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# A prospective study of direct trocar entry versus veress needle entry for laparoscopic surgery

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**Abstract**
**Background:** The aim of this study was to compare the outcomes of direct trocar entry without prior pneumoperitoneum at umbilical level (DTI) versus veress needle entry for laparoscopic surgeries in terms of injury to abdominal viscera, safety, need for reinsertion of trocar and the time taken from skin incision to the insertion of camera.
**Methods:** The present study was a prospective study conducted at the Department of General Surgery at Dr. M.K. Shah Medical College & Research Centre & Smt S.M.S. Multispeciality Hospital, Ahmedabad, Gujarat, India. (Faimer School Id: F0006702), a tertiary care hospital, from January 2020 till January 2021. Total of 100 cases were included in the study. All the cases who underwent abdominal laparoscopic surgery during this time duration were taken into account. The patients were divided into two groups bases upon the surgical units in which they were admitted as Group A in which traditional technique of veress needle entry was used for access, and Group B in which direct trocar entry without prior pneumoperitoneum was used. These two groups were compared in terms of the demographic profile, duration of procedure, risk of injuries, safety and various complications which were encountered during the procedure.
**Results:** Patients in both the groups had similar demographic characteristics. The mean duration of the procedure was significantly shorter in group B (1.74 ± 0.6min) than in group A (4.06 ± 1.2min). No major complications in both groups were encountered. Minor complications were significantly less in group B than in group A.
**Conclusion:** From our study we conclude with the opinion that direct trocar entry is as safe as prior insufflation of abdomen with the veress needle in a laparoscopic procedure. It is a time saving procedure, reduces the number of blind procedures and eliminates the complications of veress needle entry.

**Keywords:** direct trocar entry (DTI), pneumoperitoneum, veress needle, laproscopic surgery

## Introduction

- In direct trocar entry, a variation of the closed technique, after incision on the skin and the subcutaneous tissue, the abdominal wall is lifted up and the trocar and cannula are introduced directly without first creating a pneumoperitoneum with the veress needle.
- We believe, direct trocar entry is as safe as the open or the semi open or the closed technique. It eliminates one step of the procedure, is much less time consuming and is as easy or as difficult to master the closed technique of the veress needle insertion.

## Aims and Objectives

- The aim of the present study was to enter the peritoneal cavity directly with a trocar without prior pneumoperitoneum and to compare it with trocar entry after creating a pneumoperitoneum with a veress needle in terms of;

a. Injury to abdominal viscera.
b. Safety.
c. Reinsertion.
d. Time taken from skin incision to insertion of camera.

## Inclusion Criteria

- Patients which are posted for planned laproscopic surgeries irrespective of age and sex.

**Exclusion Criteria**

- Emergency surgeries.
- Patients having abdominal scars crossing umbilicus.
- Immunocompromised patients
- Seropositive patients

**Material and Methods**

- Our study regarding various prospects related to direct trocar entry vis a vis veress needle entry for creating pneumoperitoneum for laparoscopic surgery was done at the Department of General Surgery, Dr. M.K. Shah Medical College & Research Centre & Smt S.M.S. Multispeciality Hospital, Ahmedabad, Gujarat, India.

**Our patients were divided into two groups**

Group A) Patients with Veress needle entry.

Group B) Patients with direct trocar entry.

- A thorough preoperative work up was carried out which included a detailed clinical examination. The presence of scars was noted and patients with scars crossing the umbilicus were excluded. Obesity was not a criteria for rejection. Preoperative routine haematological investigations, liver function tests and ultrasound abdomen were done. MRCP was done in some selected cases of cholelithiasis and all cases of choledocholithiasis. In cases of laparoscopic hernia repair, history of precipitating factors and the history of previous surgery was asked while for laparoscopic appendicectomy history of number and severity of previous attacks was taken.

