

\*Selected, quality filtered, not subject to external review

**Policy Issue:** In December 2007, the Chair of the VA Central Office Bariatric Surgery Work Group asked the VA Technology Assessment Program (VATAP) to assemble and review the literature on gastric sleeve resection for obesity treatment to support clinical guidance regarding the use of this procedure in the veteran population.

Gastric sleeve resection or “sleeve gastrectomy” (SG) is an unbanded form of vertical banded gastroplasty, where a majority of the stomach is resected to reduce stomach size. Up to now it has been used in staged weight loss as a first stage procedure prior to biliopancreatic diversion or gastric bypass to reduce surgical risk in high risk patients. Preliminary evidence has shown that gastric sleeve resection may achieve substantial weight loss, thus generating interest in its use as a single-stage bariatric procedure, particularly its laparoscopic version (LSG).

**Methods:** To meet the client’s urgent information needs, VATAP sought the results of exiting systematic reviews and health technology assessments (HTA) and supplemented them with updated searches of recent clinical trial data from primary studies. First, VATAP conducted comprehensive literature searches of MEDLINE<sup>®</sup>, EMBASE<sup>®</sup>, and Current Contents<sup>®</sup> and Cochrane Library electronic databases from 1982 through December 2007 for existing systematic reviews or meta-analyses published in English comparing surgical interventions for morbid obesity that included SG in adult populations.

VATAP also queried members of the International Network of Agencies for HTA (INAHTA; [www.inahta.org](http://www.inahta.org)) through its electronic listserv for existing reports or reports in progress. These results are presented in Table 1.

**Results:** VATAP identified two horizon scanning reports conducted by the Australian-New Zealand Horizon Scanning Network (ANZHSN), one published in early 2007 and an updated version produced in October 2007 (not officially released to the public as of January 29, 2008). One other report by a group in France (La Haute Autorité de Santé) is slated for completion in the spring 2008. The ANZHSN October 2007 review is the most current available review of SG and serves as the basis for this report.<sup>1</sup>

VATAP searched the databases mentioned above for primary studies of gastric sleeve resection not reviewed by ANZHSN and found 167 references. One additional comparative study met criteria for inclusion in this report along with eight case series, and their abstracts are presented in the end references:

- One new clinical trial comparing the effect of three different bariatric procedures (laparoscopic adjustable gastric banding (LAGB), LSG, Roux-en-Y gastric bypass (RYGBP)) on diabetic status (Gan 2007; Level III-3 evidence-comparative study);
- Eight case series (Level IV).

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<sup>1</sup> Sleeve gastrectomy as a single stage bariatric procedure. October 2007. ANZHSN Horizon Scanning Technology Horizon Scanning Report. HealthPACT Secretariat. Department of Health and Ageing. Canberra, Australia. <http://www.horizonscanning.gov.au>.

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Results of the ANZHSN review were based on two randomized controlled trials (Level II intervention evidence) and five comparative studies (Level III intervention evidence). Numerous case series in the evidence base were not considered in the review, because higher level comparative studies were available. Results report short-term outcomes primarily in super obese populations (BMI  $\geq$  50), except for one study with 3 years follow up post surgery:

- The evidence showed that LSG can induce substantial excess weight loss (%EWL), at least as effectively as LAGB (in one study up to 3-years post surgery) but, not unexpectedly, less effectively than gastric bypass and duodenal switch in the short term. However, these results should be viewed in light of the ease and simplicity of LSG relative to the other more invasive procedures.
- Comparable reduction in co-morbidities was observed in patients who underwent LSG or RYGBP, most notably in resolution rates of diabetes within 4 months after surgery despite LSG patients being significantly more obese than the RYGBP patients in the study.
- Evidence suggested that, compared to LAGB, LSG had lower complication rates but more severe complications. LSG is safer than laparoscopic RYGBP or intragastric balloon implantation. Evidence of the safety of LSG compared with duodenal switch is conflicting possibly because of differences in baseline patient characteristics. The incidence of gastric sleeve dilatation appears to be an uncommon event, but the evidence is far from conclusive at this point.
- One study found that LSG and LAGB had significantly shorter operative times compared to RYGBP and duodenal switch. LSG had a significantly longer length of stay compared to LAGB, but a significantly shorter length of stay compared to RYGBP and duodenal switch.
- Knowledge gaps include: comparing the effectiveness of LSG to established bariatric procedures in super-obese (BMI  $\geq$  50) as a stand alone procedure; long-term (> 5 years) safety, durability of weight loss and comorbidity data for LSG relative to existing bariatric procedures; and effects of LSG on plasma ghrelin levels and subsequent effect on appetite.

