

Study of Direct Trocar Insertion Technique For Creating Pneumoperitoneum In Laparoscopy: A Case Series Of 50 Cases

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Abstract

Introduction : Laparoscopy is the art of examining the abdominal cavity and its contents without making large incisions. The first step in laparoscopic surgery is LE and creation of pneumoperitoneum. This is a very important step because it allows easy and safe insertion of the other ports under direct vision through the telescope 2.

Aims & Objectives : To assess time of establishment of pneumoperitoneum in Direct Trocar Insertion technique, To assess complications in Direct Trocar Insertion technique.

Material and Method: Among 50 patients, Direct Trocar insertion technique was used, complications were assessed.

Results: The mean duration for creating pneumoperitoneum is 2min 05 secs. No major complications were found.

Discussion: Direct trocar insertion is a safe and effective method in a learned hands with less complications and less time taken for creating pneumoperitoneum.

Keywords: Direct trocar insertion, Laparoscopy, Pneumoperitoneum

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I. Introduction

Laparoscopy is the art of examining the abdominal cavity and its contents without making large incisions. It requires insertion of a cannula through the abdominal wall, distention of abdominal cavity with gas or air (pneumoperitoneum), visualization and examination of the abdominal contents through an illuminated telescope and/or performing operative procedures then. The first step in laparoscopic surgery is LE and creation of pneumoperitoneum. This is a very important step because it allows easy and safe insertion of the other ports under direct vision through the telescope. The laparoscopic intraperitoneal access is associated with injuries to the gastrointestinal tract and major blood vessels. At least 50% of these injuries occur before starting the operation. [1]. In spite of significant advances in endoscopic techniques and instrumentation, inadvertent and potentially avoidable complications related to abdominal entry continue to occur. [2], including lifethreatening complications such as damages of major abdominal vessels, bowel injuries, bladder injuries, extra-peritoneal emphysemas and postoperative infections. [3,4] The standard techniques of insufflations are: Veress needle, open laparoscopy where the peritoneum opened under direct vision (Hasson's method), optical trocar insertion and direct trocar insertion (DTI) in addition to variants of these techniques. [5] Direct trocar insertion without prior pneumoperitoneum was first described by Dingfelder JR et al. in 1978. [6] It has many benefits as; a shorter operation time, immediate recognition of vascular and visceral injuries, decrease incidence of entry failure. [7] and less insufflation-related complications such as gas embolism. [8] Trocar is a medical device that is made up of an obturator (which may be a metal or plastic sharpened or non-bladed tip), a cannula (basically a hollow tube), and a seal. Trocars are placed through the abdomen during laparoscopic surgery. The trocar functions as a portal for the subsequent placement of other instruments, such as graspers, scissors, staplers, etc.

1. Aim and Objectives

- To assess time of establishment of pneumoperitoneum in Direct Trocar Insertion technique.
- To assess complications in Direct Trocar Insertion technique.

II. Materials And Methods

2.1 Plan OF STUDY

1. Sample Size: 50 Patients (50 using Direct Trocar technique)
2. Eligibility criteria

2.2 Inclusion criteria for the study are:

- Patients over the age of 18 years and up to 70 years.
- Presence of a pathological condition.
- Subjects eligible for elective surgery.
- Written signed informed consent.

2.2 Subjects fulfilling the following exclusion criteria will not be recruited into the study:

- Patients who had undergone previous midline laparotomy for any infective pathology in abdomen.
- BMI equal to or more than 35.
- Patients with umbilical hernia.
- Patients receiving antiplatelet agents or anticoagulants.
- Known history of alcohol or drug abuse
- Liver cirrhosis
- Known immunodeficiency.
- Severely compromised physical or psychological health, concurrently participating in another clinical trial and having received another investigational drug or device within the last 30 days

a) Surgical technique

Technique:

Pneumoperitoneum was created by following technique Direct Trocar Insertion- In this method of entry, a 10 to 12mm transverse incision was given supraumbilically or infraumbilically. After placing the patient in Trendelenburg position, abdominal wall was elevated with towel clamps and the trocar was inserted into the abdominal cavity turned 30 degrees towards pelvis.

d) Data extraction

The following data will be collected using predesigned and pretested questionnaire.