**Technique of Veress needle entry**

- Patient was laid in supine position on the operating table and after the induction of anaesthesia a stab incision was made in the infra umbilical region and umbilicus was lifted in the mid line.
- The veress needle was held like a dart between the thumb and the index finger, angled and pointed towards the pelvis. As the needle pierces with gentle progressive pressure exerted by dorsiflexing the wrist the tip of veress needle was advanced through the various layers of the abdominal wall, the linea alba and peritoneum.
- The fact that the needle tip is in the peritoneal cavity has to be established carefully. This was done by injecting saline. (Saline drop test). It was connected to the electronic pneumoinsufflator and CO2 insufflation was commenced at a flow rate of 1 liter per minute. The pressure reading on the insufflator at the tip of the needle and in the intraabdominal cavity was carefully monitored. Intraperitoneal presence of needle was confirmed by :

1. On electronic insufflator indicator.
2. Steady flow of gas.
3. Low pressure in the peritoneal cavity.
4. Symmetrical distension of abdomen.
5. Increasing resonance on percussion over subphrenic area.
6. Increasing resistance by anaesthetist.

**Intra abdominal pressure was kept between 12-14mm of Hg.**

The trocar was inserted towards the pelvis at an angle of about 80 degree to the anterior abdominal wall, aimed towards the maximum depth of the air cushion in the region of the pelvis. First or primary trocar is a blind port and was inserted with all possible precautions. A sudden loss of resistance indicates entry into the peritoneal cavity, which was confirmed by hissing sound of escaping gas. The telescope was now inserted and gas tube was connected. All procedures began with detailed examination of peritoneal cavity. All secondary or additional ports were inserted under vision.

**Technique of Direct Trocar Entry**

- After making the skin incision below the umbilicus, the abdominal wall was grasped in the left hand and lifted up. In very obese patients, the assistant also helped in lifting the abdominal wall. The trocar and cannula were grasped firmly in the right hand of the operating surgeon and pushed into the peritoneal cavity at angle of 45 degrees towards the pelvis.
- Successful entry was confirmed by introducing the camera while the lax abdominal wall was held up with the left hand. The gas tubing was then connected and the pneumoperitoneum was created. A thorough inspection of the peritoneal cavity was done before creating other ports under vision appropriate to the procedure.

**Observation and Results**

The study consisted of 50 cases of each of direct trocar as well as veress needle entry for creating pneumoperitoneun. The break up of cases into various age groups is as follows:

**Table 1:** Age and sex distribution

| Age group | Direct trocar entry | | Veress needle entry | |
|---|---|---|---|---|
| | Male | Female | Male | Female |
| 10-20 | 0 | 0 | 0 | 4 |
| 21-30 | 1 | 5 | 3 | 5 |
| 31-40 | 2 | 6 | 3 | 9 |
| 41-50 | 2 | 18 | 1 | 12 |
| 51-60 | 3 | 9 | 3 | 8 |
| 61-70 | 2 | 2 | 1 | 1 |
| Total | 10 | 40 | 11 | 39 |

The youngest patient in this study was a 16 year old girl and the oldest was a 68 year old male. As it is evident, 80% of the patients with direct trocar entry and 78% with veress needle entry were females. Most of the females were in the age group of 41 to 50 years. Overall female: male ratio was (79: 21).

**Table 2:** Clinical Diagnosis

| Clinical diagnosis | Direct trocar entry | Veress needle entry |
|---|---|---|
| Gall stone disease | 47 | 43 |
| Appendicitis | 3 | 1 |
| Incisional hernia | 0 | 2 |
| Hydatid cyst | 0 | 2 |
| Choledocholithiasis | 0 | 2 |

The direct trocar entry was performed in 47 cases of gall stone disease and 3 cases of recurrent appendicitis for laparoscopic appendicectomy. Veress needle was used in 43 cases of gall stone disease, of which in two cases each appendicectomy and bile duct exploration was done in the same surgery. Repair of Incisional hernia in two cases, marsupialization of hydatid cysts in two cases and choledocholithotomy was done in two cases after veress needle use.

