ECRONICON OPEN ACCESS

EC GASTROENTEROLOGY AND DIGESTIVE SYSTEM

Research Article

Optical Trocar Insertion Technique for Bariatric Surgery on Asian Population Patients

Yoonhong Kim*

Department of Surgery, Kosin University Gospel Hospital, Busan, Korea

***Corresponding Author:** Yoonhong Kim, Division of Gastrointestinal Surgery, Department of Surgery, Kosin University Gospel Hospital, Busan, Korea.

Received: November 15, 2023; **Published:** December 15, 2023

Abstract

Background: The global prevalence of obesity is rising, particularly in Western countries and the United States, positioning bariatric surgery as a key treatment modality. In Asia, the increasing recognition of obesity-related issues has led to a higher frequency of bariatric surgeries, especially given the region's higher prevalence of metabolic diseases.

Methods: This retrospective study analyzed 172 patients who underwent bariatric surgery between January 2017 and January 2022 at our institution. The primary focus was on the safety and efficacy of optical trocar insertion, a technique used in all cases by a single surgeon. Data were gathered from medical records, laboratory results, CT scans, and operation videos. The surgical technique involved marking the port site below the xyphoid process and lateral to the midline, followed by the use of a Medtronic® optical trocar visualized through an Olympus® laparoscopy system.

Results: The study population had an average age of 38.27 years (range 19 - 65), with a male-to-female ratio of approximately 38:62. The mean BMI was 40.27, with the lowest being 22.5. The majority underwent Sleeve Gastrectomy (73%), followed by Roux-en-Y Gastric Bypass (26%). No intraoperative bleeding was observed. Postoperative complications included bleeding in 7 patients, necessitating reoperation in 2 cases, but no complications were related to the trocar site.

Conclusion: Optical trocar insertion in laparoscopic bariatric surgery is a safe and effective technique, even in patients with lower BMIs. This study underscores the need for further research to establish its efficacy as a standard practice in laparoscopic surgeries.

Keywords: *Bariatric Surgery; Optical Trocar Insertion; Laparoscopic Surgery*

Introduction

Laparoscopic surgery is the predominant method for intraabdominal operations currently. This approach is gaining global prominence based on its outcomes which are not inferior to open abdominal surgery [1]. It is favored for its smaller incision scars, reduced pain, and shorter recovery periods [2]. Particularly in surgeries involving obese patients, laparoscopic surgery is preferred due to the relative narrowness of intraabdominal space and a higher risk of complications associated with thick abdominal wall fat [3]. Bariatric and metabolic surgeries, which are on the rise globally, are predominantly performed laparoscopically.

The initial step in beginning laparoscopic surgery involves the creation of pneumoperitoneum and trocar insertion to secure a clear view [4]. Various techniques are employed by surgeons for port location and insertion methods, with a preference for entry through the

umbilical area in most abdominal surgeries. However, in cases with large or thick abdomens, this approach tends to be less favored due to a higher frequency of complications, leading to alternative entry sites and methods being preferred in obesity surgeries [5].

Purpose of the Study

The purpose of this study is to describe the methods and safety of optic trocar insertion in bariatric surgery patients, drawing from a series of cases where this technique was employed.

Materials and Methods

A retrospective analysis was conducted using patient files recorded between January 2017 and January 2022 at our institution, involving individuals who underwent bariatric surgery. A total of 172 patients were included in the study. All procedures were performed by a single surgeon who utilized the same technique for the insertion of the first trocar to initiate laparoscopic operations. The data was collected through medical chart reviews, laboratory test results, CT scan images, and recorded operation video files.

Surgical technique

Under general anaesthesia, the port location site was marked approximately 15 - 20 cm below the xyphoid process, and 3 - 5 cm left laterally from the midline. A skin incision of about 1.5 - 2 cm was made, followed by subcutaneous dissection using a monopolar coagulator. We employed an optical trocar with a fascial closure system from Medtronic®, visualized by the Olympus® laparoscopy system. After making the skin incision, the camera was attached to the trocar, and CO_2 gas was insufflated while entering the abdominal wall. We visually confirmed the penetration through the anterior rectus muscle, muscle layer, and posterior fascia, proceeding to the preperitoneal fat layer. Subsequently, we ensured proper entry of CO_2 gas into the abdominal cavity. After temporarily removing the obturator, the camera was inserted to confirm the opening of the peritoneum. The obturator was then reattached, and the trocar was positioned at an appropriate location inside the abdominal cavity. Generally, this procedure was performed with the trocar perpendicular to the abdominal wall.

Results

Among the 172 patients studied, the average age was 38.27 years (ranging from 19 to 65). Of these, 65 were male (37.8%), and 112 were female (62.2%). The average weight was 112.57 kg, with a mean BMI of 40.27, and the lowest recorded BMI was 22.5. Regarding the types of surgeries performed, there were 124 cases (approximately 73%) of Sleeve Gastrectomy and 44 cases (about 26%) of Roux-en-Y Gastric Bypass, along with one case of reversal of RYGB and one gastric band removal. Among the entire patient group, 62 individuals (36%) had a history of previous abdominal surgery.

During the surgeries, there was no visible bleeding observed. However, 7 patients underwent further evaluation for postoperative bleeding symptoms (low blood pressure, increased heart rate), and 2 of these required reoperation. In these 7 cases, evaluations through CT or re-operation identified the source of bleeding at the surgical stapler line, with no bleeding incidents at the trocar site. Following surgery or supportive care (including blood transfusions), all patients were discharged without any significant complications (Table 1).

