



# EXPERT REPORT

## AESCULAP<sup>®</sup> Caiman<sup>®</sup>

EXPERIENCE REPORT ON GASTRIC SLEEVE SURGERY -  
A POPULAR PROCEDURE FOR TREATING MORBID OBESITY

Dr. med. Michael Kramer

## EXPERIENCE REPORT ON GASTRIC SLEEVE SURGERY— A POPULAR PROCEDURE FOR TREATING MORBID OBESITY

### 1. FOREWORD

The Viszera Surgical Center in Munich specializes in minimally invasive surgery of the abdominal cavity and the rectum.

We are the Arabellaklinik's primary surgical department, with nine operating theaters and around 90 beds. The clinic is uniquely located within a large hotel complex; some departments are on the 19th floor, looking out over the city of Munich. Viszera also has its own surgical endoscopy clinic.

Besides offering a full range of obesity-related procedures, its primary focal areas include reflux treatment, hernia surgery, and laparoscopic bowel surgery, especially interdisciplinary endometriosis procedures.

We are particularly active as surgical trainers and instructors, so that we can share our knowledge while supporting young, talented professionals in our fields and developing their enthusiasm for modern surgery.

### 2. INTRODUCTION

The way we live has changed more within the past hundred years than it did in all the previous millennia combined. Naturally, it stands to reason that we have not yet adapted genetically to the new challenges we face.

This is why, in modern times, we have seen what was previously a positive characteristic of our bodies—the ability to store up nutrients efficiently in case of hard times—turn into a negative one. The combined effects of excessive eating/nutrient storage and lack of movement have resulted in the disease known as obesity. Body mass index (BMI), which is reported in  $\text{kg}/\text{m}^2$ , was introduced as a way of expressing the severity of this disease. BMIs of  $30 \text{ kg}/\text{m}^2$  and above are described as

Class I obesity. Class III obesity, the highest, refers to a BMI of at least  $40 \text{ kg}/\text{m}^2$ ; around 1–2% of our population fits this classification. In patients with Class III obesity, operations for long-term treatment are by far the most effective form of therapy. Such procedures can effect sustainable losses of 40–70% of excess weight after five years, depending on the method used. Bariatric surgery is also in compliance with treatment guidelines for patients with  $\text{BMI} > 35 \text{ kg}/\text{m}^2$  who have serious comorbidities.

Today, around 470,000 surgical procedures are performed annually worldwide to treat obesity. Unfortunately, only around 9,000 of these procedures are performed annually in Germany (vs. 40,000 in France), despite a need for around ten times that many, as the health insurance companies do not approve these surgeries. This has nothing to do with long-term post-operative statistics, which are good. Rather, it is simply a matter of budget pressure within the modern health care system, which cannot prioritize long-term improvement of health over short-term balance sheet cost increases, and so of course saves money wherever it is presumed possible. In the future, we should place at least as much emphasis on improving our health and quality of life over the long term as we do on disease prevention. This represents a challenge for society as a whole.

### 3. OBESITY TREATMENT IN 2016

Obesity surgery was originally developed as an open operation, and remained so until the 1990s; oncological gastric bypass surgery, in particular, served as a template for this method. Today, around 350,000 patients in the United States have undergone Roux-en-Y gastric bypass surgery.

Over the past 25 years, however, the production of better and better instruments has been the key to developing progressively more patient-friendly procedures; now, obesity surgery can usually be performed laparoscopically. This dramatically reduces the risk of complications and reduces hospital stays, primarily because wound healing no longer poses a problem.

Having such surgeries performed by teams of surgeons, internists, nutritionists and general practitioners in specialized wards at obesity centers also lowers complication incidence rates, and the ongoing postoperative care they provide ensures better long-term results.

More and more, doctors nowadays are taking the life-long nature of the disease into consideration when choosing procedures. Just as orthopedic surgeons must anticipate future replacement of prosthetic joint, obesity surgeons must have the ability to revise operations later on.

This is why gastric band surgery scarcely plays a role any longer, as these bands generally need to be removed and replaced with a different method after around ten years. Laparoscopic Roux-en-Y gastric bypass (LRYGB) operations are a very popular choice, as are laparoscopic sleeve gastrectomies (LSG), which have only been in existence as an independent procedure since 2002.

The LSG's long-term adaptability is undoubtedly part of the reason why it has become the most popular bariatric procedure of our time. Additional positive factors include preservation of the natural digestive pathway and undisturbed absorption of medication. But endoscopic suture procedures show potential for allowing subsequent revision of LRYGBs as well, which becomes necessary in around 1/3 of cases due to stretching. LSG and LRYGB procedures are similar in terms of long-

term results (50-70% excess weight loss) and improvement of comorbid conditions. If necessary, the LSG may also be supplemented with a bypass component, either in front or behind the pylorus of the stomach, in order to bring about even more weight loss; however, this is usually associated with more side effects as well, such as nutritional deficiencies (dose-effect principle).

