

Safe and Aesthetic Laparoscopic Access Achieved with 5-mm Open Entry

Carolyn Robb^{1*}, Lauren Tetelbaun¹, Patricia Xu¹, Chloe Schreiber¹, Alexis Greene^{1,2} MD AND Martin Keltz^{1,2} MD

¹New York Medical College School of Medicine, Valhalla, New York, United States

²WestMed Reproductive Services, Purchase, New York, United States

*Corresponding author:

Carolyn Robb,
New York Medical College School of Medicine,
Valhalla, New York, United States

Received: 23 Oct 2025

Accepted: 18 Nov 2025

Published: 22 Nov 2025

J Short Name: COS

Copyright:

©2025 Carolyn Robb. This is an open access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and build upon your work non-commercially

Keywords:

Laparoscopic Entry; Open Entry Technique; Peritoneal Access; Umbilical Entry; Gynecological Laparoscopy

Citation:

Carolyn Robb, Safe and Aesthetic Laparoscopic Access Achieved with 5-mm Open Entry. Clinics of Surgery® 2025; V11(1): 1-5

1. Abstract

1.1. Background and Objectives

Laparoscopic entry carries a complication rate of up to 1.3%, including bowel and vascular injury. The Hasson, Veress, and 5-mm open entry techniques differ in approach: Hasson uses a 1–2 cm open incision, Veress involves blind needle access, and the 5-mm open entry combines direct or laparoscopic visualization after the fascia is stretched with a tonsil clamp at the umbilical defect. Previously shown to be safe and easily mastered by both attendings and residents, this study re-evaluates the 5-mm technique in a multi-surgeon setting.

1.2. Methods

Over 20 years, a single surgeon performed more than 2,000 5-mm open entry cases without entry-related complications. Building on this experience, we retrospectively reviewed 195 laparoscopic gynecologic surgeries performed by two surgeons from 2021–2025. The technique involves tenting the umbilicus with three tonsil clamps, injecting 1 mL of 0.25% bupivacaine, making a 2–4 mm vertical incision within the umbilical scar that is then stretched to approximately 5 mm with a tonsil clamp, and bluntly dissecting the fascia to expose the mid-umbilical fascia and enter the peritoneal cavity. A 5-mm bladeless optical trocar is advanced under direct visualization, and carbon dioxide insufflation begins once placement is confirmed.

1.3. Results

All cases achieved successful entry without conversion to Veress. One patient had a prior Hasson entry for cholecystectomy. Omental adhesions occurred in 15 cases (7.7%). No entry-related complications occurred.

1.4. Conclusion

The 5-mm open entry technique is a safe, efficient, and cosmetically favorable method for laparoscopic gynecologic surgery.

2. Introduction

Safe and effective abdominal entry is a critical first step in laparoscopic surgery, as complications during this phase can significantly impact patient outcomes. Although rare, laparoscopic entry is associated with a complication rate as high as 1.3%, with bowel and vascular injuries being the most serious [1]. Notably, nearly half of all complications related to laparoscopy occur during peritoneal access and the creation of pneumoperitoneum [2,3]. The traditional Veress needle approach remains widely used in gynecological surgery due to its speed and familiarity, though it involves blind insertion, which can increase the risk of injury, especially in patients with prior abdominal surgery [4]. Open techniques, such as the Hasson method, offer the advantage of direct visualization but require larger incisions, which can be used for specimen removal, and longer operative times [5]. In 2007, a novel 5-mm open entry technique implemented to improve safety and cosmesis while avoiding blind instrument placement was reported [6]. Here, we present an updated report of the 5-mm open entry technique utilized by a gynecological surgeon and partner where specimen removal utilized a cosmetically preferable low two-centimeter suprapubic port.

3. Methodology

3.1. Study Design

We conducted a retrospective review of 195 laparoscopic gynecological surgeries performed by two surgeons from 2021–2025. Descriptive statistics and multivariable logistic regression analyses were performed using RStudio. Approval for the study was obtained by the institutional review board at New York Medical College.