**Table 3:** Adverse Factors to Trocar Insertion

| Factors | Direct trocar entry | Veress needle entry |
|---|---|---|
| History of jaundice | 7 | 4 |
| History of previous surgery | 10 | 11 |
| Obesity | 8 | 7 |

Both the groups were having similar adverse factors as mentioned in this table. In 9 out of 11 patients who had history of jaundice, the illness was transient and recovered at its own, 2 patients were having CBD stones and underwent choledocholithotomy. Diameter of the CBD was 10 and 12 mm with stones in the lower CBD in both the cases. 10 out of 21 patients, who had history of previous surgery, had undergone LSCS via pfannenstiel or lower midline incision. 4 had undergone laparotomy, 2 appendicectomy, 2 pyelolithotomy, 2 incisional hernia repair and 1 splenectomy.

**Table 4:** Insertion Parameters

| Number of insertions | Direct trocar entry | Veress needle entry |
|---|---|---|
| Once | 48 | 44 |
| Twice | 2 | 5 |
| More than two | 0 | 1 |

| Mean camera time taken from skin incision to insertion of camera | |
|---|---|
| Direct trocar entry(in minutes) | 1.74 ± 0.6 |
| Veress needle entry(in minutes) | 4.06 ± 1.2 |

- In cases of direct trocar entry 48 times we had single insertions and 2 times double. 10 of the 48 patients with single insertion were having history of previous surgery and 4 were obese. In 2 patients we had to do two insertions. They were obese and had history of previous surgery. In cases of veress needle entry 44 times we had single insertion while in 5 cases we inserted twice, 3 had previous surgery and 2 had obesity.
- The mean time for camera insertion in case of direct trocar entry was 1 min 74 sec, of which maximum was 3 min 00 sec and minimum was only 1 min 20 sec. The mean camera time in case of veress needle entry was 4 min 06 sec, of which maximum was 7 min 20 sec and minimum was 3 min 10 sec.

**Table 5:** Complications Related to Veress Needle Versus Direct Trocar Entry

| Complications | Direct trocar entry | Veress needle entry |
|---|---|---|
| Git perforation | 0 | 0 |
| Urinary bladder perforation or injury to urinary tract. | 0 | 0 |
| Major vascular injury | 0 | 0 |
| Gas in Mesentry, Omentum or Retroperitoneum | 0 | 0 |
| Gas in Preperitoneal space | 0 | 3 |
| Bleeding at port site | 1 | 1 |
| Abdominal wall haematoma | 2 | 3 |
| Post-Surgery abdominal wall hernia | 0 | 0 |
| Wound infection | 0 | 0 |

There were hardly any complications noted regarding veress needle or direct trocar entry injury in our study as shown in the table. There were three cases of gas in preperitoneal space all with the veress needle. Almost all the cases of abdominal wall haematoma were obese patients having thick abdominal wall.

## Discussion

In todays era of laparoscopic surgery, despite numerous recent technical advances in minimally invasive surgery, the potential exists for serious morbidity during initial laparoscopic access. Safe access depends on adhering to well-recognized principles of trocar insertion, knowledge of abdominal anatomy, and recognition of hazards imposed by previous surgery.

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 occurs prior to commencement of the intended surgery [1].

The first technique to gain access to the peritoneal cavity was the classical open technique by Hasson. Veress techniques was introduced as classical closed method that followed. It was Dingfelder in 1978 who reported a modified version of closed technique of creating pneumoperitoneum with direct trocar insertion which was later described by Copeland *et al.* [2, 3] in 1983, according to whom the prerequisite for the technique are adequately relaxed abdominal wall, adequate skin incision and sharp trocars for insertion with ease.

The present study was conducted in the Department of General Surgery at Dr. M.K. Shah Medical College & Research Centre & Smt S.M.S. Multispeciality Hospital, Ahmedabad, Gujarat, India, a tertiary care hospital, from January 2020 till January 2021. Total of 100 cases were included in the study.