Findings from the additional VATAP searches would not alter the conclusions of the ANZHSN review.

**Guidelines and policy statements:** An Aetna Clinical Policy Bulletin on Obesity Surgery considers sleeve gastrectomy to be an investigational procedure.<sup>2</sup> The American Society for Metabolic and Bariatric Surgery (<http://www.asbs.org>) issued a “Position Statement on Sleeve Gastrectomy as a Bariatric Procedure” in June, 2007. Based on similar findings from their evidence review, they stated the following:

*“The ASMBS recognizes performance of sleeve gastrectomy may be an option for carefully selected patients undergoing bariatric surgical treatment, particularly those who are high risk or super-super-obese, and that the concept of staged bariatric surgery may have value as a risk reduction strategy in high-risk populations. It is suggested that surgeons performing sleeve gastrectomy prospectively collect and report outcome data for this procedure in the scientific literature. In addition, it is suggested that surgeons performing sleeve gastrectomy inform patients regarding the lack of published evidence for sustained weight loss beyond 3 years and provide them with information regarding alternative procedures with published long-term ( $\geq$  5 years) data confirming sustained weight loss and comorbidity resolution based upon available literature at this time.”*

<sup>2</sup> [http://www.aetna.com/cpb/medical/data/100\\_199/0157.html](http://www.aetna.com/cpb/medical/data/100_199/0157.html) accessed January 24, 2008.