3.2. Surgical Technique

The patient is placed in a dorsal lithotomy position and prepped and draped in usual sterile fashion. The umbilicus, just above the inferior margin of the umbilical fold, is grasped and elevated

using three tonsil clamps (Figure 1a). The assistant administers 1 mL of 0.25% bupivacaine into the umbilicus above the clamp for local anesthesia. A No. 11 blade scalpel is used to make a 2–4 mm vertical skin incision within the umbilicus, between the elevated clamps (Figure 1b), which is stretched to fit a 5-mm laparoscope. The third tonsil clamp is then used to bluntly dissect the subcutaneous tissue in a downward spreading motion until the fascial layer is reached. Lateral stretch tension with the tonsil clamp tip separates the fascia and peritoneum, which is confirmed by sliding the closed tonsil into the peritoneal cavity. This is followed by placement of the visiport bladeless trocar into the already accessed peritoneal cavity (Figure 2a). Trocar placement is confirmed by placing the 5-mm laparoscope through the visiport to visualize the intraabdominal cavity (Figure 2b). Pneumo-peritoneum is then established using carbon dioxide gas. At the conclusion of the laparoscopic procedure, the 5-mm mid-umbilical incision is closed using an absorbable subcuticular suture.

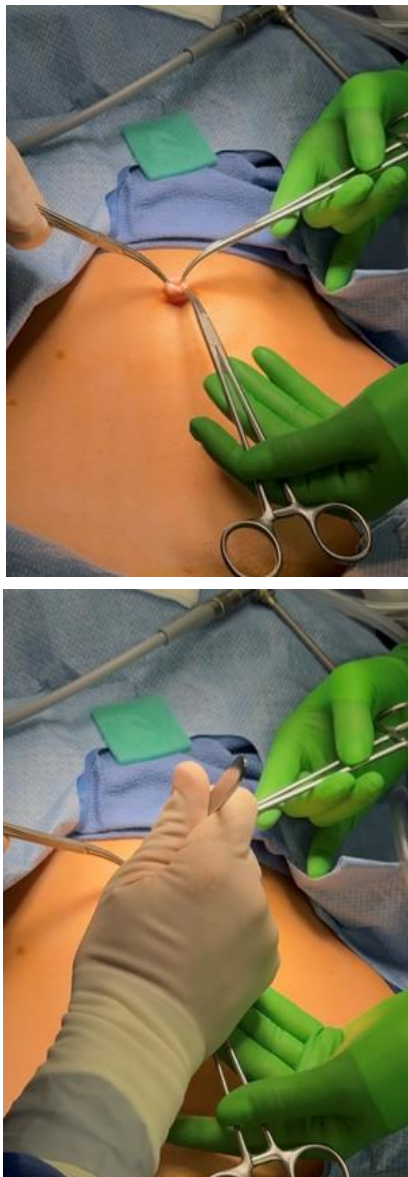


Figure 1: (a) The umbilicus is grasped and elevated using three tonsil clamps. (b) A No. 11 blade scalpel is used to make a 2–4 mm vertical skin incision within the umbilicus, between the elevated clamps.

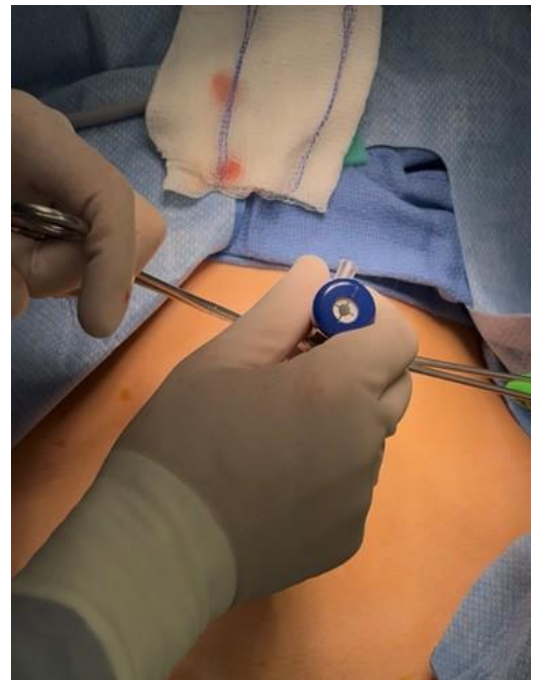


Figure 2: (a) Insertion of bladeless trocar. (b) 5-mm laparoscope placed through the visiport to visualize the intraabdominal cavity.

