



Verres needle versus modified open technique as first access port in laparoscopy

Authorship details:

1. Dr SATYANARAYANA PRASAD A, Assistant Professor, Department of General Surgery, NRI Medical College and General Hospital, Chinakakani, Guntur Dt. – 522503, Andhra Pradesh, India.
2. Dr SUNEETHA GUTUPALLI, Associate Professor, Department of Physiology, NRI Medical College and General Hospital, Chinakakani, Guntur Dt. – 522503, Andhra Pradesh, India.
3. Dr MANIKYA PRASANNAKUMAR P, Assistant Professor, Department of General Surgery, NRI Medical College and General Hospital, Chinakakani, Guntur Dt. – 522503, Andhra Pradesh, India.

ABSTRACT:

Introduction: Accessing the abdominal cavity to create pneumo-peritoneum for laparoscopy is the first and the most crucial step. The entry related complications rate is accounting for about 50% of total complications of laparoscopic surgeries. Both of the most popular closed Veress needle and open Hasson's cannula techniques are associated with complications. Hasson requires a set of special instruments, and they must be fixed after the umbilicus is cut open, which proves to be time consuming. But the modified open technique diminishes the resistance of penetration, thus ensuring more safety and simplifying the laparoscopic entry process. It is fast, easy to learn with very few associated problems.

Aim: To compare the Verres needle and modified open technique as first port in laparoscopy and check the feasibility of training the junior residents with one of the techniques.

Material and methods: All the patients attending the departments of Obstetrics & Gynaecology, Surgical Gastroenterology and General Surgery of NRI MC & GH, requiring laparoscopy are selected into the study over a period of one year and were randomized to both procedures, the Veress needle and modified open technique. Patients contraindicated for general anaesthesia were excluded. The descriptive data of the study subjects is noted and unpaired student's "t" test is employed for analysis of collected data.

Results: It is a cross-sectional, randomized, double blinded, observational study with 268 study subjects. There were 199 patients in group A who underwent laparoscopy by Modified Hasson technique. The Veress technique was used in 69 patients who belonged to group B. The entry access time (the time to place the first port) for group A was significantly lesser than that of group B (5.05 min vs. 17.3 min). There were a total of three complications in group B only. There was no significant difference between the two groups in terms of extraperitoneal port placement, intraperitoneal injury, failure to enter the abdomen, port site seroma, port site infection and mortality. Port site bleeding occurred in two cases in which one needed exploration. One bowel injury occurred in post laparotomy patient with modified open technique which is immediately repaired. Two mesenteric injuries occurred in Veress needle entry.

Conclusion: A high cost and less availability of laparoscopic equipment is a challenge in developing countries. Establishing pneumoperitoneum through commonly described techniques not always be feasible. So the Modified open technique has an advantage of ease of access, safety, less time consuming and easy trainability to residents.



INTRODUCTION

Accessing the abdominal cavity to create pneumo-peritoneum for laparoscopy is the first and most crucial step. It's even a daunting task for an academic surgeon to make his residents learn the step with ease. Commonly there are closed (Veress needle), open (Hassan cannula) and direct trocar insertion techniques. The entry related complications rate is accounting for about 50% of total complications of laparoscopic surgeries¹. Complications associated with introduction of the Veress needle for inducing pneumoperitoneum include pre-peritoneal insufflation, pneumo-omentum, gas embolism, failed placement or multiple attempts to enter the abdominal cavity provoking minor and/or major injuries, including those to intestines or vascular structures. Open laparoscopy introduced by Hasson requires a set of special instruments, and they must be fixed after the umbilicus is cut open, which proves to be time consuming. Direct trocar insertion described by Dingfelder has potential for injuries from the sharp tip. But the modified open technique diminishes the resistance of penetration, thus ensuring more safety and simplifying the laparoscopic entry process. It is fast, easy to learn with very few associated problems.²

In 1947, Raoul Palmer of France popularized the use of the Veress needle using CO₂ to induce pneumoperitoneum. In patients known or suspected to have peri-umbilical adhesions, or after failure to establish pneumoperitoneum after three attempts, alternative sites for Veress needle insertion may be sought.³⁻⁵ Palmer's point, Trans-uterine, Trans cul-de-sac, Ninth or tenth inter-costal space.

Hasson first described the open entry technique in 1971⁶. The suggested benefits are prevention of gas embolism, of pre-peritoneal insufflation, and possibly of visceral and major vascular injury. A small incision is made transversely or longitudinally at the umbilicus. This incision is long enough to be

able to dissect down to the fascia, incise it, and enter the peritoneal cavity under direct vision⁶. The cannula is inserted into the peritoneal cavity with the blunt obturator in place. Sutures are placed on either side of the cannula in the fascia and attached to the cannula fitted with cone shaped sleeve or purse-stringed around the cannula to seal the abdominal wall incision to the cone-shaped sleeve.