**Table 1. INAHTA Responses**

**Query: What HTA/systematic reviews exist on laparoscopic sleeve gastrectomy (vertical gastrectomy)?**

Agency	Response	Comment
AETMIS (Canada)	AETMIS is not working on this topic and did not address it in our report on bariatric surgery published in 2005. ASERNIP (Feb 2007) Horizon Scanning Report: <a href="http://www.surgeons.org/AM/Template.cfm?Section=ASERNIP_S_NET_S_Database&amp;TEMPLATE=/CM/ContentDisplay.cfm&amp;CONTENTID=17659">http://www.surgeons.org/AM/Template.cfm?Section=ASERNIP_S_NET_S_Database&amp;TEMPLATE=/CM/ContentDisplay.cfm&amp;CONTENTID=17659</a>	
AHRQ (USA)	AHRQ EPC 2004 report on bariatric surgery: <a href="http://www.ahrq.gov/clinic/tp/obesphpt.htm">http://www.ahrq.gov/clinic/tp/obesphpt.htm</a>  Reports in progress Bariatric surgery in women: <a href="http://www.ahrq.gov/clinic/tp/barirept.htm">http://www.ahrq.gov/clinic/tp/barirept.htm</a>  EPC report obesity treatment in peds (draft due in Jan or Feb, review pending): <a href="http://www.ahrq.gov/clinic/tp/chwghttp.htm">http://www.ahrq.gov/clinic/tp/chwghttp.htm</a>	(did not address gastric sleeve resection)
CADTH (Canada)	We haven't reviewed this procedure at CADTH.  ECRI did a 2007 "Hotline" response on this topic-available with subscription  Aetna briefly discusses this in their Clinical Policy Bulletin on Morbid obesity surgery, available: <a href="http://www.aetna.com/cpb/medical/data/100_199/0157.html">http://www.aetna.com/cpb/medical/data/100_199/0157.html</a>  ANZHSN did a horizon scanning prioritizing summary on Laparoscopic sleeve gastrectomy in early (Feb) 2007: <a href="http://www.horizonscanning.gov.au/internet/horizon/publishing.nsf/Content/2E6BEDBA8F538999CA25714E00200B64/\$File/PS%20-%20%20Laparoscopic%20sleeve%20gastrectomy.pdf">http://www.horizonscanning.gov.au/internet/horizon/publishing.nsf/Content/2E6BEDBA8F538999CA25714E00200B64/\$File/PS%20-%20%20Laparoscopic%20sleeve%20gastrectomy.pdf</a>	Feb 2007 report laid the foundation for the October 2007 report and clinical advisory statement.  See MSAC response below.
DACEHTA (Denmark)	DACEHTA recently published a report concerning surgical treatment of obesity. An English summary is available:  <a href="http://www.sst.dk/publ/Publ2007/MTV/Kirurgi_overvaegt/564215_indh_en_sammen_nettet.pdf">http://www.sst.dk/publ/Publ2007/MTV/Kirurgi_overvaegt/564215_indh_en_sammen_nettet.pdf</a>  It focuses on procedures already used in the Danish Health Services.	Did not include sleeve gastrectomy.
DECIT/SCT IE/MS (Brazil)	Brazilian Ministry of Health has 5 Systematic reviews on obesity and their abstracts in English are available at: <a href="http://portal.saude.gov.br/portal/saude/area.cfm?id_area=1088">http://portal.saude.gov.br/portal/saude/area.cfm?id_area=1088</a>  Full text is in Portuguese.	(none addressed gastric sleeve resection)
HAS (France)	A literature review has been conducted and the report is in the validation process (publication for feb-march).	Dr Pascal Potier is in charge of this project. p.potier@has-sante.fr
IHE (Canada)	Negative	
ICTAHC (Israel)	No systematic reviews or HTA reported but: Laparoscopic procedures are well-established in Israel. This procedure is performed in at least 2 medical centers in Israel for the indication of morbid obesity	
MSAC (Australia)	"Sleeve gastrectomy as a single stage bariatric procedure." Horizon Scanning Report. Produced by ASERNIPS-Australian Safety and Efficacy Register of New Interventional Procedures-Surgical on behalf of ANZHSN. Australia and New Zealand Horizon Scanning Network. October 2007. (Pending official release)  HealthPACT has just produced a horizon scan report on this and has issued an advisory to clinicians throughout Australia and New Zealand which essentially says, sleeve gastrectomy has fewer but more serious complications, long term data are yet to emerge but short term (three year) results are encouraging. Post operative follow up	

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Agency	Response	Comment
	<p>may be simpler as repeated band adjustments are avoided. This may influence the cost impact of supporting bariatric surgery in the public sector. Health services will need to carefully address governance issues (credentialing scope of practice and audit) if embracing any form of bariatric surgery. This procedure is an appropriate surgical option for the treatment of morbid obesity noting that further long term data are needed.</p>	
SBU (Sweden)	Negative	

## END REFERENCES

Gan, S. S. H., M. L. Talbot, et al. (2007). "Efficacy of surgery in the management of obesity-related type 2 diabetes mellitus." ANZ journal of surgery **77**(11): 958-62.

BACKGROUND: It is estimated that up to 80% of persons with diabetes mellitus type 2 are overweight and in these patients it is recognized that effective weight control can lead to improvement or even resolution of their diabetes (Colagiuri et al.). All currently carried out operations for morbid obesity have been shown to improve diabetes, but there appears to be a variable response to surgery depending on several surgical and patient factors. METHODS: In this prospective review, we analysed the change in the diabetic status in 72 patients undergoing three different bariatric procedures in a single institution over 30 months. A review of the published work comparing the efficacy of the various procedures in achieving improvement or resolution of diabetes was also carried out and correlated to our findings. RESULTS: At an average follow up of 13 months, 50% of patients who had placement of laparoscopic adjustable gastric band had an improvement or resolution of their diabetes, compared with 95% of patients who had had laparoscopic sleeve gastrectomy or Roux-en-Y gastric bypass. Two of 12 (17%) laparoscopic adjustable gastric band patients had normal blood glucose levels off all diabetic medications compared with 7 of 21 (33%) laparoscopic sleeve gastrectomy and 27 of 39 (69%) Roux-en-Y gastric bypass patients. There was no significant association between the amount of weight lost and the return to euglycaemia. CONCLUSION: Direct comparison has shown a significant difference in the effects of different forms of bariatric surgery on type 2 diabetes, this is in keeping with evidence that surgery can lead to improvement in diabetes additional to that obtained by weight loss alone.