4. Results

The average patient age and BMI were 36.1 ± 5.8 years and 29.0 ± 5.7 kg/m², respectively (Table 1). The rate of prior abdominal surgery, including either prior laparoscopy, laparotomy, or C-section, was 39.2% (Table 2). Surgical indications included endometriosis ablation (75.9%), ovarian cyst or hydrosalpinx (36.4%), tubal infertility (30.3%), and myomectomy (16.9%) (Table 3).

The 5-mm open entry laparoscopic technique was used in all cases except one, in which the patient underwent a concurrent cholecystectomy and the Hasson technique was employed for entry and removal of the gallbladder. The 5-mm technique had a 100% success rate of primary peritoneal entry. No cases were converted to Veress needle entry (Table 3). There were no com-

lications related to peritoneal entry. The most commonly reported intraperitoneal adhesions were adnexal (32.3%), paracolic (23.1 %), and tubal (18.5 %) (Table 3). Only 15 (7.7%) cases had omental or small bowel adhesions to the anterior abdominal wall. The rate of unintended intraoperative events was 4.6%, including blunt deserosalization of colon, uterine perforation during hysteroscopy, and bradycardia following insufflation (Table 4). Unintended intraoperative events did not require any further intervention and were independent of prior abdominal surgery, age, or BMI (Table 5). At 2 weeks post-op, the umbilicus demonstrated cosmetic healing with no visible scarring (Figure 3).

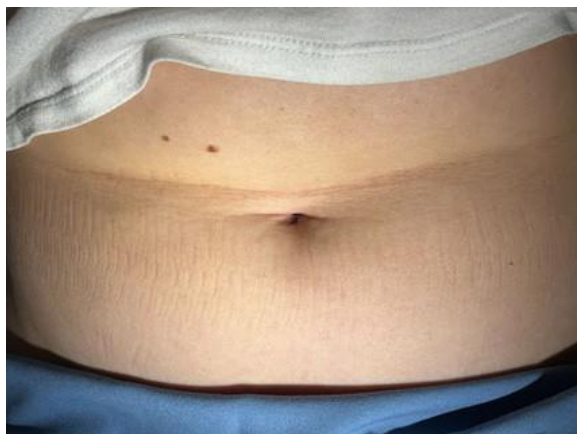


Figure 3: Umbilicus at 2 weeks post-op showing cosmetic healing with no visible scarring. The incision is well-hidden within the natural contours of the belly button and free of infection or dehiscence.

Table 1: Continuous Baseline Characteristics of Cases (N=195).

Baseline Characteristic	Mean (SD) Range
(Age (years	[17-54] (5.8) 36.1
(BMI (kg/m ²	[16.0-47.2] (5.7) 29.0
Gravidity	[0-16] (2.2) 1.7
Parity	[0-3] (0.7) 0.5
Number Prior C-Sections	[0-3] (0.5) 0.2

Table 2: Categorical Baseline Characteristics of Cases (N=195).

Baseline Characteristic	Number of Cases (%)
Prior Laparoscopy	50 (25.8)
Prior Laparotomy	9 (4.6)
Prior C-Section	33 (17.0)
Prior Abdominal Surgery*	76 (39.2)

*Patients who had any prior laparoscopy, laparotomy, or C-Section.

Table 3: Characterization of Cases by Surgical Variables (N=195).