Hasson advocated the open technique as the preferred method of access for laparoscopic surgery.⁷ Using the closed technique, the visceral and vascular complication rates were 0.22% and 0.04% for general surgeons and 0.10% and 0.03% for gynaecologists. A meta-analysis of English language studies from both the gynaecological and general surgical literature addresses only major complications defined as bowel or vascular injury.⁸ Hasson et al. conclude "There is no evidence to support abandoning the closed entry technique in laparoscopy; however, the selection of patients for an open or alternative procedure is still recommended."⁹

The suggested advantages Dingfelder's method (1978) of entry are the avoidance of complications related to the use of the Veress needle, a failed pneumoperitoneum, preperitoneal insufflation, intestinal insufflation, or the more serious CO₂ embolism.¹⁰ The direct entry method is faster than any other method of entry¹¹. The technique begins with a supra-umbilical skin incision wide enough to accommodate the diameter of a sharp trocar/cannula system. The anterior abdominal wall must be adequately elevated by hand, and the trocar is inserted directly into the cavity, aiming towards the pelvic hollow.

Veress needle technique for creating pneumoperitoneum is comparable or even superior to open technique, but surgeon must continue with the primary access technique in which they feel more comfortable and



confident.¹² Compared with the traditional Veress needle puncture, the modified open trocar first-puncture is easier to follow, especially for learners. Opening the umbilical hole for the sake of minimizing or zeroing puncture resistance is a safer and more practicable manoeuvre for laparoscopic entry.¹³

So this study has been aimed to observe the ease of gaining access to abdominal cavity, safety profile, the ease in training of residents, and other advantages of the procedure when compared to Veress needle in establishing pneumoperitoneum for patients requiring laparoscopy in NRI MC & GH, Chinakakani, Guntur (Dt.), A.P.

MATERIALS & METHODOLOGY:

All the patients attending the departments of Obstetrics & Gynaecology, Surgical Gastroenterology and General Surgery of NRI MC & GH, requiring laparoscopy are selected into the study over a period of six months and are randomized to both procedures, the Veress needle and modified open technique. Patients contraindicated for general anaesthesia are excluded.

Modified open technique steps:

Skin incision and retraction with S shaped retractors. Fig – 1



Lifting of linea alba with Spencer wells curved haemostat. Fig – 2

No potential risk to the subjects during the study as the procedures are routinely performed in NRI MC & GH. Also are benefited in the way that the potential risks of Veress needle insertion can be avoided if we adopt the modified open technique as a routine for gaining access to abdominal cavity. Potential benefits the study going to derive will be that, we can adopt less time consuming and most economical procedure for routine use and the residents can easily be trained in laparoscopy.

Procedure:

After making a horizontal incision just above the umbilicus, Subcutaneous tissue is dissected with artery forceps. Linea alba is identified and lifted upwards by holding with two artery forceps on either end of the incision. Langenbecks retractor is used to retract skin. 11 number surgical blade is used to incise the linea alba in the midline, vertically. A blunt trocar is used to make a entry into the abdominal cavity. Abdominal cavity is insufflated and scope is introduced to confirm the access. Time taken from incision to visualization of abdominal cavity is noted.

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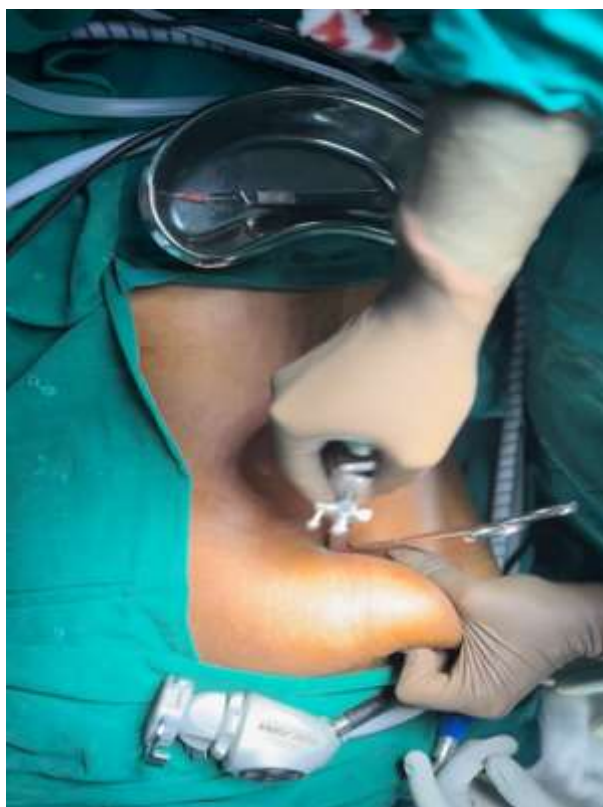
Incision of linea alba with 11 size surgical blade. Fig – 3



