

Original Article

## Modified Open Technique for First Port Insertion in Laparoscopic Surgery

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### Abstract

Laparoscopy has become the method of excellence for abdominal surgeries in modern age. The significance of a secure and dependable approach for the initial trocar insertion cannot be overstated in this surgical procedure. This preferred method involves employing a modified open technique to access the peritoneal cavity. This study was conducted to evaluate the laparoscopic surgery of modified open technique. This cross sectional follow-up study was conducted in the Department of General Surgery Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka from January 2019 to December 2022. The umbilicus was everted to make it tubular, an infra-umbilical incision was given to cut the linea alba for making an opening and advanced bluntly to introduce the first port. A total of 197 patients were studied after completion of surgery. Cholecystectomy was the most common surgical indication. The mean entry time was  $3.1 \pm 0.6$  minutes. Regarding the postoperative complication port site infection was 2.03% and port site hernia was 1%. There was no incidence of pre-peritoneal placement of port, port site seroma, haematoma. No mortality was found during the hospital stay of patients. Modified open technique is a quick and safe procedure for insertion of the first port in laparoscopic surgery.

**Keywords:** Open technique, laparoscopy, complications.

### INTRODUCTION

In contemporary surgery, laparoscopy is the established method for abdominal procedures. A crucial initial step in laparoscopic surgery is the secure placement of the first port. This approach offers various advantages, including a

faster recovery, shorter hospital stays, and a lower risk of postoperative adhesions compared to open procedures it's noteworthy that the initial port entry poses a higher risk of morbidity compared to laparotomy.<sup>1</sup> Studies suggest that during introduction of initial port approximately 50% of complications occur in laparoscopic surgery.<sup>2</sup>

In minimal invasive surgery the main target of the surgeon is to stay away from unintended damage throughout the time of introduction of the first port, research indicates that laparoscopy-induced intestinal injuries occur at a rate of 3.6%. Over the past two decades, substantial advancements in laparoscopic surgery, such as enhanced optics, electronics, and auxiliary instruments, have contributed significantly to the prevention of complications.<sup>3</sup>

Enhanced surgical skills, specialized training centers, workshops, and online instructional videos play a crucial role in acquiring valuable insights to prevent complications.<sup>4</sup>

Various methods exist for inserting the first port into the abdomen, all of which adhere to two main principles: closed and open techniques. In the closed method, pneumoperitoneum is established by insufflation of CO<sub>2</sub> gas after the veress needle is inserted into the peritoneal space, after that first port is introduced. This closed access technique may have higher chance of inadvertent trauma to major abdominal vessels, bowel and bladder. To address these concerns, the open access technique was introduced by Hasson. In this method, fascia is laid open sufficiently to enter the peritoneal cavity under straight sight where especially devised canula, edgeless obturator and valve with bailer is applied.<sup>4</sup> Regarding the superiority of the open technique over the closed entry method, conflicting evidence exists in various studies, with no consensus opinion.<sup>5</sup> To address this uncertainty, we conducted a study to assess the effectiveness of the altered open access procedure for the introduction of primary port in minimal access surgery.

### MATERIALS AND METHODS

This study was conducted in the Department of General Surgery, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh during the period of January 2020 to December 2022. Patients who underwent laparoscopic

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surgery by altered open access procedure during the period were included in this study.

Data were considering age, sex, indications for laparoscopic surgery and entry time of the first port, postoperative and intraoperative complications.

### OPERATIVE TECHNIQUE

All patients received general anesthesia. To highlight the umbilical tube, upward traction was applied to the umbilicus using a Mayo towel clip on its lateral margins. A small transverse skin incision, approximately the size of the cannula, was made just below the umbilicus. For precise incision diameter estimation, the trocar sleeve was applied to mark the incision site. The trocar sleeve diameter was used to determine the incision size, minimizing the risk of gas leakage. The umbilical tube was prominently visualized in the wound in a longitudinal plane. A scalpel (no. 11) was used to make a nick in the linea alba and extended to the everted umbilical tube, the incision enlarged by medium-sized artery forceps to pierce the peritoneum. The port was then introduced through the raised hole generated by umbilical tube, the trocar being served as a guide. The sleeve was pushed in, and the trocar was withdrawn. Insufflation began after connecting the insufflation tube to the connector valve of the entered cannula. A laparoscope (0/30) was introduced to examine the entire abdominal cavity. The duration of time between the incision given and introduction of the telescope into the peritoneal cavity was regarded as the “time of entry”. Closure of the defect was performed using polyglactin 910 OS-6 no. O. A long-acting local anesthetic (0.25% Bupivacaine) was infiltrated around the port site. After the procedure, the abdominal cavity was deflated of gas. The towel clip was reapplied to the umbilicus to recreate the umbilical tube, displacing the fascial access.