Variable	Number of Cases (%)
5-mm Technique	194 (99.5)
Converted to Veress Needle Entry	0 (0.0)
Endometriosis Ablation	148 (75.9)
Ovarian Cyst or Hydrosalpinx	71 (36.4)
Fallopian Tube Repair	30 (15.4)
Fallopian Tube Removal	34 (17.4)
Laparoscopic Myomectomy	33 (16.9)
Laparoscopic Lysis of Adhesions	127 (65.1)
Hysteroscopic Biopsy or Polyp	148 (75.9)
Hysteroscopic Metroplasty	68 (34.9)
Hysteroscopic Lysis of Adhesions	14 (7.2)
Hysteroscopic Myomectomy	34 (17.4)
Unintended Intraoperative Events	8 (4.1)
Intraperitoneal Adhesions	114 (58.5)
Omental Adhesions to Anterior Abdominal Wall	15 (7.7)
Paracolic Adhesions	45 (23.1)

Table 3: Characterization of Cases by Surgical Variables (N=195).

Adnexal Adhesions	63 (32.3)
Tubal Adhesions	36 (18.5)
Reverted to Open Surgery	0 (0.0)
Hysteroscopic Uterine Perforation	4 (2.0)

Table 4: Unintended Intraoperative Events.

Type of Event	Number of Cases (%)
Blunt deserosalization of bowel	1 (0.5)
Abortion of laparoscopic abdominal cerclage due to poor visualization	1 (0.5)
Errant connection of the methylene blue syringe to the balloon tubing during chromotubation causing application of significant pressure applied to uterus; no significant sequelae	1 (0.5)
Bradycardia post-insufflation	1 (0.5)
Uterine perforation during hysteroscopy	4 (2.0)
Intraoperative events requiring further intervention (i.e. transfusion, readmission, repeat procedures)	0 (0.0)
Total	8 (4.1)

Table 5: Multivariable Logistic Regression for Unintended Intraoperative Events Adjusted for Age, BMI, and Prior Abdominal Surgery.

	OR [95% CI]	p-value
(Intercept)	0.79 [0.01-102.93]	0.92
BMI	1.01 [0.90-1.14]	0.85
Age	0.91 [0.80-1.03]	0.14
Prior Abdominal Surgery	1.72 [0.41-7.19]	0.46

5. Discussion

Laparoscopic surgery requires safe and reliable access to the peritoneal cavity, and several entry techniques have been developed to minimize the risk of complications. The Veress needle technique, also known as closed entry, is typically performed at the umbilicus or Palmer's point [7]. It uses a Veress needle and insufflator to create pneumoperitoneum prior to trocar placement. This approach is fast, familiar, and involves a minimal incision. However, because it relies on blind insertion, it carries an increased risk of vascular or bowel injury and is less ideal in patients with a history of abdominal surgery or adhesions [8].

Palmer's point entry is an alternative site located in the left upper quadrant, 3 cm below the left costal margin in the midclavicular line 8. This method uses a Veress needle or optical trocar and is particularly useful in patients with midline adhesions, as it avoids umbilical entry 9. While it is safer in such cases, it carries a risk of injury to the stomach or spleen, especially if the stomach is not decompressed beforehand, and may be technically more difficult in those with enlarged abdominal organs, such as splenomegaly [9,10].

In contrast, the Hasson technique is an open entry method performed in the periumbilical region, often supraumbilical or infraumbilical, using a Hasson trocar secured with anchoring sutures [5]. After a small incision and direct dissection to the peritoneum, the trocar is placed under direct vision. It is preferred in patients with prior abdominal surgeries due to its reduced injury risk, but it requires a larger incision, is more time-consuming, and necessitates fascial closure and suturing [11].

Broad comparisons of laparoscopic entry techniques underscore ongoing debate about the safest approach. A systematic review found no high-quality evidence favoring the Veress needle, direct trocar, or open techniques universally [12]. Each method has unique advantages and limitations, with surgeon experience and patient-specific anatomy being key determinants of safety [12]. Major complications of laparoscopic entry include vascular or visceral injuries, which are rare but serious. Minor complications include extraperitoneal insufflation, omental injury, subcutaneous emphysema, and failed entry. Although the overall rates of major complications are low for both the Veress needle and Hasson entry techniques, they still occur. One prospective study reported bowel injury rates of 0.1% for Veress needle and 0.08% for Hasson technique [13]. Similarly, a meta-analysis reported vascular injury rates of 0.92% (10/1086) for Veress needle and 0% (0/376) for Hasson in non-randomized studies. However, direct randomized comparisons of the two techniques showed no statistically significant difference in major complication rates due to limited evidence [14]. Furthermore, a 2024 single-center retrospective study comparing Hasson and Veress techniques found no significant difference in primary port placement injuries, suggesting both are comparably safe in practice [15]. In contrast, minor complications and failed entry are more frequently associated with the Veress needle than the Hasson or direct trocar techniques [16,17]. While the Hasson technique is

associated with a higher rate of carbon dioxide leakage at the port site, it has significantly lower rates of failed entry and fewer minor injuries [16].