Any weight-reducing measures, including operative ones, can lose efficacy over time. Additional measures may become necessary. This must be taken into account when selecting a course of treatment.

#### 4. SLEEVE GASTRECTOMY TECHNIQUE

This operation was originally performed as the first step of a distal gastric bypass procedure (biliopancreatic diversion-duodenal switch), in which the restrictive component was reduced stomach size (and thus reduced food intake capacity). This first step of narrowing stomach diameter with the help of a gastric sleeve proved highly effective in itself, resulting in its recognition as an independent procedure.

The LSG constitutes a subtotal lengthwise resection wherein an indwelling calibration sleeve measuring between 34 and 40 Charriere is used to separate off the greater curvature of the stomach from the antrum to the angle of His. The remaining stomach has a diameter of around 1.1 to 1.4 cm in the fundus and corpus regions. The pylorus, which is important for food passage, remains intact; stomach volume is initially reduced to around 100-150 mL. Once the staple line has healed, the remainder of the stomach gains elasticity, increasing its intake volume somewhat (to 200 mL one year post-operation). To perform the laparoscopic procedure, four to five trocars are placed in the upper abdomen; the left hepatic lobe is lifted

## EXPERIENCE REPORT ON GASTRIC SLEEVE SURGERY— A POPULAR PROCEDURE FOR TREATING MORBID OBESITY

intraoperatively with a retractor in order to provide good visibility. Pre-operative weight loss can be beneficial in this regard by decreasing liver volume.

The gastricae brevis vessels are resected using bipolar cutting instruments or ultrasonic dissecting scissors. Both types of instruments offer highly reliable sealing. Additional placement of a clip can be useful with the large vessels to the spleen. The Aesculap® Caiman® has been our instrument of choice for this indication for about one year.

Crucial factors in preventing excessive stretching of the remaining stomach include using a uniformly shaped sleeve and maintaining a distance of 4-6 cm between the pylorus and the staple line. A larger distance will result in the antrum becoming too large after several years, which patients will then report (loss of restriction) and which can result in renewed weight gain. In such situations, of course, a new resection can be performed in order to bring about weight loss once more.

Today, the stomach is resected with the help of electronically controlled endomechanical staplers; using additional clip suture reinforcements provides additional protection against staple line insufficiencies.

Removal of the greater curvature of the stomach (and the fundus in particular) also removes cells that produce ghrelin, a neurotransmitter involved in triggering the feeling of hunger in the brain. Post-operatively, therefore, patients report feeling much less hungry, and satiety sets in quickly due to the small volume of their remaining stomachs.

Naturally, the post-operative condition following removal of the greater curvature of the stomach is irreversible.

One less powerfully effective, but reversible variant is to reduce stomach volume laparoscopically or endoscopically using sutures (Plicatur sleeve). No long-term results data on this procedure is available yet, but it could prove a viable reversible alternative, especially for patients with lower BMIs.

### 5. COMPLICATIONS / AFTER-CARE

The gastric sleeve is closed by two muscles: the cardia in the direction of the esophagus, and the pylorus towards the duodenum. As such, filling the stomach can create increased pressure inside it. This can result in staple line insufficiency, particularly in the first few days after the operation. If this occurs, the insufficiency must be drained to the outside immediately, and a sealing procedure must be performed on the stomach. Such procedures are performed endoscopically using either direct sutures, clips, or stents. Suturing over insufficiencies intra-abdominally does not work in most cases, as they frequently occur in the angle of His, with pronounced peritonitis in the surrounding area. Nowadays, staple line insufficiencies occur in around 1% of cases. Centers performing more than 50 such procedures per year can reduce this rate of incidence even further.

Increased intragastral pressure can result in an additional problem: about a third of all patients suffer from post-operative reflux, along with volume reflux (in patients with large axial hiatal hernias). This can dramatically impact patients' quality of life. If medication does not suffice to alleviate the condition, hiatoplasty is necessary to restore the anatomy and increase the sealing force of the cardia ("tighten the belt"). Reflux can also result from the fundus being too large, which results in excessive acid production, so the enlarged fundus should be resected as part of the

same operation. If all of these measures prove insufficient, two additional options are available: conversion to an LRYGB, or placement of a magnetic ring as an anti-reflux plasty (though long-term results have not yet been obtained for the latter method).

The gastric sleeve can be reduced again later on to counteract stretching (re-sleeve gastrectomy). If additional weight loss is necessary, or renewed weight gain occurs, a small intestine bypass may be performed behind the stomach (BPD-DS). However, the rules regarding substitution and aftercare are particularly stringent in such cases.

Of course, patients themselves and their eating habits play a very large role in determining the long-term outcomes of these procedures. Patient non-compliance can obviously lead to insufficient weight loss or a weight rebound effect over time. For this reason, aftercare by a specialized team of nutritionists, including regular training sessions and behavior checks, plays a very large role! Regular participation in self-help groups can support and motivate patients as well.

