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Outcomes of laparoscopic sleeve gastrectomy at a bariatric unit in South Africa

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HIGHLIGHTS

- First study of laparoscopic sleeve gastrectomy performed in South Africa.
- Laparoscopic sleeve gastrectomy produces an adequate percentage excess BMI loss at 6 months.
- A significant improvement in the quality of life was observed.
- Results of this research are comparable to other studies of LSGs.
- Low complication rate supports the use of the procedure.

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ABSTRACT

Background: Laparoscopic sleeve gastrectomy (LSG) has gained popularity over the years as a standalone procedure. In 2014, it was the most rapidly growing bariatric procedure. The aim of this study was to describe the outcomes of LSG at a single bariatric unit in Johannesburg, South Africa, using the Bariatric Analysis and Reporting Outcome System (BAROS) standardised scoring.

Methods: A retrospective record review and analysis was carried out using data collected from patients who had LSGs. The information obtained included patient demographics, comorbidities, preoperative weight and height, operative technique, time and complications, postoperative gastrografin swallow results, hospital stay, and weight at 6 months postoperatively. The percentage of excess body mass index (BMI) loss (%EBMIL) was calculated at 6 months, and included in the BAROS questionnaire completed by the patients at the 6-month follow-up visit. Statistical significance was set at $p < 0.05$.

Results: A total of 103 patients were included in the study; of these, 85.4% were female and 14.6% were male. The mean preoperative BMI was 42.1 kg/m^2; additionally, 77.7% of the patients in the study had comorbidities prior to the procedure. The mean operative time was 104.3 min, with a mean hospital stay of 2.5 days. No mortalities occurred, and a complication rate of 7.7% was encountered. At the 6-month follow-up, the mean %EBMIL was 65%. When followed up at 6 months, all 103 patients demonstrated no failures according to the BAROS assessment. It was found that 96.1% had good, very good or excellent outcomes. In total, 9.7% of the patients had an excellent outcome.

Conclusions: LSG was shown to produce an adequate %EBMIL loss at 6 months, resulting in a significant improvement in the quality of life (QoL), coupled with good BAROS outcomes. The results of this research are comparable to other studies of LSGs, and the low complication rate supports the use of the procedure and accounts for no observed mortality.

1. Background

Obesity is a growing health problem that affects more than one-third of the US population [1]. In the past 30 years, the age-standardised prevalence of obesity has almost doubled worldwide [2]. Obesity is defined as a body mass index (BMI) ≥30 kg/m^2, and is further subdivided into three classes by the BMI value [3].

1.1. The South African context

The end of Apartheid in 1994 promised a better life for all South

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Africans, but also brought with it an abrupt increase in diseases of lifestyle [4]. South Africa belongs to the subset of regions with the highest obesity prevalence [2]. In a 10-year report, the South African Medical Research Council stated that 61% of South Africans are overweight, obese or morbidly obese [5]. Southern Sub-Saharan Africa exhibits the greatest difference in the male and female prevalence of obesity, with prevalences of 18.7% and 36.7% in males and females, respectively [6]. Weight gain is observed to be highest in middle age, and once obese, there is a significant increase in morbidity and mortality [7]. This is accounted for by the comorbid conditions triggered by obesity, including type 2 diabetes, hypertension and heart disease, and certain types of cancer [8].

1.2. Bariatric surgery

Currently, bariatric surgery is the most effective method to treat morbid obesity and achieve a reduction in patient weight, control or the remission of comorbid conditions, and ultimately a reduction of long-term mortality [9]. Furthermore, bariatric surgery shows greater cost-effectiveness compared to other nonsurgical treatments [9]. To date, six procedures have predominated bariatric surgery. In chronological order, these are jejunoileal bypass (JIB), Roux-en-Y gastric bypass (RYGB), vertical banded gastroplasty (VBG), biliopancreatic diversion (BPD), adjustable gastric banding (AGB) and sleeve gastrectomy (SG) [10].

