely based on best practice and experience.

Causes and Clinical Implications

Reactive hypoglycaemia, in rare cases can be the result of an insulinoma, and this can still be the case following bariatric procedures. However, the more likely cause is through the effect of the procedure, which is greatest following the more restrictive procedures such as RYGB, which have multiple actions by which they enhance insulin action and secretion. This is evidenced by the nearly 80% resolution to remission of type 2 diabetes mellitus seen following surgery.3 The effects of surgery on suppressing ghrelin, enhancing incretin hormones and altering vagal tone all may account for the overnight improvements in insulin action and secretion seen in patients with type 2 diabetes following the procedures. In individuals with both Type 2 diabetes and ‘normal’ glycaemia both may have their insulin homeostasis adjusted, resulting in an excess insulin secretion in response to a carbohydrate rich meal.

Historically reactive hypoglycaemia was largely due to malabsorption and food being absorbed more rapidly, hence the term ‘dumping syndrome’. However, with greater understanding of the underlying physiology and endocrinology, it is probably the effect of altered hormonal and neural physiology. It has even been hypothesised in a number of cases, the effect of surgery may have led to nesidioblastosis, with the enhanced incretin effect, especially glucagon-like peptide 1 (GLP1) having a hypertrophic effect on the β-cells of the pancreas leading to the acquired hyperinsulinaemia associated with the reactive hypoglycaemia.4

Symptoms and Signs of Reactive Hypoglycaemia

The degree of hypoglycaemia reported in the cases of Service and colleagues included neuroglycopenia.4 This is associated with a severe deficiency of cerebral glucose. Typically normal fasting glucose levels are 3.5-5.5 mmol/l, with levels down to approximately 2.8 mmol/l being associated with adrenergic responses of the fight or flight response (e.g. sweating and irritability). When glucose levels fall below 2.8mmol/l the brain will start to become deficient of glucose and functioning will be impaired (vagueness through to unconsciousness).
Potential Sequelae of Reactive Hypoglycaemia

Most common forms of hypoglycaemia seen after bariatric surgery occur due to a lack of synchronicity of insulin and glucose, and can be managed through lifestyle and possibly pharmaceutical agents. It is important to consider that less benign causes of incapacitating hypoglycaemia such as nesidioblastosis and more rarely insulinomas can also occur in this group.

It is critical that the potential seriousness of severe hypoglycaemia in this population is not ignored. In insulin treated patients with diabetes, hypoglycaemia and driving has significant medico-legal implications. Indeed insulin treated patient who have a motor vehicle accident under UK law and found to be hypoglycaemic can be prosecuted as having driven under the influence of drugs. Although not recognised by the regulatory authorities, there is the potential a post-bariatric patient has a car accident caused by them driving under the influence of surgery?

Investigating Reactive Hypoglycaemia

There are no clear diagnostic methods for identifying reactive hypoglycaemia. Many units use a prolonged glucose tolerance test, asking the patient to drink 75 g of anhydrous glucose in 300ml of water, and then measuring glucose every 30-60 minutes for 3-8 hours. This will only measure peripheral glucose in the veins, and not central cerebral spinal fluid. This can be partially improved by arterialising the periphery using a heat box, but is still an indirect measurement. It may be more appropriate to use the highest carbohydrate cereal meal the patient can tolerate, to create an ecologically more valid test.

In addition, other causes beyond nesidioblastosis and more rarely insulinomas need to be considered. These include self-administration with insulin or sulphonylureas either accidentally or deliberately and undiagnosed Addison’s disease. For the latter a clinical review of symptoms, low blood pressure, fatigue and altered skin pigmentation may lead to further investigations and a short Synacthen test.

Treatments - Dietetic

The lifestyle management of reactive hypoglycaemia has not been subject to the rigour of clinical trials. The pragmatic advice is based on an approach aimed at minimising excessive excursions of insulin and insulin promoting gut hormones. The basis of the approach includes advising patients not to consume large quantities of carbohydrate in one meal (quantity would be individually based on tolerance), liquid sources of carbohydrate limited (hence the irrational use of a glucose tolerance test in this patient group) as this will lead to rapid stomach pouch emptying and availability of carbohydrate in the intestine and choosing low glycaemic index foods. Low glycemic index foods are known to flatten glucose response and moderate insulin secretion in healthy subjects with normal gastrointestinal physiology. However to date no formal study of moderating glycemic index of diet in patients post bariatric have been undertaken.

It would be pragmatic to slightly increase protein intake, without increasing fat to displace some of the carbohydrate in meals. This may help to blunt the hyperinsulinemia. Other approaches have focused on the consumption of smaller meals evenly spread throughout the day. However this approach needs to be undertaken as part of a full nutritional assessment with ongoing follow up to maximise its effectiveness while still meeting nutritional requirements.
For patients found to have reactive hypoglycaemia, individual advice from a dietitian is the best way for them to help them to self-manage their symptoms and still achieve their weight loss goals.