Because the LSG procedure does not alter the basic digestive pathway, the body is able to absorb sufficient quantities of vitamins and minerals, so long-term complications in this regard are rare. Even so, patients should have their vitamin B12 levels checked regularly, as smaller amounts of the "intrinsic factor" needed to absorb this vitamin are present following gastric reduction surgery. Vitamin D levels should be checked as well; any deficiencies should be addressed using targeted supplementation.

## 6. USE OF BIPOLAR VESSEL SEALING SYSTEMS

Cutting and sealing the gastricae breves vessels precisely is important to gastric sleeve procedures' success, as is proper dissection around the angle of His towards the spleen. The Aesculap® Caiman® is highly suitable for use in this regard, as its unique design allows both straight dissection and lateral grasping of tissue. Bipolar sealing also ensures that little thermal spreads to the adjacent tissue regions. Left- and right-handed surgeons can use the Caiman® equally well, and it provides financial advantages over ultrasonic dissection scissors while offering comparable safety and speed, as we concluded after our first 50 usages of the instrument in gastric sleeve operations.



Fig. 1 Image of the Caiman's jaw shape, which can be used in a variety of applications.

## EXPERIENCE REPORT ON GASTRIC SLEEVE SURGERY— A POPULAR PROCEDURE FOR TREATING MORBID OBESITY

### 7. CONCLUSION

Laparoscopic gastric sleeve operations are the most popular surgical method of treating obesity in our time, and rightly so; however, they pose great technical challenges to surgeons. In terms of accounting for obesity's nature as a lifelong disease, the procedure is practically ideal, as it allows subsequent adjustment. Technological progress will continue to simplify the operation and make it even safer.

### REFERENCES / SOURCE INFORMATION

- 1 Angrisani L, Santonicola A, Iovino P, Formisano G, Buchwald H, Scopinaro N. Bariatric surgery worldwide 2013 . *Obes Surg.* 2015 Oct;25(10):1822-32.
- 2 Sánchez-Pernaute A, Rubio MÁ, Cabrerizo L, Ramos-Levi A, Pérez-Aguirre E, Torres A. Single-anastomosis duodenoileal bypass with sleeve gastrectomy (SADI-S) for obese diabetic patients. *Surg Obes Relat Dis.* 2015 Sep-Oct;11(5):1092-8.
- 3 Colquitt JL, Pickett K, Loveman E, Frampton GK. Surgery for weight loss in adults. *Cochrane Database Syst Rev.* 2014 Aug 8.
- 4 Park JY, Kim YJ. Laparoscopic gastric bypass vs sleeve gastrectomy in obese Korean patients. *World J Gastroenterol.* 2015 Nov 28;21(44):12612-9.
- 5 Sheppard CE, Sadowski DC, de Gara CJ, Karmali S, Birch DW. Rates of reflux before and after laparoscopic sleeve gastrectomy for severe obesity. *Obes Surg.* 2015 May;25(5):763-8.
- 6 Wang MC, Guo XH, Zhang YW, Zhang YL, Zhang HH, Zhang YC. Laparoscopic Roux-en-Y gastric bypass versus sleeve gastrectomy for obese patients with Type 2 diabetes: a meta-analysis of randomized controlled trials. *Am Surg.* 2015 Feb;81(2):166-71.
- 7 Ribaric G, Buchwald JN, McGlennon TW. Diabetes and weight in comparative studies of bariatric surgery vs conventional medical therapy: a systematic review and meta-analysis. *Obes Surg.* 2014 Mar;24(3):437-55.
- 8 Buchwald H. The evolution of metabolic/bariatric surgery. *Obes Surg.* 2014 Aug;24(8):1126-35.
- 9 Runkel M, Müller S, Brydnyak R, Runkel N. Downgrading of type 2 diabetes mellitus (T2DM) after obesity surgery: duration and severity matter. *Obes Surg.* 2015 Mar;25(3):494-9.
- 10 Lee WJ, Pok EH, Almulaifi A, Tsou JJ, Ser KH, Lee YC. Medium-Term Results of Laparoscopic Sleeve Gastrectomy: a Matched Comparison with Gastric Bypass. *Obes Surg.* 2015 Aug;25(8):1431-8.



#### CONTACT / AUTHOR

**Dr. med. Michael Kramer**

Medical director

Viszera Bauchchirurgie, Munich

In the Arabella building

Arabellastr. 5

81925 Munich

Germany

# AESCULAP<sup>®</sup> – a B. Braun brand

Aesculap AG | Am Aesculap-Platz | 78532 Tuttlingen | Germany  
Phone +49 7461 95-0 | Fax +49 7461 95-2600 | [www.aesculap.com](http://www.aesculap.com)

The main product trademark "Aesculap" and the product trademark "Caiman" are registered trademarks of Aesculap AG.

Subject to technical changes. All rights reserved. This brochure may only be used for the exclusive purpose of obtaining information about our products. Reproduction in any form partial or otherwise is not permitted.