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*Research Article*

# STUDY OF CORRELATION BETWEEN VERESS NEEDLE AND OPEN TECHNIQUE IN LAPAROSCOPIC SURGERIES- A SURGEONS PREFERENCE

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**A R T I C L E I N F O**

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**A B S T R A C T**

In a prospective randomized study on 75patients undergoing laparoscopic surgery, the safety and feasibility of open access laparoscopy was analyzed and compared to the closed Veress needle technique. Open access laparoscopic surgery was performed in half the time needed for the Veress needle technique with equal safety and without complications or technical disadvantages. Furthermore, open access offers economical advantages, as disposable trocars are no longer needed. Therefore the open access technique is recommended as the standard for laparoscopic operations.

The patient must be offered Clear explanationsand information given regarding the associated risks and potential complications associated with laparoscopic surgery and the possibility of conversion to laparotomy if the clinical circumstances so dictate.There is no single safe technique that reduces laparoscopic surgery entry complications in low risk patients. The surgeon should select the technique which he feels most comfortable with.



## INTRODUCTION

Laparoscopy was first performed in humans in 1910 by Jacobeus in Sweden [1]. In the last few decades, laparoscopy has evolved considerably and is now a commonly preferred procedure in many surgical specialties because of its advantages over traditional laparotomy [2]. Although laparoscopy has many advantages over laparotomy, it is not devoid of complications, most of which are associated with the entry into the surgical site [2-5]. In any laparoscopic procedure, the first and most important step is entry. Laparoscopic entry is a blind procedure, and it represents a problem for all the related complications. Complications arising from laparoscopic surgery are rare and commonly occur when attempting to gain access to the peritoneal cavity. Creation of the pneumoperitoneum is the first and most critical step of a laparoscopic procedure because that access is associated with injuries to the gastrointestinal tract and major blood vessels and at least 50% of these major complications occur prior to commencement of the intended surgery. This complication rate has remained the same during the past 25 years .The most serious Complication include vascular injuries (0-0.2%) and bowel perforations (0.1-0.2%) in all the techniques used [3]

Many techniques and aids have been used and studied with regard to the entry step in laparoscopic procedures. These include open (Hasson), closed (Veress), direct trocar insertion, disposable shielded trocars, radially expanding trocars, and visual entry systems [3]. Among these, the most used techniques are closed (Veress) and open (Hasson), the choice of which varies according to the surgeon's preference and other regional and local factors [2]. The complication rates from both techniques vary according to the entry method and device used, and accordingly, their reported incidence varies widely in the literature [3].As the debate goes on, the preference and experience of the surgeon continue to be the decisive factor in choosing one method over the other.

The Aim of this study is to identify the better method of creating Pneumoperitoneum depending on the Surgeons comfort and Patient outcome.

## MATERIAL AND METHODS

- All patients who were admitted at the institution under Department of Surgery, MGM hospital, Navi Mumbai, and Underwent Elective Laparoscopic Surgery were included in the study.
- Study Design: Prospective study.
- Study Location: Tertiary care teaching hospital-based study done in Department of General Surgery, MGM hospital, Navi Mumbai.
- Study Duration: 6monthsJanuary 2022- June 2022
- Sample Size: 75 Patients.
- Source of data: The data will be obtained from the patients coming to Surgical Department of MGM HOSPITAL, NAVI MUMBAI.

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**Inclusion criteria**

1. Patients who underwent elective laparoscopic surgery
2. Either Sex - Male, Female.
3. Age - Above 18 years.

**Exclusion criteria**

1. Patient who underwent emergency laparoscopic procedure.
2. Under 18 years of age.
3. All patients above the age of 18 years with severe debilitating diseases.
4. Patients not willing to participate in the study.

**Methodology**

- All Patients presenting to Institution and planned for Laparoscopic Cholecystectomy, Appendicectomy were included in the study.
- Patients were divided into two groups on basis of random chit picking.
- Group A- Patients underwent Laparoscopic access through open Technique
- Group B- Patients underwent Laparoscopic access through Veress

  Needle Technique

**Open/Hansons Technique**

A vertical or transverse skin incision approximately 10 to 12 mm in length is made just below or above the umbilicus. The subcutaneous fat and tissues are bluntly dissected apart using small narrow finger retractors or a Kelly hemostat. The white linea alba is visualized and grasped on either side with hemostats. The linea alba is elevated with the hemostats and a vertical 10-mm incision is made through the fascia. Further dissection with a hemostat will reveal the thickened white peritoneum, which is grasped with a pair of laterally placed hemostats. The peritoneum is elevated and opened cautiously with a scalpel. The Hasson port with its blunt, rounded-tip obturator is introduced into the abdomen and Co2 insufflation done.