**Treatment – Medical and Surgical**

It is also known that pharmaceutical agents such as acarbose, an alpha glucosidase inhibitor, has beneficial effects by reducing the rate of absorption of glucose from carbohydrate and thus reducing insulin. Again, as can be the side effects of low glycemic index diets, acarbose is associated with increased flatulence and bloating, which might be undesirable in bariatric surgery patients. There also has been some success reported using other agents including verapamil and diazoxide. However, in some cases several surgical options have been described for resistant reactive hypoglycaemia post-LRYGB including placement of an gastric band (non-adjustable or adjustable), reversal of LRYGB and even partial pancreatectomy.

**Conclusion**

Reactive hypoglycaemia is common in patients following bariatric surgery. For most it can be managed by eating smaller loads of carbohydrate and largely avoiding liquid sources of carbohydrates (e.g. soft drinks). Some patients may also benefit from pharmacological management. However, it is important to be aware that a small minority of patients may suffer from a more severe form of hypoglycaemia associated with nesidioblastosis, which warrants further investigation and management.

**References**

Symposium Snapshot:
International Bariatric Club & Romanian Association of Endoscopic Surgery Session during the 4th Romanian Bariatric and Metabolic Surgery Symposium

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The Romanian Association of Endoscopic Surgery (RAES) was created in the year 2000 with the purpose to improve the quality of laparoscopic surgery in Romania. This association boasts more than 1200 members. Professor Catalin Copâescu, the Head of the Delta Hospital, Bucharest Romania, the first IFSO endorsed Center of Excellence in Bariatric Surgery and General Secretary of RAES has spearheaded the use of the internet for the education of bariatric surgeons in Romania and worldwide. The number of bariatric surgery operations in Romania has increased exponentially in parallel with the global increase of such surgeries. Consequently there was a need for a national bariatric forum for the education and discussion of the latest surgical techniques and management strategies for bariatric patient. This need was greatly facilitated by the Romanian Association of Endoscopic Surgery (RAES). RAES has grown over the last decade and in 2011 the first collaborative symposium between RAES and the International Bariatric Club (IBC) was convened resulting in a dynamic meeting with worldwide experts. The lecture based discussions given over the internet (Table I) proved highly educational for the members of both RAES and the IBC.
A similarly successful joint RAES-IBS symposium was held in December 2012 with a highly educational program utilizing the internet to broadcast live lectures. The program (Table 2) scheduled for this symposium covered contemporary and novel/experimental bariatric procedures as well as outlined how to perform bariatric surgery effectively and safely. It also provided a good opportunity for the younger members of RAES and IBC to consolidate their knowledge about the different bariatric surgery operations and management of complications.

The symposium was opened by Dr. Manoel Galvao Neto from the highly acclaimed Gastro Obeso Center in São Paulo, Brazil with a presentation entitled “Endoscopic treatment of primary and secondary obesity”. His team counts more than 11,000 bariatric procedures performed to date and are global leaders in therapeutic bariatric endoscopy. An overview of the role of endoscopic treatments as a therapeutic option in the obese patient in addition to medical and surgical treatments for obesity was given. Emphasis was placed on the fact that these endoluminal procedures provide only short
term efficacy, with the risk of weight re-gain after device removal. However they have the advantage of a lower morbidity and mortality rate compared to surgical treatment. Dr Galvao Neto summarized the current technologies of endoscopic treatment such as space occupying devices as exemplified by intragastric balloons and also restrictive procedures as illustrated by endoscopic plication of the stomach (by using the Apollo Overstitch™), endoscopic band like procedures (Barosense™) and the endoscopic Mason-like gastroplasty (TOGA™ sleeve stapler). In addition “sleeved” bypass procedures such as the endoscopic gastro-duodeno-jejunal bypass procedure and the endoscopic duodeno-jejunal bypass (Endobarrier™) were also described. A detailed overview of the role of therapeutic endoscopy in secondary obesity (weight re-gain after the first bariatric procedure) by way of endoscopic suturing of the gastro-jejunal stoma in Roux en Y Gastric Bypass was also described. The literature shows that up to 12% of the patients may need revisional surgery after gastric bypass with a not insignificant risk of complication (14%) and mortality (1.3%). It has been shown that weight re-gain is associated with a dilated (> 15 mm) gastro-jejunal anastomosis, and these patients can benefit from an endoscopic intervention to reduce stoma size.