In 50 cases of the study, pneumoperitoneum was created with direct trocar entry while in other 50 cases it was after veress needle entry. In both the groups the patients were of similar male to female ratio and they were having similar adverse factors to veress needle or direct trocar insertion like history of previous surgery and obesity. All the patients were thoroughly studied in detail and after the surgery followed in the ward and OPD.

The majority of the patients included in our study were in the 4$^{th}$ and 5$^{th}$ decade, amongst which there were a higher number of female patients as shown in Table1. Our findings corresponds to age distribution and male: female ratio found in the study done by Mehm*et al.*i Yerdel *et al.* [4] in 1999. Laparoscopic cholecystectomy was the most frequent procedure done, followed by laparoscopic appendicectomy, which correlate with the findings of the study of K. Theodoropoulou *et al.* [5].

The mean time taken to create pneumoperitoneum was less in patients with direct trocar entry(1.74 ± 0.6mins) than patients with veress needle entry (4.06 ± 1.2 mins).Pneumoperitoneum creation by Veress needle insertion, insuflation and trocar introduction takes longer than direct introduction of trocar where in the steps to create pneumoperitoneum are reduced and hence the time. The similar findings were reported by Issam Merdam *et al.* [6]. And Sushma sinha *et al.* [7].

Multiple attempts at insufflations were more common with veress needle as compared to direct trocar entry. Our findings are comparable to the study carried out by Zakherah MS [8], which showed that direct trocar group had only 2% of patients who underwent multiple attempts in contrast to Veress needle group where it was 14%. Borgatta *et al.* [9] too reported fewer instrument insertions with direct trocar (7.8%) as compared to Veress group (21.8%). Incidence of minor complications such as abdominal wall hematoma, bleeding at port site and gas in preperitoneal space, was almost similar in both the groups.

## Conclusion

This study further strengthens the literature on Direct Trocar Entry being a good and safe technique of laparoscopic access. We further conclude with the opinion that direct trocar entry is as safe as prior insufflation of abdomen with the veress needle in a laparoscopic procedure. It is a time saving procedure, reduces the number of blind procedures and eliminates the complications of veress needle entry.

## References

1. Patel PG, Chikhalia DP, Patel R, Jadav S, Dave AM. Direct Trocar Entry in Laparoscopic Surgeries: A Retrospective Study. Gastroenterol Hepatol J 2017;1(109):29-33.
2. Dingfelder JR. Direct laparoscopic trocar insertion without prior pneumoperitoneum. J Reprod Med 1978;21:45-47.
3. Copeland C, Wing R, Huka JF. Direct trocar insertion at laparoscopy: an evaluation. Obstet Gynecol 1983;62:665-669.
4. Yerdel MA, Karayalcin K, Koyuncu A, Akin B, Koksoy C, Turkcapar AG *et al.* Direct trocar insertion versus Veress needle insertion in laparoscopic cholecystectomy. Am J Surg 1999;177:247-9.
5. Theodoropoulou K, Lethaby DR, Bradpiece HA, Lo TL, Parihar A. Direct Trocar Insertion Technique: an Alternative for Creation of Pneumoperitoneum. JSLS 2008;12:156-158.
6. Issam Merdan, Sadq Ghleb Kadem, Yaqoop Ayoob Yaqoop. Safety and efficacy of modified open technique as a first laparoscopic entry in comparison with direct trocar entry and veress needle technique. Bas J Surg 2016;22:15-20.
7. Sushma Sinha, Surya Malik. Veress needle versus direct trocar entry for laparoscopy: A retrospective study. IJRCOG 2019;8:127-130.
8. Zakherah MS. Direct Trocar versus Veress Needle Entry for Laparoscopy: A Randomised Clinical Trial. Gynecol Obstet Invest 2010;69(4):260-3.
9. Borgatta L, Gruss L, Barad D, Kaali SG. Direct trocar insertion vs Veress needle for laparoscopic sterilization. J Reprod Med 1990;35(9):891-4.