1.3. Laparoscopic sleeve gastrectomy (LSG)

Sleeve gastrectomy is a partial gastrectomy where the majority of the greater curvature of the stomach is removed. The antrum is divided approximately 4 cm from the pylorus and a tubular stomach (sleeve) is fashioned around a bougie (32–40 French in size) [11]. It was initially performed in patients characterised by high surgical risk and represented the first stage of a more complex procedure, namely duodenal switch or gastric bypass [12]. In subsequent years, SG has gained popularity as a standalone procedure [12]. Standalone SG was first advocated by Regan et al., in 2005, and was popularised by Michel Gagner [13]. In 2014, SG was the most rapidly growing bariatric procedure in terms of the number of bariatric surgeries performed [10]. SG is easier to perform than RYGB and does not require any anastomosis. Further, there is a reduced risk of internal herniation and trace element or mineral deficiencies [14]. The mechanism of weight loss in SG is largely restrictive in nature, as the stomach is reduced in size. However, an interesting point is that the physiological consequences of SG also account for weight loss after the procedure. Levels of ghrelin are reduced; thus, the patient feels less hungry [15]. In a paper published in *Nature* in 2014, Ryan et al. elucidated further molecular mechanisms for weight loss [16]. SG results in significant increases in circulating bile acids, which bind to the farsenoid-X receptor (FXR), thereby regulating metabolism [16].

1.4. Bariatric surgery outcomes

Assessments of the results of bariatric surgery have incorporated many different factors. Outcomes of a bariatric procedure should include weight loss, improvement in comorbid conditions, and an assessment of the patient's quality of life (QoL) [17]. The use of a standardised scoring system allows for a better comparison of the results across different studies. The Bariatric Analysis and Reporting Outcome System (BAROS) was developed by Oria and Moorehead [17], and offers two distinct advantages; it is comprehensive and its ease of use allows it to be utilised in daily practice [18]. The aim of this study was to describe the outcomes of LSG at a single bariatric unit in Johannesburg, South Africa, using the Bariatric Analysis and Reporting Outcome System (BAROS) standardised scoring.

2. Methods

An intensive literature search revealed no articles describing the outcomes of SG in the South African context. With the recent advent of SG and its increased use worldwide, it would be helpful to analyse outcomes of the procedure in a South African setting.

2.1. Study area

This study is a single-institution study based at the Bariatric Unit at Life Bedford Gardens Hospital in Johannesburg, South Africa. This unit is multidisciplinary in nature, and provides a holistic bariatric surgery service. The Life Bedford Gardens Hospital is a private healthcare hospital and requires payment for services. Available bariatric procedures include the placement of an intra-gastric balloon, laparoscopic AGB, LSG or RYGB.

2.2. Study design

The study design is a retrospective record review, including all patients undergoing LSG over the previous 4 years in the unit, from January 2011 to October 2014.

2.3. Inclusion criteria

To be included in the study sample, each patient had to meet the following three inclusion criteria: they had undergone an LSG, they had had no previous bariatric surgery, and they presented for a follow-up visit at 6 months postoperatively.

2.4. Statistical analysis

The Statistical Package for the Social Sciences (SPSS) 22.0 (SPSS Inc., Chicago, IL) software programme for Macintosh was used for the data analysis. Descriptive results included frequencies, mean ± standard deviation, median and range, while the statistical evaluations were performed using the non-parametric Mann–Whitney *U* test, and Pearson's correlation. The significance level was set at $p < 0.05$.

2.5. Perioperative management

The multidisciplinary team, including the bariatric surgeon, physician, psychologist, dietician and kinesiotherapist, reviewed prospective bariatric surgery patients. Preoperative investigations included blood tests, electrocardiograms, chest radiographs, abdominal ultrasound and upper gastrointestinal tract (GIT) endoscopy.

All cases utilised a laparoscopic approach. Low-molecular-weight heparin in combination with an intermittent pneumatic compression device and early mobilisation were used as perioperative thromboprophylaxis. A single dose of antibiotic was administered 30 min prior to the induction of anaesthesia. For the procedure, the patient was placed on the operating table supine, with legs abducted and the surgeon positioned between the patient's legs. The primary operating port was a 12 mm trocar placed to the right of the midline, halfway between the umbilicus and xiphoid process. Four 12 mm trocars were then placed under laparoscopic vision. A 35F bougie was used to calibrate the sleeve size for all LSG surgeries performed at the Life Bedford Gardens Hospital.

The patients were initiated on clear fluids by the first