In addition to the risk of complications, the cosmetic outcome after surgery is another important factor in selecting a laparoscopic entry technique. A randomized controlled trial reported a significantly higher ($p<0.001$) cosmetic survey score following intraumbilical incision compared to a periumbilical incision, supporting the use of our technique [18].

To our knowledge, we are the first to report the use of the 5-mm open entry technique. Advantages of this approach include minimizing blind entry, achieving a small non-visible cosmetic incision, avoiding the Veress needle, and reducing the risk of vascular or bowel injury due to direct visualization. However, it does have relatively limited data compared to traditional methods. In the original retrospective study of 65 patients, the 5-mm open entry method demonstrated a 71% success rate without any complications, and failures were easily converted to the standard Veress needle approach. The technique proved to be independent of factors such as prior surgery, BMI, or age, and offered the added benefits of speed and cosmetic outcomes 6. The present study corroborates and updates this data reporting over 2000 cases free of complication since 2007 and a detailed review of 195 cases over the past 4 years.

Although we are the first to report this 5-mm open entry technique, other modified open entry approaches have been recently described. One such technique utilizing a 5-mm laparoscope involves an 8-mm infraumbilical skin incision, followed by blunt cephalad dissection with a hemostat and trocar placement prior to insufflation [19]. In their 15-year retrospective review of 350 cases, the only major complication was a colon perforation in a patient with unrecognized adhesions. Notably, however, our technique utilizes a smaller 2-4-mm umbilical incision with a direct, single-step open entry, offering enhanced safety, cosmetic outcomes, and procedural simplicity.

Limitations of this study include its single-institution design with two surgeons who have years of familiarity and expertise with the method, limiting the generalizability of our data. Additionally, the study is retrospective in nature, which can introduce bias. Finally, as the 5-mm open entry is the only technique employed by these surgeons for gynecological laparoscopy, there is no direct comparison to other entry techniques in terms of complication rates, operative time, or patient outcomes.

While our study has limitations, it has various strengths. First, the study presents data from 195 consecutive laparoscopic cases, reflecting consistent use of the 5-mm open entry technique in routine reproductive gynecologic surgical practice and building upon the cohort of only 65 cases in the original report of this method 6. Next, the 5-mm technique had a 100% successful peritoneal entry rate when attempted, with no conversions to Veress needle entry. No peritoneal entry complications were reported, even in patients with omental or small bowel adhesions to the abdominal wall, suggesting that the technique is safe when

performed by experienced surgeons. The technique allows for direct visualization during entry, reducing the risks associated with blind insertion, and postoperative follow-up showed cosmetic healing, which is particularly relevant in minimally invasive surgery. Finally, this technique was successful in patients with a wide range of demographic and clinical characteristics, including age, BMI, prior abdominal surgery, presence of abdominal wall adhesions, and surgical indications such as myomectomy, ovarian cystectomy, ectopic pregnancy, endometriosis ablation, and tubal infertility (Table 1-3).

6. Conclusions

The 5-mm open entry technique is a safe, efficient, and cosmetically favourable method for laparoscopic gynaecological surgery. Given its excellent safety profile and cosmetic advantage, wider adoption of this technique may benefit both patients and surgeons as it might replace Hasson entry, particularly if a more cosmetic suprapubic incision and port were used for specimen removal. However, broader implementation will require formal training and education, particularly for those unfamiliar with the approach. Future research should focus on multi-institutional, prospective studies comparing this method directly with traditional entry techniques, such as Veress needle and Hasson entry, to evaluate operative times, complication rates, patient satisfaction, and long-term outcomes. Expanding the evidence base and standardizing training can help establish the 5-mm open entry as a widely accepted and reproducible approach in minimally invasive gynaecologic surgery.