### RESULTS

A total of 197 patients were included in the study. Individuals with a history of previous abdominal surgeries were excluded from the study.

Table I shows the distribution of patients characteristic and entry time; average age of the study group was 36.52±12.97 and female male ratio was 1.1:1. Surgical indications included appendicitis was 25 (12.7%), cholelithiasis 153 (77.7%), and diagnostic laparoscopy 19 (9.6%). The mean entry time for the procedure was 3.1±0.06 minutes.

**Table-I: Patient characteristics and entry time.**

Patient characteristics	Frequency	Percentage (%)
Age	36.52±12.97	
Sex		
Male	94	47.7
Female	103	52.3
Indications		
Appendicitis	25	12.7
Cholelithiasis	153	77.7
Diagnostic laparoscopy	19	9.6
Entry time	3.1±0.6	

Table II states the distribution of laparoscopic entry-related complications, here patients with port site infection was 4 (2.03%) and 2 (1.0%) was postoperative port-site hernia. There was no occurrence of pre-peritoneal port placement, port site haematoma or intra-abdominal trauma. No postoperative mortalities were recorded in the study.

**Table-II: Laparoscopic entry-related complications.**

Complications	Frequency	Percentage (%)
Extraperitoneal port placement	0	00
Intraperitoneal injury	0	00
Failure to enter the abdomen	0	00
Port site seroma	0	0
Port site infection	4	2.03%
Port site hematoma	0	00
Port site hernia	2	1.0
Mortality	0	00

### DISCUSSION

More than three decades in the past, various guidelines and strategies have been applied to alleviate the danger related to the introduction of initial port in minimal invasive surgery. There is no procedure or device that can be accepted invariably. Hasson’s method and the application of Veress needle are regarded as open and closed techniques respectively that are popularly taken on process in current practice Small laparotomy is employed for entry to the peritoneal space and gas leakage prevented from the pneumoperitoneum applying specially devised canula

along with cone in Hasson's open method.<sup>6</sup> This method is particularly favored for creating a pneumoperitoneum in cases where adhesions are anticipated. In contrast, the Veress needle is inserted through a small skin incision to create a pneumoperitoneum. However, the use of the Veress needle is considered a blind technique, carrying a higher risk of injury. Even the optical trocars, a relatively newer device, are not exempt from the hazards of initial port placement.<sup>7,8</sup>

In practice, every process has difficulties of different grading. Meta-analysis shows that open technique prone to have fewer chances of extensive problem. The challenge of excessive price and limited availability of laparoscopic equipment apart from security measures are evident in least developed states. Therefore, there is a need for a dependable and easily executable technique, using readily available tools, to enhance the effective utilization of laparoscopic surgery.<sup>11</sup>

This study demonstrated the feasibility of a secure open method for the insertion of the first port using readily available equipment. The technique does not necessitate an extensive array of accessory instruments; in fact, a towel clip, middle-sized artery forceps and rational sized trocar were used. Slight less introduction of the needle causes frequent abdominal injuries in traditional veress technique.

Introduction of trocar directly, use of radially expanding trocar, optical trocars and shielded trocars are some alternatives to open and closed methods. Hasson started an open procedure to deduce the risk related to the closed veress technique. The advantage of this approach lies in accessing the peritoneal cavity under direct vision, although it tends to be more time-consuming compared to the closed method.<sup>4,6,9</sup>

Other studies have acknowledged the safety of accessing the abdomen through the umbilical stalk or tube in laparoscopy.<sup>9-12</sup> Moberg et al. outlined a technique where umbilicus was elevated by a towel clip, blunt reusable trocar introduced and S-shaped retractor used specifically in obese patients.<sup>11</sup> For the similar purpose Lal et al.<sup>10</sup> utilized two Allis's forceps, an artery forceps and a small Langenback retractor.

In modified open technique, here positioned an infraumbilical incision to target the point of least resistance for the initial entry port penetration. Sadhu et al. also utilized an infra-umbilical technique in their research.<sup>12</sup>

We opted for a simplified approach to the first port entry to minimize the risk of failure to enter the peritoneum and the challenges associated with extensive dissection. The average time for the first port entry in our study was  $3.12 \pm 0.06$  minutes, which is shorter than the 4.8 minutes reported by Ismaila et al. In our study, the total complications were 4 (2.1%), a rate comparable to the original Hasson's technique (0.5%).<sup>3</sup> Notably, there were no instances of injury to internal organs, extraperitoneal hematoma, port site hematoma, port site hernia, or failure to access the abdominal cavity. The study group did not experience any mortality.

## CONCLUSIONS

Safe quick and dependable port entry in laparoscopy is possible in modified open technique. As entry time is less and it was superior to the other technique in terms of complication this method can be used in all cases of laparoscopic surgery.

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