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Research Article

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Drains in Bariatric Surgery: A Surgical Dilemma

(*Running Title: Routine Drain Placement in Sleeve Gastrectomy***)**

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Abstract

Aim: *Routine drain placement is still widely used in sleeve gastrectomy (SG) and is indispensable for many surgeons. It is a matter of debate whether the use of drains is beneficial in terms of early diagnosis and treatment of bleeding and leakage complications.*

This study aims to investigate the necessity of routine drain's placement in sleeve gastrectomy.

Materials and methods: *One hundred seventy-two patients were divided into two groups. Group 1 with-drain consists of 33 patients and Group 2 no-drain with 139 patients. The demographic characteristics and the intra-operative and post-operative findings of the patients were examined. Post-operative pain scores were calculated with the VAS scoring system, and complication rates and infection parameters were compared.*

Results*: There were no differences between the two groups in terms of demographic data, intra-operative and postoperative findings except the pain evaluated by visual analog scale (VAS) scores.*

Pain was less in group 2. A statistically significant difference was found between group 1 and group 2 in terms of pain (p=0,013). There was no significant difference in infection parameters, leakage, and bleeding (p<0,01).

Conclusion: *Routine drain placement in sleeve gastrectomy looses its importance and increases postoperative patient's pain. Further prospective randomized controlled studies are needed to clarify requirement of routine drain use in sleeve gastrectomy*

Keywords: sleeve gastrectomy, drains placement, VAS score, bariatric surgery, obesity**.**

Introduction

According to the World Health Organization (WHO), obesity is one of the most significant health issues affecting the adult population worldwide [1]. The prevalence of obesityrelated diseases continues to rise steadily, impacting not only adults but also children. Currently, over 35% of the global adult population is classified as obese, while 13% of children are affected [2].

Sleeve gastrectomy (SG) is the most frequently performed bariatric surgical procedure globally, followed by gastric bypass, revisional bariatric surgeries, and gastric balloon applications [3]. However, SG is not without complications, with the most common being bleeding and leakage from the stapler line [4].

Early detection and intervention are crucial in managing bariatric surgery complications. The earliest clinical signs of leakage include fever, tachycardia, and pain radiating to the left shoulder. However, complications such as leakage or bleeding may not always be evident from the content or amount of fluid in the surgical drain. Even when a drain indicates a potential complication, most clinicians rely on additional imaging techniques to confirm the diagnosis. Modern imaging methods have significantly improved the speed and accuracy of complication detection. Treatment options include percutaneous drainage catheters, which can be inserted into abscess locations by interventional radiologists, and endoscopic stents for addressing leaks.

The use of routine drains in SG remains controversial. Some surgeons believe that drains increase the risk of intra-abdominal infections, wound infections, postoperative pain, reduced respiratory capacity, and prolonged hospital stays [5, 6]. Conversely, others argue that drains provide potential benefits, such as the early detection of high-flow postoperative bleeding or large leaks. However, their efficacy in identifying small leaks, coagulated hemorrhages, or micro-perforations remains uncertain.

Materials and Methods

This study was conducted in accordance with the principles of the Declaration of Helsinki and was approved by the Human Ethics Committee of Istinye University, School of Medicine. Written informed consent was obtained from all participants after they were provided with detailed information about the study.

A total of 172 patients (123 females and 49 males) were included in the study and divided into two groups:
• **Group 1** (With-Drain): 33 patients • **Group 2** (No-Drain): 139 patients

The demographic characteristics, intraoperative and postoperative findings, postoperative pain scores, complication rates, and infection parameters were examined for all patients. Pain scores were assessed using the Visual Analog Scale (VAS),

with scores ranging from 0 (no pain) to 10 (worst pain). VAS scores were evaluated in the mornings without administering analgesics.

Inclusion Criteria:

- Body mass index (BMI) > 40 kg/m²
- BMI > 35 kg/m² with obesity-related comorbidities

Exclusion Criteria:

1. Patients with cirrhosis
2. Patients younger than 18 years old
3. Patients who had undergone prior bariatric surgeries (revision surgeries)

The study analyzed the following data:

- Demographic characteristics
- Medical and surgical histories
- Preoperative and postoperative hemoglobin values
- Additional intervention requirements
- Surgery duration
- Blood loss and transfusion requirements
- VAS scores during the first three postoperative days
- Postoperative hospital stay

The type and amount of fluid from the drains were recorded daily for three days. The surgical method, postoperative treatment protocol, and drain type were standardized for all participants.

Statistical Analysis

Descriptive statistics were used to summarize the demographic and clinical characteristics of the study population. The Student's *t*-test was used to analyze statistical differences between the two groups. A *p*-value of <0.05 was considered statistically significant. All statistical analyses were performed using IBM SPSS Statistics version 23.

Surgical Technique

All sleeve gastrectomy procedures were performed by the same surgical team under the supervision of a consultant surgeon (AS), using a standardized five-trocar technique.

The procedure was conducted with the patient in a reverse Trendelenburg position at a 30° angle. The surgeon stood between the patient's legs. Trocar placement was as follows:

1. A 10-mm optical trocar was placed in the upper abdomen, 1–2 cm above the umbilicus.
2. A 5-mm trocar was inserted in the subxiphoid area for the Nathanson liver retractor.
3. A 15-mm trocar was placed in the right upper quadrant.
4. A 12-mm trocar was inserted in the left upper quadrant.
5. A 5-mm trocar was introduced in the left subcostal anterior axillary line.