From California, we had the honor of Professor Mathias Fobi, Past President of ASMBS and IFSO, who presented on the subject of the banded gastric bypass. He started his presentation by emphasizing his disappointment that the current trends in bariatric surgery are driven primarily by minimal invasiveness, amelioration of co-morbid conditions and by novel surgical techniques but not necessarily by weight loss and weight loss maintenance. This was the rationale as to why he developed the banded gastric bypass. As Professor Michel Gagner has previously shown, the gastro-jejunal anastomosis stretches in the standard gastric bypass and with time a new larger gastric pouch (up to 300 cc) may develop. This occurrence of a dilated stoma and gastric pouch contribute to the phenomenon of weight re-gain after gastric bypass. Banding the gastric pouch helps control the size of the gastric pouch reservoir but the band must not be seen as a method of restriction. When banding the gastric pouch the ring must not be too tight otherwise there is a real risk of band erosion into the gastric pouch. It was recommended a ring of a circumference of 6-7 cm be used.

A review of several studies reporting better weight loss with banded gastric bypass as well as weight loss maintenance was also given followed by an elegant video presentation showing his technique of laparoscopic banded gastric bypass.

The next presentation by the President and Director of the International Bariatric Club, Dr. Tomasz Rogula outlined the ‘Experience of Robotic Gastric Bypass at the Cleveland Clinic.’ He started his talk with a literature review regarding the robotic approach for gastric bypass concluding that there are limited studies that show statistically significant differences regarding the gastro-jejunal leak rate between conventional laparoscopic Roux-en-Y gastric bypass (LRYGB) and robotic gastric bypass. He summarized the technical evolution of the robotic gastric bypass at the Cleveland Clinic which initially involved performing only the gastro-jejunal anastomosis and then with a gradual transition to performing the entire procedure robotically. The intra-operative set up was described with emphasis placed on the advantages of the robotic gastric bypass in high BMI patients with the robotic arms being strong and long enough to overcome the torque when operating on centrally obese patients. Revisional bariatric surgery was also described as an appropriate indication for robotic surgery. The video presentation showed the additional benefits such as the excellent visualization and the ease of dissection especially at the Angle of His. The lack of the tactile feedback during
small bowel manipulation was highlighted as a disadvantage. The presentation concluded with a discussion about the future of robotic bariatric surgery.

Dr. Francesco Severio Papadia from Genoa, Italy presented a video about the laparoscopic biliopancreatic diversion (BPD). He emphasized, in his opinion, the need to do a concomitant laparoscopic cholecystectomy due to the high incidence of cholelithiasis after weight loss following BPD. The dissection of the greater curvature was performed close to the stomach wall up to the first two short gastric vessels. Next, attention was given to the dissection of the pylorus and the ligation of the right gastric artery. The duodenum is transected and the dissection is continued on the lesser curvature in order to identify the left gastric artery. The stomach was then transected. The entero-enterostomy was placed 50 cm from the ileocecal valve and the alimentary limb was about 250 cm. The gastroenterostomy was a mechanically performed side-to-side anastomosis. He emphasised the ease and safety of pulling down the stomach through the mesocolic window rather than pulling up a Roux limb through the mesocolon. The mesocolic and mesenteric defects were closed as standard. At the end of the presentation the discussion focused on indications for biliopancreatic diversion stating that super morbid obesity, revisional surgery (with the anastomosis performed far from the fibrotic tissue) and uncontrolled type II diabetes were the main reasons for considering BPD.

Dr. Robert Rutledge from Nevada, USA provided the penultimate presentation on the omega loop gastric bypass, also known as the Mini-gastric Bypass (MGB). The presentation started with a concise review of the first consensus meeting for MGB held in Paris, France in October 2012. He also detailed the incidence of gastro-esophageal reflux disease after MGB and with LRYGB. Dr. Rutledge described the results of the MGB, highlighting that this procedure is short, simple, effective and durable. He finished by showing a video of a MGB with the technical details emphasized as can also be found on a website dedicated to this procedure. (www.minibypass.net)

The symposium included live surgery performed by Dr. Ariel Ortiz from Tijuana, Mexico on laparoscopic greater curvature plication (LGCP). The precise technical details were emphasized peri-operatively as well as his personal experience noting that the weight loss achieved for his first 150 patients (from a total of 450 patients) operated on was not as good as for all the other conventional bariatric surgeries. He described the high costs associated with the long learning curve of the procedure. The indications for gastric plication in lower BMI patients were also discussed.

The last presentation came from the host of the symposium, Dr. Catalin Copăescu (Bucharest, Romania) who presented to the audience the technical aspects of a safe and efficient Laparoscopic Sleeve Gastrectomy (LSG) as it was developed after an experience of operating on more than 2100 patients. He advocated that the feared complication of a leak may be prevented by proper surgical technique and peri-operative management. In this respect a ‘Leak Prevention Surgical Protocol (LPSP)’ has been instituted at the Delta Hospital Bariatric Center of Excellence in Bucharest since 2010. The results of this protocol are very good, with no leaks recorded for the 1116 patients included into this program (2010-2012) in comparison with a leak rate of 1.3% (11/1065) noted for patients operated on before (2005-2009) (p<0.001).