Patient Characteristics	Value
Number of patients	172
Mean age	38.27 (19 - 65)
Sex Male Female	 65 (37.8%) 112 (62.2%)
Mean weight	112.57 kg (63.2 - 182.9)

Mean BMI	40.27 kg/m^2 (22.5 - 69.0)
Operation type Sleeve gastrectomy Roux-en-Y gastric bypass Reversal of Roux-en-Y gastric bypass Gastric band removal	 125 (72.6%) 44 (25.6%) 1 (0.6%) 1 (0.6%)
Previous abdominal operation history	62 (36.0%)
Post-operative bleeding symptom	7 (4.1%)
Re-operation	2 (1.2%)

Table 1: *Result of surgical outcomes.*

Discussion

Obesity prevalence is increasing, particularly in the West and the United States, and bariatric surgery plays a significant role in its treatment. Bariatric surgery has been shown to significantly reduce the complications and mortality associated with obesity, and has a positive impact on quality of life [6].

In Asia, where issues related to obesity are increasingly recognized, the frequency of bariatric surgeries is growing as these procedures gain national attention [7]. Particularly due to the high prevalence of metabolic diseases like diabetes in Asian populations [8] the value of metabolic surgery is receiving greater attention. Asian guidelines for obesity metabolic surgery typically set a lower BMI threshold compared to Western guidelines. Additionally, recent guidelines from the American Diabetes Association (ADA) have lowered the BMI threshold for surgery indications in the context of metabolic surgery [9].

The insertion of the first trocar in laparoscopic surgery is a crucial technique for creating a pneumoperitoneum and securing a clear view inside the abdominal cavity. Various methods, including open and closed techniques and the Veress needle, have been developed [10]. However, in obese patients, umbilical insertion can lead to higher rates of complications such as surgical site infection and incisional hernia, necessitating alternative techniques [11]. The development of optical trocars, which allow for visual confirmation during insertion, has enabled safer surgical techniques, as demonstrated by the results of this study, enabling complication-free initiation of laparoscopic surgery [12]. However, as with other Western studies, care must be taken due to the possibility of omental and mesenteric injuries (Table 2) [13].

Authors	Trocar entry method	Type of Trocar used	Complications	Site of entry
Rabl., *et al*.	Direct with optical view	Endopath 12 mm	3/196 (1.5%)	Left side of umbilicus
Habibi., *et al*.	Direct	12 mm shielded	11/327 (2.9%)	Transverse skin incision below the xyphoid process and left to midline
Altun., *et al*.	Direct	Versaport plus 12 mm	7/376 (4.4%)	Supraumbilical incision

Table 2: *Published trocar induced complications in surgery for obese patients.*

Most previous studies have focused on Western patients with relatively higher BMIs. In contrast, this study involved Asian patients with generally lower BMI criteria for bariatric surgery, safely implementing the technique even in cases with a BMI in the low 20s.

Conclusion

While a gold standard for first trocar insertion has not yet been established, this study confirms that optical trocar insertion can be safely performed even in patients with relatively lower BMIs. Further research is needed to validate the effectiveness of optical trocar insertion in general laparoscopic surgery.

Conflict of Interest

The author has no conflict of interest.

Bibliography

1. St John A., *et al*. "The rise of minimally invasive surgery: 16 year analysis of the progressive replacement of open surgery with laparoscopy". *Journal of the Society of Laparoendoscopic Surgeons* 24.4 (2020): e2020.00076.
2. Agha R and Muir G. "Does laparoscopic surgery spell the end of the open surgeon?" *Journal of the Royal Society of Medicine* 96.11 (2003): 544-546.
3. Schirmer B and Watts SH. "Laparoscopic bariatric surgery". *Surgical Endoscopy* 17.12 (2003): 1875-1878.
4. Sakamoto A., *et al*. "Initial closed trocar entry for laparoscopic surgery: Technique, umbilical cosmesis, and patient satisfaction". *Gynecology and Minimally Invasive Therapy* 6.4 (2017): 167-172.
5. Clapp B. "Optimal initial trocar placement for morbidly obese patients". *Journal of the Society of Laparoendoscopic Surgeons* 22.4 (2018): e2017.00101.
6. Buchwald H and Oien DM. "Metabolic/bariatric surgery Worldwide 2008". *Obesity Surgery* 19.12 (2009): 1605-1611.
7. Fan JG., *et al*. "New trends on obesity and NAFLD in Asia". *Journal of Hepatology* 67.4 (2017): 862-873.
8. Boffetta P., *et al*. "Body mass index and diabetes in Asia: a cross-sectional pooled analysis of 900,000 individuals in the Asia cohort consortium". *PLoS One* 6.6 (2011): e19930.
9. American Diabetes Association Professional Practice Committee. "2. Classification and diagnosis of diabetes: standards of medical care in diabetes-2022". *Diabetes Care* 45.1 (2022): S17-S38.
10. Rosenthal RJ., *et al*. "Direct visual insertion of primary trocar and avoidance of fascial closure with laparoscopic Roux-en-Y gastric bypass". *Surgical Endoscopy* 21.1 (2007): 124-128.
11. Berch BR., *et al*. "Experience with the optical access trocar for safe and rapid entry in the performance of laparoscopic gastric bypass". *Surgical Endoscopy* 20.8 (2006): 1238-1241.
12. Miti C., *et al*. "Primary entry trocar design and entry-related complications at laparoscopy in obese patients: meta-analysis". *BJS Open* 7.3 (2023): zrad047.
13. Daldal E., *et al*. "Feasible first trocar insertion technique in bariatric surgery: A novel technique". *Turkish Journal of Vascular Surgery* 9.4 (2020): 988-992.

Volume 11 Issue 1 January 2024