Weiner, R. A., S. Weiner, et al. (2007). "Laparoscopic sleeve gastrectomy - Influence of sleeve size and resected gastric volume." Obesity surgery **17**: 1297-1305.

Background: Although the efficacy of laparoscopic sleeve gastrectomy (LSG) for morbidly obese patients with a BMI of <50 kg/m(2), the incidence of weight gain by change of eating behaviors, and gastric dilatation following LSG have not been investigated thus far, LSG is becoming more common as a single-stage operation for the treatment morbid obesity. Methods: This is a prospective study of the initial 120 patients who underwent isolated LSG. Initially, the LSG was performed without a calibration tube and resulted in high sleeve volumes (group 1: n=25). In group 2 (n=32), a calibration tube of 44 Fr and in group 3 (n=63) a calibration tube of 32 Fr were used. The study group consists of 101 patients with high BMI who were scheduled for a two-step LBPDS, but rejected the second step after 1 year. Study endpoints include estimated sleeve volume, volume of removed stomach, operative time, complication rates, length of hospital stay, changes in co-morbidity, percentage of excess BMI loss (%EBL) and changes in BMI (kg/m(2)). Results: All 3 groups were comparable regarding age, gender, and co-morbidities. There was no hospital mortality, but there was one case of late mortality (0.8%). 2 early leaks (1.7%) were seen. % excess BMI loss was significantly higher for patients who underwent LSG with tube calibrations. LSG with large sleeve volume showed a slight weight gain during 5 years of observation. A total of 16 patients (13.3%) underwent a second stage procedure within a period of 5 years (2 redo-sleeves, 7 LBPDS, 3 LRYGBP). Conclusion: Early weight loss results were not different between the groups, but after 2 years the more restrictive LSG (groups 2, 3) results were significantly better than in patients without calibration. A removed gastric volume of <500 cc seems to be a predictor of failure in treatment or early weight regain. A statistically significant improved health status and quality of life were registered for all groups. The general introduction of LSG as a one-stage restrictive procedure in the bariatric field can be considered only if the procedure is standardized and long-term results are available.

Melissas, J., S. Koukouraki, et al. (2007). "Sleeve gastrectomy: a restrictive procedure?" Obesity surgery - the official journal of the American Society for Bariatric Surgery and of the Obesity Surgery Society of Australia and New Zealand **17**(1): 57-62.