References

1. Alkatout I. Complications of Laparoscopy in Connection with Entry Techniques. *J Gynecol Surg*. 2017; 33(3): 81-91.
2. Watrowski R, Kostov S, Alkatout I. Complications in laparoscopic and robotic-assisted surgery: definitions, classifications, incidence and risk factors – an up-to-date review. *Videosurgery Miniinvasive Tech*. 2021; 16(3): 501-525.
3. Härkki-Sirén P, Kurki T. A nationwide analysis of laparoscopic complications. *Obstet Gynecol*. 1997; 89(1): 108-112.
4. Lécuru F, Leonard F, Jais JP, Rizk E, Robin F, Taurelle R. Laparoscopy in Patients with Prior Surgery: Results of the Blind Approach. *JSLs*. 2001; 5(1): 13-16.
5. Kumar S, Dubey IB, Aggarwal VC, Soni RK. Evaluation of Open (Hasson's) and Closed (Veress) Technique of Intraperitoneal Access for Creation of Pneumoperitoneum in Laparoscopic Surgery. *Cureus*. 2023; 16(2): e54770.
6. Keltz MD, Lang J, Berin I. A 5-mm Open-entry Technique Achieves Safe, Single-step, Cosmetic Laparoscopic Entry. *JSLs*. 2007; 11(2): 195-197.
7. Veress Needle - an overview | ScienceDirect Topics. Accessed June. 2025.
8. Thepsuwan J, Huang KG, Wilamarta M, Adlan AS, Manvelyan V, Lee CL. Principles of safe abdominal entry in laparoscopic gynecologic surgery. *Gynecol Minim Invasive Ther*. 2013; 2(4): 105-109.
9. Granata M, Tsimpanakos I, Moeity F, Magos A. Are we underutilizing Palmer's point entry in gynecologic laparoscopy? *Fertil Steril*. 2010; 94(7): 2716-2719.
10. Thepsuwan J, Huang KG, Wilamarta M, Adlan AS, Manvelyan V. Principles of safe abdominal entry in laparoscopic gynecologic surgery. *Gynecol Minim Invasive Ther*. 2013; 2(4): 105-109.
11. Krishnakumar S, Tambe P. Entry Complications in Laparoscopic Surgery. *J Gynecol Endosc Surg*. 2009; 1(1): 4-11.
12. Recknagel JD, Goodman LR. Clinical Perspective Concerning Abdominal Entry Techniques. *J Minim Invasive Gynecol*. 2021; 28(3): 467-474.
13. Dunne N, Booth MI, Dehn TCB. Establishing pneumoperitoneum: Verres or Hasson? The debate continues. *Ann R Coll Surg Engl*. 2011; 93(1): 22-24.
14. Ahmad G, Baker J, Finnerty J, Phillips K, Watson A. Laparoscopic entry techniques. *Cochrane Database Syst Rev*. 2019; 2019(1): CD006583.
15. Syed IN, Syed NN, Naseem R, Singh-Ranger D. The Hasson Versus Veress Trocar Wars: Determining the Safety Index of Laparoscopic Surgical Entry Techniques. *Cureus*. 2024; 16(11):e74073.
16. Cornette B, Berrevoet F. Trocar Injuries in Laparoscopy: Techniques, Tools, and Means for Prevention. A Systematic Review of the Literature. *World J Surg*. 2016; 40(10): 2331-2341.
17. Jiang X, Anderson C, Schnatz PF. The safety of direct trocar versus Veress needle for laparoscopic entry: a meta-analysis of randomized clinical trials. *J Laparoendosc Adv Surg Tech A*. 2012; 22(4): 362-370.
18. Lee JS, Hong TH. Intraumbilical versus periumbilical incision in laparoscopic cholecystectomy: A randomized controlled trial. *Int J Surg Lond Engl*. 2016; 33 Pt A:83-87.
19. Pryor KP, Hurd WW. Modified Open Laparoscopy Using a 5-mm Laparoscope. *Obstet Gynecol*. 2016; 127(3): 535-538.