**Veress Needle Technique**

A 1-cm vertical or horizontal skin incision is made and the abdominal wall on either side of the umbilicus is grasped by the surgeon and first assistant either by thumb and forefinger or by towel clips so as to elevate the abdominal wall. A Veress needle is held like a pencil by the surgeon who inserts it through the linea alba and peritoneum where a characteristic popping sensation is felt.

An unobstructed free intraperitoneal position for the Veress needle is verified by easy irrigation of clear saline in and out of the peritoneal space and by the hanging drop method where the saline in the translucent hub of the Veress needle is drawn into the peritoneal space when the abdominal wall is lifted.

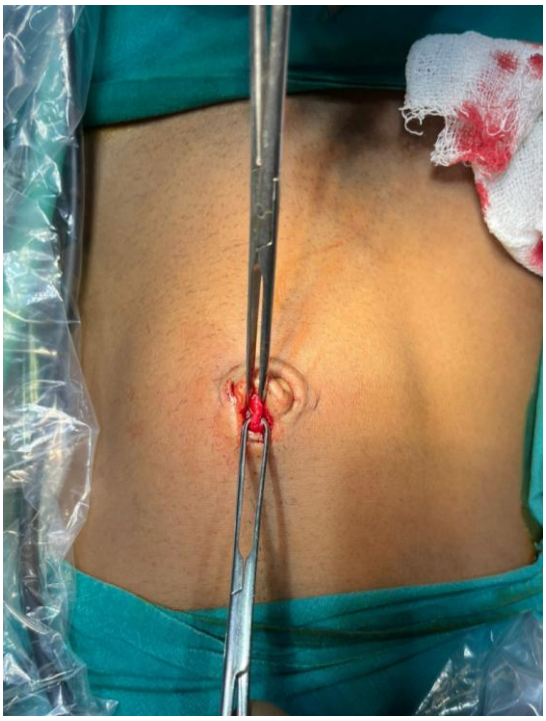

**Fig 1** Open technique for Port insertion-Umbilical tube held by Allis forceps.

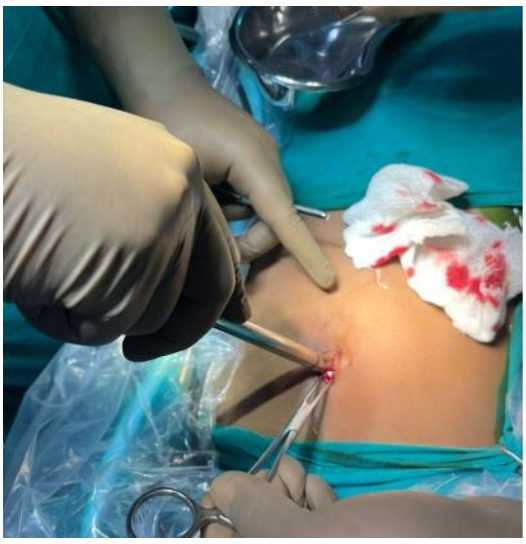

**Fig 2** Blunt 10mm Trocar inserted via Open Technique

**Table 1** Comparision of time required for Laparoscopic Access.

| **Comparision of time required for Laparoscopic Access.** | | | | |
|---|---|---|---|---|
| | Open Technique (38 Cases) | | Veress Needle Technique (37 Cases) | |
| | No. | Percentage | No. | Percentage |
| <5Min | 23 | 60.52% | 18 | 48.65% |
| >5Min | 15 | 39.47% | 19 | 51.35% |
| | 38 | 100% | 37 | 100% |

**Table 2** Comparision of Intraoperative Complications

| Comparision of Intraoperative Complications | | | | |
|---|---|---|---|---|
| | **Open Technique (38 Cases)** | | **Veress Needle Technique (37 Cases)** | |
| | No. | Percentage | No. | Percentage |
| Port Site Leak | 28 | 73.68% | 19 | 51.35% |
| Vascular Injury | 0 | 0 | 0 | 0 |
| Omental Injury | 0 | 0 | 0 | 0 |
| Bowel Injury | 0 | 0 | 0 | 0 |
| Gas Embolism | 0 | 0 | 0 | 0 |
| Extraperitoneal insufflation | 0 | 0 | 3 | 8.10% |