BACKGROUND: Diet and surgically-induced weight loss have been shown to lead to alterations in motor and sensory function of the stomach. We investigated the clinical outcome and gastric emptying of solid foods in morbidly obese (MO) patients following sleeve gastrectomy (SG). METHODS: We studied 23 MO patients [(7 males, 16 females), mean age 38.9 +/- 11.0 years (range 20-64 years), mean weight 135.1 +/- 19.0 kg (range 97-167 kg), mean BMI 47.2 +/- 4.8 kg/m(2) (range 39.6-56.0 kg/m(2))] who each underwent a sleeve gastrectomy (SG) for weight reduction. At the monthly follow-up visits, variations in weight and BMI changes, postoperative meal size and frequency, and presence of gastrointestinal symptoms were recorded. 11 patients underwent scintigraphic measurement of the gastric emptying of a solid meal pre- and 6 months postoperatively. RESULTS: A significant reduction in patients' weight was evidenced at 6 and 12 months postoperatively [98.6 +/- 11.8 kg and 87.0 +/- 10.7 kg respectively (P=0.001)]. BMI decreased to 35.2 +/- 4.3 kg/m(2) at 6 months and to 31.1 +/- 4.5 kg/m(2) at 12 months, respectively (P=0.001). Although meal size was drastically reduced, meal frequency increased postoperatively in 12 patients (52.2%). Only 5 patients (21.8%) reported occasional vomiting after meals following SG. The gastric emptying half-time (T1/2) accelerated (47.6 +/- 23.2 vs 94.3 +/- 15.4, P<0.01) and the T-lag phase duration decreased (9.5 +/- 2 min vs 19.2 +/- 2 min, P<0.05) post-operatively. The percentage of the meal emptied from the stomach 90 min after consumption increased significantly after SG (75.4 +/- 14.9% vs 49.2 +/- 8.7%, P<0.01). CONCLUSIONS: This study indicates that following SG, the stomach empties its contents rapidly into the small intestine and symptoms of vomiting after eating (characteristic of restrictive procedures) are either absent or very mild. Therefore, the term 'restrictive' is possibly ill-advised for this new bariatric operation. It remains for other mechanisms of energy intake reduction, such as intestinal distension and satiety signals through gut hormones to be investigated, to comprehensively explain precisely how this 'food limiting' procedure results in weight loss.

Silecchia, G., C. Boru, et al. (2006). "Effectiveness of laparoscopic sleeve gastrectomy (first stage of biliopancreatic diversion with duodenal switch) on co-morbidities in super-obese high-risk patients." Obesity surgery - the official journal of the American Society for Bariatric Surgery and of the Obesity Surgery Society of Australia and New Zealand **16**(9): 1138-44.

BACKGROUND: We evaluated laparoscopic sleeve gastrectomy (LSG) on major co-morbidities (hypertension, type 2 diabetes / impaired glucose tolerance, obstructive sleep apnea syndrome (OSAS) and on American Society of Anesthesiologists (ASA)

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operative risk score in high-risk super-obese patients undergoing two-stage laparoscopic biliopancreatic diversion with duodenal switch (LBDP-DS). METHODS: 41 super-obese high-risk patients (mean BMI 57.3+/-6.5 kg/m<sup>2</sup>), age 44.6+/-9.7 years) were entered into a prospective study (BMI > or = 60, or BMI > or = 50 with at least two severe co-morbidities, no Prader-Willi syndrome, no conversion, minimum follow-up 12 months). 9 patients had BMI > or = 60. 17 patients (41.4%) had OSAS on C-PAP therapy. In 10 patients, at least one intragastric balloon had been positioned and 4 had undergone laparoscopic adjustable gastric banding, all with unsatisfactory results. At surgery, 41.5% were classified ASA 4 and 58.5% as ASA 3 (mean ASA score 3.4+/-0.5). Patients underwent evaluation every 3 months postoperatively and were restaged at 12 months and/or before the second step. RESULTS: 60% of major co-morbidities were cured and 24% improved. Average BMI after 6 and 12 months was 44.5+/-8.1 and 40.8+/-8.5 respectively (mean follow-up 22.2+/-7.1 months). After 12 months, 57.8% of the patients were co-morbidity-free and 31.5% had only one major co-morbid condition. At restaging, 20% of patients were still classified as ASA score 4 (OSAS on C-PAP therapy). 3 patients showed BMI <30 and were co-morbidity-free 12 months after LSG. CONCLUSIONS: LSG represents a safe and effective procedure to achieve marked weight loss as well as significant reduction of major obesity-related co-morbidities. The procedure reduced the operative risk (ASA score) in super-obese patients undergoing two-stage LBDP-DS.

Roa, P. E., O. Kaidar-Person, et al. (2006). "Laparoscopic sleeve gastrectomy as treatment for morbid obesity: technique and short-term outcome." Obesity surgery - the official journal of the American Society for Bariatric Surgery and of the Obesity Surgery Society of Australia and New Zealand **16**(10): 1323-6.