After decompression of the stomach using a nasogastric tube, greater curvature dissection was performed from 2–4 cm proximal to the pylorus to the angle of His. The stapler line was continuously sutured with 3-0 polydioxanone (PDS).

Postoperatively, local anesthetic was applied to the trocar sites for pain management. If no signs of bleeding were observed at the eighth postoperative hour, low-molecular-weight heparin was administered for thromboprophylaxis. A liquid diet was initiated 48 hours after surgery, and drains were removed. Patients were discharged on the third postoperative day.

Results

Laparoscopic sleeve gastrectomy was carried out for 172 patients during the study period.

Patients gender were 123 female and 49 males. Mean age was 36.9 years old. (üst alt sınır), The highest BMI was 69 kg/m^2 and the lowest BMI was 35 kg/m^2, mean BMI was 42 kg/m^2. patient with a drain 33 (20%), without drain 139 (80%), mean vas score with drain. Çok analamsız Cümleler kurmuşsunuz. Arkadaşlar Lütfen biraz ciddi Yazalım yazıları. BU kısmı düzgün bir şekilde baştan yazalımmm lütfennn. The pain was less common in the drainless group and a statistically significant difference was found. The Critical T-test was used to compare the infection parameters and the white blod cell p value is (p= 0.60-0.67), crp p value is (p= 0.51-0.59) No statistically significant difference was found. Postoperative bleeding was observed in one patient in both groups. These patients were followed up with erythrocyte replacement and medical treatment without the need for a second surgical intervention. No other complications were observed.

	Group 1 (n=33)	**Group 2 (n= 139)**	**P Value**
Age	Median: 40.4	Median: 35.8	0.94
Male / Female ratio	10/23=0.43	39/100=0.39	
BMI	42.7	41.5	1.29

Table 1: Demographics of included patients.

Patients	**Vas(mean)**	**Complications**	**White blod cell (wbc)**	**C reaktif protein (Crp)**	**Infection parameters**
Group 1 (33)	7.6 (p=0.013)		p> 0.05	P=0.60	P=0.51
Group 2 (139)	7.3 (p= 0.013)		p>0.05	P=0.67	P=0.59

Table 2: Complications and vas parameters

Discussion

Obesity and its related diseases have become major medical, social, and economic challenges worldwide. Various surgical techniques have been developed to manage obesity; however, only two procedures, **sleeve gastrectomy (SG)** and **Roux-en-Y gastric bypass (RYGB)**, have gained significant popularity. Among these, SG is the most commonly performed bariatric procedure globally due to its advantages, such as the absence of intestinal anastomosis and its technical simplicity.

The prevalence of major complications following SG, such as bleeding, abscess formation, and staple line leakage, has been reported to range from 5% to 11% in the literature. Drain placement has traditionally been employed during SG to detect and manage intraabdominal complications early. However, the effectiveness of routine drain placement remains controversial.

Controversies Surrounding Routine Drain Placement

Retrospective studies suggest that routine drain placement does not significantly reduce the risk of postoperative complications such as abscesses, bleeding, or leaks. On the contrary, it may contribute to increased infection rates, postoperative pain, and patient discomfort. For example, studies by Albanopoulos et al. and Clapp et al. demonstrated no clear advantage of drains in preventing complications, while highlighting their potential drawbacks, including increased surgical site infections (SSIs).

Moreover, the **American Society for Metabolic and Bariatric Surgery (ASMBS)** issued a position statement in 2015, which does not support routine drain placement during SG or RYGB. The statement emphasizes the importance of imaging, surgical exploration, and non-operative management in the detection and treatment of gastrointestinal leaks rather than reliance on drains.

A study by Gray et al. analyzed over 148,000 patients undergoing SG or RYGB and found that 15.6% had drains placed. Patients with comorbidities such as diabetes or COPD were more likely to receive drains. However, drain placement was associated with higher rates of SSIs and a greater likelihood of reoperation or intervention.

Impact on Postoperative Pain and Patient Comfort

Postoperative pain is one of the most critical factors affecting patient comfort. Evidence from both bariatric and general surgery, such as laparoscopic cholecystectomy, suggests that drain placement increases postoperative pain. A study by Bostanci et al. highlighted the negative impact of drains on patient comfort, a finding consistent across other surgical fields.

In a meta-analysis on gastric cancer surgeries, drain placement was shown to prolong operative time by approximately 9 minutes and extend hospital stays by 0.69 days. Similarly, in cases of perforated appendicitis, drain use was associated with an increase in surgical site infections and longer hospital stays.

Our study corroborates these findings. Patients in the no-drain group reported significantly lower pain scores, as assessed by the Visual Analog Scale (VAS). This aligns with the results of Gundogan et al., who found that pain scores were lower in patients who did not have drains following SG.

Clinical Implications

The findings from our study and the broader literature suggest that routine drain placement during SG may not provide significant clinical benefits in terms of complication prevention. Instead, it may increase postoperative pain and patient discomfort, without reducing rates of bleeding, abscess formation, or leaks. Given these outcomes, routine drain placement in SG should be reconsidered, and its use should be tailored to specific patient needs and risk factors.

Conclusion

While drains have been traditionally employed to manage complications following SG, there is no strong evidence to support their routine use. Advances in imaging and noninvasive management techniques have made early detection and treatment of complications more efficient, reducing the reliance on drains. Our findings contribute to the growing body of evidence advocating for selective, rather than routine, drain placement during SG.

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