**Table 3** Post Operative Complication

| Post Operative Complications | | | | |
|---|---|---|---|---|
| | Open Technique (38 Cases) | | Veress Needle Technique (37 Cases) | |
| | No. | Percentage | No. | Percentage |
| Port Site Pain | 38 | 100% | 37 | 100% |
| Vomitting | 4 | 10.52% | 4 | 10.81 % |
| Surgical Emphysema | 0 | 0 | 0 | 0 |

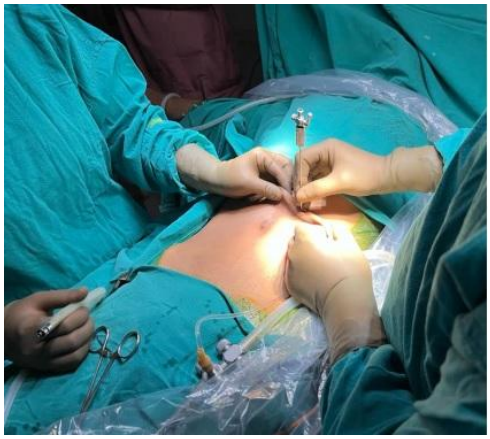

**Fig 3** Veress Needle Technique used for creating Pneumoperitoneum

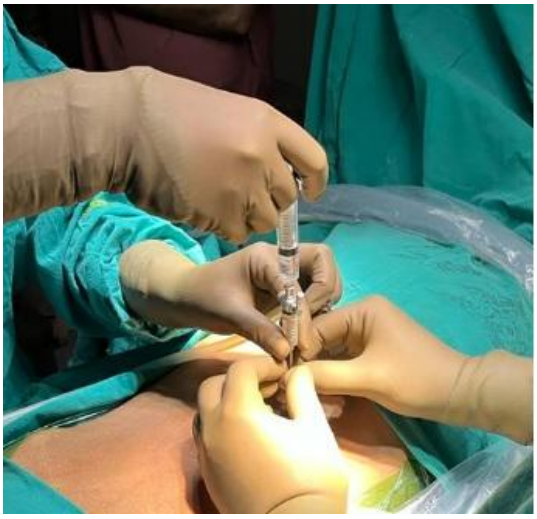

**Fig 4** Hanging drop technique used for confirming insertion of Veress Needle in Peritoneum.

## DISCUSSION

Over the last two decades, rapid advances have made laparoscopic surgery a well-established procedure. However, because laparoscopy is relatively new, it still arouses controversy, particularly with regard to the best method for the creation of the pneumoperitoneum. To minimise entry-related injuries, several techniques, instruments and approaches have been introduced during the last century. These include the Veress-pneumoperitoneum trocar; classic or closed entry,[5] the open (Hasson) technique,[6] direct trocar insertion without prior pneumoperitoneum,[7] use of shielded disposable trocars, optical Veress needle, optical trocars, radially expanding trocars and a trocarless reusable, visual access cannula. Each of these methods of entry enjoys a certain degree of popularity according to the surgeon's training, experience and bias according to regional and interdisciplinary variability.

The Veress Needle is however the most frequently used technique. Janos Veress from Hungary developed the Veress needle in 1938 for the induction of pneumothorax, and not for laparoscopic usage [8]. Veress use was first popularized in France in 1947 [9] .Nowadays Commercially available Verres needles vary from 12 to 15 cm in length, with an external diameter of 2 mm. A bezel-shaped tip enables the needle to pierce the tissues of the abdominal wall.Upon entering the peritoneal cavity, the resistance generated from the abdominal wall is overcome, which permits the exposure of the interior needle with its blunt atraumatic mandril [6]. Once the peritoneal cavity is inflated by this technique, the first trocar can be inserted without problems, minimizing intraoperative gas leakage and saving surgical time. In 1971, Hasson described the open technique for the first time as a way of avoiding a few of the complications associated with the Veress technique [10].The concept in the open technique is to create a tiny incision, directly incise the layers of the abdominal wall, directly cut the peritoneum and enter the abdomen. Since gas can escape around the incision, an olive is placed over the end of the trocar to occlude the incision, and sutures are placed on the abdominal fascia and attached to the cannula[2]. The benefits of this method of entry are the prevention of bowel injury caused of blind puncture with a needle and subsequent trocar, gas embolism, avoid preperitoneal insufflation and to have certainty of establishing a pneumoperitoneum, a very low incidence of vascular injuries, and furthermore a correct anatomical repair of the abdominal wall incision.