BACKGROUND: Laparoscopic Roux-en-Y gastric bypass (LRYGBP) and laparoscopic adjustable gastric banding (LAGB) are the most commonly performed surgical procedures for weight reduction in the United States. Currently, laparoscopic sleeve gastrectomy (LSG) is being explored. The aim of this study was to assess the safety and short-term efficacy of LSG as a treatment option for weight reduction. METHODS: Data of all patients who underwent LSG for treatment of morbid obesity between November 2004 and March 2006 and completed the 3- and 6-month follow-up visits at the time of the study, were retrospectively reviewed. Data collected included demographics, operative time, length of stay, postoperative complications, and degree of weight reduction. RESULTS: Of the 62 patients who underwent LSG performed by two surgeons, the data of 30 patients (7 males and 23 females) were further analyzed. Mean preoperative BMI was 41.4 (33-59) kg/m<sup>2</sup>. Mean operative time was 80 min (range 65-130). Mean hospital stay was 3.2 days (range 2 to 25). Mean weight loss at 3 and 6 months following the procedure was 22.7 kg and 30.5 kg respectively, and mean % excess weight loss (EWL) was 40.7 and 52.8, respectively. Three patients were considered to have mild complications, and one patient had a major complication that necessitated surgical intervention. There was no mortality. CONCLUSIONS: In the short-term, LSG is a safe and effective treatment option.

Mognol, P., D. Chosidow, et al. (2006). "Laparoscopic sleeve gastrectomy (LSG): review of a new bariatric procedure and initial results." Surgical technology international **15**: 47-52.

OBJECTIVE: To evaluate the outcomes and initial results of laparoscopic sleeve gastrectomy (LSG) and review of the literature. METHODS: A retrospective analysis of the initial ten patients who underwent LSG was performed. Study endpoints included operative time, complication rates, hospital length of stay, and percentage of excess body weight loss. RESULTS: This study included five women and five men, with a mean age of 43 (range: 31-52) years. Their mean preoperative weight was 182 kg (range: 125 kg-247 kg), with a mean preoperative body mass index (BMI) of 64 (range: 61- 80). Indication for LSG was the importance of BMI in all patients. One patient had previous restrictive bariatric surgery. Mean operative time was two (range: 1.5-2.5) hours. No patients required conversion. No postoperative complications nor mortality were noted. The median hospital stay was 7.2 days. Average excess body weight loss and BMI at one year were 51% and 23 kg/m<sup>2</sup>, respectively. CONCLUSIONS: LSG can be integrated safely into a bariatric treatment program with good results in terms of weight loss and quality of life. LSG can be a first-step procedure before gastric bypass or duodenal switch, or a one-step restrictive procedure if long-term results are good. LSG should be considered as a surgical option in the bariatric field, but further studies are needed to determine its exact use.

Cottam, D., F. G. Qureshi, et al. (2006). "Laparoscopic sleeve gastrectomy as an initial weight-loss procedure for high-risk patients with morbid obesity." Surgical endoscopy **20**(6): 859-63.

BACKGROUND: The surgical treatment of obesity in the high-risk, high-body-mass-index (BMI) (>60) patient remains a challenge. Major morbidity and mortality in these patients can approach 38% and 6%, respectively. In an effort to achieve more favorable outcomes, we have employed a two-stage approach to such high-risk patients. This study evaluates our initial outcomes with this technique. METHODS: In this study, patients underwent laparoscopic sleeve gastrectomy (LSG) as a first stage during the period January 2002-February 2004. After achieving significant weight loss and reduction in co-morbidities, these patients then proceeded with the second stage, laparoscopic Roux-en-Y gastric bypass (LRYGBP). RESULTS: During this time, 126 patients underwent LSG (53% female). The mean age was 49.5 +/- 0.9 years, and the mean BMI was 65.3 +/- 0.8 (range 45-91). Operative risk assessment determined that 42% were American Society of Anesthesiologists physical status score (ASA) III and 52% were ASA IV. The mean number of co-morbid conditions per patient was 9.3 +/- 0.3 with a median of 10 (range 3-17). There was one distant mortality and the incidence of major complications was 13%. Mean excess weight after LSG at 1 year was 46%. Thirty-six patients with a mean BMI of 49.1 +/- 1.3 (excess weight loss, EWL, 38%) had the second-stage LRYGBP. The mean number of co-morbidities in this group was 6.4 +/- 0.1 (reduced from 9). The ASA class of the majority of patients had been downstaged at the time of LRYGB. The mean time interval between the first and second stages was 12.6 +/- 0.8 months. The mean and median hospital stays were 3 +/- 1.7 and 2.5 (range 2-7) days, respectively. There were no deaths, and the incidence of major complications was 8%. CONCLUSION: The staging concept of LSG followed by LRYGBP is a safe and effective surgical approach for high-risk patients seeking bariatric surgery.