At the end the meeting we realized once more this is a new form of education in bariatric surgery provided by the International Bariatric Club. It facilitated the sharing of experiences from world
experts with minimal costs. All lectures were recorded for subsequent viewing and a complete list of all the webinars can be found on http://www.ibcclub.org.

The third IBC-RAES symposium is scheduled for 2015 under the organizational leads of Drs. Catalin Copăescu, Tomasz Rogula and Marius Nedelcu. This event will showcase the latest innovations in bariatric surgery and we hope it will continue the high quality, educational value of internet facilitated education.
My Journey Into The International Bariatric Club (IBC)

Dr. Duc Vuong, M.D.
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Director: Bariatric Surgery
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I could not believe what I was seeing on my smart phone. I had to show it to my new partner: “Hey, Dr. Joe! Come look at this.”

On my phone, my Facebook app was opened to the International Bariatric Club group, an organization of which I had only recently learned. A Latin American surgeon had posted a short video of what I later discovered was an endoscopic gastric bypass procedure shown on a fluoroscopic monitor. Dr. Joe and I watched the video in amazement. “Wow!” my partner exclaimed, “What was that?” Neither one of us was sure, the procedure was so novel.

My journey into this organization of elite weight loss surgeons started in 2010. I was a young surgeon in solo private practice, struggling to learn bariatrics in Texas. I had read numerous papers and texts, attended many society meetings, and participated in several industry-sponsored courses, including animal and cadaver labs, but I never felt comfortable enough to make the leap into gastric bypass procedures. One night, while updating my Facebook status, I received the slightly mysterious message: “You’ve been invited to join the International Bariatric Club by Tomasz Rogula.” At first I thought this was an internet data scam, but I then made what has turned out to be one of my best professional decisions. I clicked “Accept.”

This opened the exclusive International Bariatric Club to me. I immediately saw several intriguing posts and comments, ranging from options for failed gastric bypasses to treatments of sleeve leaks to individual case studies. The discussion was robust, abuzz with user activity. The names were international—some German, some Arabic, some Latin. As I started scrolling through the posts and comments, I saw names I recognized, like Jaime Ponce who posted a link from the ASMBS. Or Michel Gagner who responded to a question about duodenal switch. There’s Phil Schauer commenting. Could that be THE Dr. Fobi discussing banded bypass? Ariel Ortiz talking about gastric plication data? I was astonished this resource was available to me, for free, in real time. Soon I found myself joining in discussions, posting questions myself, and becoming a part of an elite surgical community.

Then, Dr. Rogula posted a link to the monthly journal club that was to broadcast live via a webinar. The topic was a recently published article from Professor Paul O’Brien’s group in Australia comparing the long-term outcomes of gastric banding with the published literature on bariatric surgery. I cleared my schedule for that evening, and I was not disappointed. I thought it would be difficult to link to the meeting, but to my surprise, the website was easy to manage. When I joined the discussion, there in the middle of my laptop on live streaming video was Dr. Rogula of the Cleveland Clinic, serving as moderator. Along the bottom of the screen were the online attendees, including Dr. Haris Khwaja from England, Dr. Mervyn Deitel from Canada, and Dr. Fobi himself. I was among some of the great pioneers of bariatrics, engaging in discussion with them. Was I really having the occasion to compliment Dr. Terry Simpson for his cooking videos? This was simply amazing.
I was honored when Dr. Rogula asked me to join the Board of IBC as Membership Director. I felt like I had been given an opportunity to help shape the future of this organization and consequently the field of bariatrics. IBC has big plans!

The International Bariatric Club, at over 850 members, is the third largest professional organization for bariatrics in the world. The vision of IBC is to focus on the development of surgeons through near instantaneous peer-to-peer interaction. Its website already has an online journal, and IBC is currently searching for a Director of Research. The lively dialogue on Facebook will eventually be migrated to the IBC website, www.IBCClub.org, where the monthly online journal club webinars will enhance the interactivity of the group. The IBC is also partnering with a video hosting company to improve its bariatric-specific video library. By creating a safe technological forum that fosters the free exchange of ideas and experience among its members, IBC is helping to simplify the complexity of ongoing surgical education.

As I showed that video of the endoscopic bypass to my new partner, I beamed inwardly, knowing that I am involved with a cutting-edge organization. I hope you will become a part of it, too. Get your free membership at www.IBCClub.org, or find us on Facebook under International Bariatric Club, and let your journey of surgical discovery begin now.
The International Bariatric Club (IBC) is a non-profit, international organization of bariatric surgeons and educators. The IBC’s mission is to promote and exchange knowledge, ideas, and experience related to the preoperative, intraoperative, and post-operative care of the bariatric patient with bariatric professionals throughout the world.

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