- Patient group demographics:
 - Number of patients
 - Gender
 - Mean age
 - Sex ratio
 - Body mass index(bmi)
 - Technique of Laparoscopic entry
- Peri-operative parameters:
 - Attempts required to create pneumoperitoneum
 - Time taken for Laparoscopic entry
- Outcome measures:
 - Subcutaneous emphysema
 - Abdominal wall Haemorrhage
 - Extra peritoneal insufflations
 - Gas leak
 - Visceral injury
 - Omental injury
 - Port site infection
 - Vascular injury
 - Port site Pain
 - Port site Hernia

III. Results

The present study was conducted in the Department of Surgery, Mahatma Gandhi Medical College, Jaipur over a period of one year with effect from 1st May 2016 to 30th April 2017. The study was conducted on 50 patients who underwent laparoscopic procedures, including Lap. Cholecystectomy, Lap. Ovariancystectomy, Diagnostic Laparoscopy

In this study of 50 patients, which included 15 males & 35 females of age group 18-70 years over a period of 1 year. We found the following results:

		Percentage
Average attempts required to create pneumoperitoneum	1.2	
Average Time taken for entry	2min 05 seconds	
Complications		
Gas Leak	3 in 50 patients	6%
Subcutaneous emphysema	1 in 50 patients	2%
Abdominal wall Hemorrhage	2 in 50 patients	4%
Visceral injury	0	
Omental injury	0	
Vascular injury	0	
Port site pain		
Post site hernia	1 in 50 patients	2%
Port site infection	3 in 50 patients	6%

The mean time taken (in minutes) to induce pneumoperitoneum in Direct trocar technique (DT) technique mean time was 2.05 ± 0.66 minutes. Out of 50 patients in direct trocar entry, gas leak was found in 6% patients. Extra peritoneal insufflation was found only in 2% of patients. 4% had abdominal wall hemorrhage. There was no major vascular injury, gastrointestinal injury, and solid organ injury.

IV. Discussion

In this era of Modern Surgery, laparoscopic surgery has gained much popularity amongst the doctor and patients. The main reason for this being its advantages like minimal access approach, shorter hospital stay, early return to daily activities, minimal post operative morbidity & good cosmesis. Laparoscopic cholecystectomy has become the standard of care for symptomatic gall bladder disease and is currently almost widely used in amongst every surgical subspecialty. Despite its superiority over open surgery, it is not completely risk free and many of its complications are related to creation of pneumoperitoneum for gaining access to intraabdominal cavity. In the last three decades, rapid advances in laparoscopic surgery have made it an invaluable part of general surgery; but no clear consensus is there regarding the best method of gaining access to the peritoneal cavity to create pneumoperitoneum. Various studies are continuously being carried out. The present study was conducted in the Postgraduate Department of Surgery, Mahatma Gandhi Medical college, Jaipur over a period of one year on 50 patients who met the inclusion criteria. In the present study, patients who agreed to participate and signed an informed consent form. Various studies have been done regarding this technique, Hassan Khalil Melek et al [13] in his study on 236 patients showed that the mean time of Direct trocar insertion is (1.9 ± 0.9 minutes). Regarding postoperative complications, Subcutaneous emphysema was found in 3 cases (1.27%) visceral injury found in none, omental injury in 2 cases (0.84%), port site hernia in 2 cases (0.84%), port site infection in 8 cases (3.38%). Another study done by Rakesh Kaul et al [14] on 50 patients, the mean time taken to induce pneumoperitoneum in direct trocar insertion was 3.18 ± 0.66 minutes. Abdominal wall haemorrhage found in 2 cases (4%), extra peritoneal insufflations in 1 patient (2%), gas leak in 1 case (2%), omental injury found in 1 case (2%). There was no major complications. We compared the results of our study with other studies and found there was a collaboration of our study with the above mentioned results.

V. Conclusion

Direct trocar insertion technique for laparoscopic entry is a safe, efficient and quick method easily learned by surgeons previously trained in laparoscopic procedures. It has shorter entry time than other laparoscopic entry techniques with low incidence of both, major and minor complications.

Complications	This Study	Hassan Khalil Melek et al	Rakesh Kaul et al
Gas Leak	6%		1%
Subcutaneous emphysema	2%	1.27%	2%
Abdominal wall	4%		4%

Hemorrhage			
Visceral injury	0	0	0
Omental injury	0	0.84%	2%
Vascular injury	0	0	0
Post site hernia	2%	0.84%	
Port site infection	6%	3.38%	

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