### Common complications encountered

Studies have suggested that 30-50% of bowel injuries and 13-50% of vascular injuries are undiagnosed at the time of surgery. Since bowel injury is more common than vascular injury, it is more likely to produce serious sequelae because of the delay in diagnosis. The mortality rate from bowel injury is 2.5-5%.

1. **Vascular injury** is a major cause of death from laparoscopy, with a reported mortality rate of 15%. Major vascular injury can occur when the Veress needle is inserted prior to insufflation or when a trocar is inserted after insufflations. The reason for these injuries is the close proximity of the anterior abdominal wall to the retroperitoneal vascular structures. In thin patients, this

distance may be as little as two centimeters.The most common minor vascular injury is to the inferior epigastric vessels, occurring in up to 2.5% of laparoscopic hernia repairs.

2. **Bowel injury** is the third cause of death from a laparoscopic procedure after major vascular injury and anaesthesia. Unlike major vascular injuries where the risk and presentation are immediate, many bowel injuries go unrecognised at the time of the procedure. Consequently, patients present postoperatively, often after discharge with peritonitis. This delay makes it a significant cause of morbidity and mortality.
3. **Urological injuries** are mostly related to the gynaecological procedure being performed and not to entry alone. The incidence of bladder injury during laparoscopic hysterectomy ranges from 0.02-8.3%.[11].Ureteric injuries occur in approximately 1% of cases. These are more common in complex surgical procedures such as hysterectomy, urinary stress incontinence and/or genital prolapse procedures and severe endometriosis resection.
4. The incidence of **carbon dioxide embolism** was 0.001% in a review study [12].Such a complication has not been reported at open laparoscopy.
5. Other Complications occur due to creating pneumoperitoneum i.e Post operative vomitting, shoulder pain etc.

**These all Complications can occur due to**

- Inexperience or unskilled surgeon
- Failure to sharpen the trocar or elevate and stabilize the abdomen
- Perpendicular insertion of needle or trocar
- Forceful thrust
- Failure to note anatomical landmarks
- Indequate incision size.

All these complications can occur by both techniques mentioned, thus procedure of choice should be made after properly evaluating the patient, including a full clinical history and thorough clinical examination and relevant investigations. The patient must be Clear explanations must be offered and information given regarding the associated risks and potential complications associated with laparoscopic surgery and the possibility of conversion to laparotomy if the clinical circumstances so dictate. The surgeon must have adequate training and experience in laparoscopic surgery before intending to perform any procedure independently. He should be familiar with the equipment and instruments he intends to use.

There is no single safe technique that reduces laparoscopic surgery entry complications in low risk patients. The surgeon should select the technique which he feels most comfortable with.

## RESULTS

In a prospective randomized study on 75patients undergoing laparoscopic surgery, the safety and feasibility of open access laparoscopy was analyzed and compared to the closed Veress needle technique. According to study and data collected in this prospective study of 75 patients done from January 2022- June 2022, it was found that

- Time required for Laproscopic access by Open Technique was faster as compared to Veress Needle Technique. Out of 38 Patients who underwent Laproscopic Access by Open Technique- 23 Patients (60.52%) required less than 5 minutes for peritoneal access, whereas Out of 37 patients who underwent Laproscopic access by Veress needle technique- 18 patients (48.65%) required less than 5 minutes for peritoneal access.
- Intraoperative port site gas leakage present in 28 (73.68%) patients out of 38 in open method group and 19 (51.35%) of 37 cases in Veress needle technique. Extraperitoneal insufflations during entry occurred in 3 (8.10%) of 37 patients in Veress needle group. There were no any major complications that occurred in any group.
- Port site pain was accessed in both group of patients based on VAS scoring system, however it was not found to be significant. There was no significant difference in post op vomitting cases and surgical emphysema.

## CONCLUSION

The findings of our study suggest that the open technique is relatively safer, faster and associated with similar complications. However, due to the limited sample size, further research should be conducted. No single technique is considered suitable for all cases. In conclusion, the choice of technique for peritoneal access should be individualized, based on factors such as such as patient sex, diagnosis, and most importantly, the surgeons' experience and preference.

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