Moon, H. S., W. W. Kim, et al. (2005). "Results of laparoscopic sleeve gastrectomy (LSG) at 1 year in morbidly obese Korean patients." Obesity surgery - the official journal of the American Society for Bariatric Surgery and of the Obesity Surgery Society of Australia and New Zealand **15**(10): 1469-75.

BACKGROUND: In Asia, the type and main cause of obesity is different than in western society. Therefore, the treatment plan should be differentiated, and the surgery for morbid obesity should be carefully chosen. The early results of laparoscopic sleeve

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gastrectomy (LSG) without duodenal switch that has been performed in the Korean population is reported. METHODS: We retrospectively reviewed 130 patients who underwent LSG from January 2003 to May 2004. 60 of these patients now had >1 year of regular follow-up, and are the subject of this report. LSG was performed through 4 12-mm ports and 1 15-mm port, using the Endo-GIA stapler to create a lesser curve gastric tube over a 48-Fr bougie. RESULTS: For the 60 patients, the postoperative EWL was 71.6+/-21.9% at 6 months and 83.3+/-28.3% at 12 months. At 12 months after LSG, decrease in BMI was 9.2+/-3.7 kg/m<sup>2</sup>, and median weight loss was 24.6+/-10.0 kg. Dyslipidemia resolved in 75% of patients within 12 months. Diabetes resolved in 100% of patients within 6 months of operation. Hypertension resolved in 92.9% and improved in 100%. Joint pain resolved in 100% within 12 months. Weight loss plateaued at 12 months in the majority of patients. One patient has undergone a malabsorption procedure (duodenal switch) as a second-stage operation. CONCLUSION: Additional studies and follow-up are needed to determine the best surgical treatment for morbidly obese Asian patients. However, LSG without the second-stage duodenal switch operation has been an effective weight loss operation thus far, in most of the Korean patients.

Baltasar, A., C. Serra, et al. (2005). "Laparoscopic sleeve gastrectomy: a multi-purpose bariatric operation." Obesity surgery - the official journal of the American Society for Bariatric Surgery and of the Obesity Surgery Society of Australia and New Zealand **15**(8): 1124-8.

BACKGROUND: The use of the laparoscopic sleeve gastrectomy (LSG), a restrictive operation, in different settings, is presented. METHODS: 31 patients underwent LSG in the following groups: 1) 7 patients with very high BMI as a first stage of the duodenal switch (DS); 2) 7 morbidly obese patients with severe medical conditions; 3) 16 obese patients with lower BMI (35-43); and 4) 1 patient converted from a prior gastric banding. RESULTS: 1 patient with BMI 74 died, a 3.2% mortality. The percentage of excess BMI loss (%EBMIL) in group 1 above was 63.1% from 4-27 months. The %EBMIL of the cirrhotics in group 2 was 76.0% (69-100%). The %EBMIL in group 3 patients was 68.5% (58.3-123%) at 3-27 months. The %EBMIL of the group 4 patient is 13% because she had previously lost almost all of her EBMI. CONCLUSION: LSG may become the ideal operation for staging in patients with BMI >55, for treating morbidly obese patients with severe medical conditions, as an excellent alternative to adjustable bands in lower BMI patients, or for conversion of gastric banding patients.

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