Insertion of blunt tipped trocar into peritoneal cavity. Fig – 4

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STATISTICAL ANALYSIS:

It is a cross-sectional, randomized, double blinded, observational study. The ease of gaining access to the abdominal cavity is measured by the time consumed and complications during the procedure. The descriptive data of the study subjects is noted and unpaired student's "t" test is employed for analysis of collected data. Subjects will be benefited in the way that the modified open technique is less time consuming, thus decreasing the duration of exposure of subjects to the harmful effects of general anaesthesia, and also avoiding the lethal complications of Veress needle insertion. Needs no special set of instruments and also no extra CO₂ for insufflation.

RESULTS:

It is a cross sectional randomized double blinded study period of one year. There were a total of 268 patients underwent laparoscopic surgery during the study period. 32 patients with history of one previous abdominal surgeries and 21 patients with history of two previous surgeries and 2 patients with three previous surgeries were

considered for the analysis. Among the study group females were predominant (M:F=97:171) and the mean age of the study population was 35.5 years. The indications for surgery and complications were expressed in percentages as acute appendicitis (26 patients; 9.7%), cholelithiasis (127 patients; 47.38%), inguinal hernia (40 patients; 14.92%), Diagnostic Laparoscopy (26 patients; 9.7%), Laparoscopic ovarian cystectomy (17 patients; 6.34%) and LAVH (32 patients , 11.96 %) and the complications are, Port site bleeding occurred in two cases in which one needed exploration. One bowel injury occurred in post laparotomy patient with modified open technique which is immediately repaired. Two mesenteric injuries occurred in Veress needle entry. There was no mortality in the study group.

There were 199 patients in group A who underwent laparoscopy by Modified Hasson technique. The Veress technique was used in 69 patients who belonged to group B. There was no difference between the two groups in terms of age and indications for the surgery. The entry access time (the time to place the

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first port) for group A was significantly lesser than that of group B (5.05 min vs. 17.3 min). There were a total of three complications in group B only. There was no significant difference between the two groups in terms

of extraperitoneal port placement, intraperitoneal injury, failure to enter the abdomen, port site seroma, port site infection and mortality.

Table 1. Age Distribution

Age group (Years)	Distribution (n=100)	
	Number	Percentage
11 to 20	8	2.98
21 to 30	85	31.71
31 to 40	136	50.74
41 to 50	16	5.97
51 to 60	15	5.59
61 to 70	5	1.86
71 to 80	3	1.15
Total	268	100

Table 2: Sex Distribution

Sex distribution	Distribution (n=100)	
	Number	Percentage
Male	97	36.2
Female	171	63.8
Total	268	100

DISCUSSION:

Many methods have been developed during the last three decades to counter the complications associated with first port insertion in laparoscopy. But no single instrument or method has achieved the desire¹⁴. As there is no guideline for first port entry, various techniques have been followed worldwide^{15 - 17}. Persons with previous abdominal surgeries posed a threat of visceral injury during first port placement. Number of previous surgeries does not increase the risk^(REF). One such surgery occurred during modified open technique. Palmers point Veress needleinsertion is preferred site for peritoneal entry when midline scar is present¹⁸. In 20.5% of study population, previous abdominal surgeries observed. Most of the complications during first port insertion occurred with them.

Complications occurred in every hand irrespective of the experience of surgeon but an experience of more than five years is confronted with ease of access through first port¹⁴.

An abdominal girth of more than 90 cms is met with more difficulty in first port access through Veress needle. So, the Palmers point entry is preferable in such situation in terms of time taken for entry and ease of access.

Port site bleeding occurred in two cases in which one needed exploration. One bowel injury occurred in post laparotomy patient with modified open technique which is immediately repaired. Two mesenteric injuries occurred in Veress needle entry.

CONCLUSION:



A high cost and less availability of laparoscopic equipment is a challenge in developing countries. So establishing pneumoperitoneum through commonly described techniques not always be feasible. So a Modified open technique has an advantage of ease of access, safety, less time consuming and easy trainability to residents.

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