

# Direct Trocar Insertion: an Efficient Access Technique for Laparoscopic Cholecystectomy

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## ABSTRACT

**Aim:** To evaluate the feasibility and safety of direct trocar insertion for gaining access to peritoneal cavity in laparoscopic cholecystectomy.

**Methods:** An Observational study was conducted at Surgical unit II Ghulam Mohammad Mahar Medical College Hospital Sukkur from January 2016 to December 2020. Two thousand one hundred twenty (n=2120) patients were included in the study. All the patients who underwent laparoscopic cholecystectomy were included in the study. Informed and written consent was obtained from every patient to participate as study subject. Data was analyzed on SPSS version 16. Mean +/- standard deviation was calculated for age, first port access time and time to establish pneumoperitoneum.

**Results:** Under general anesthesia with patient in supine posture, abdominal access gained by first making small incision of 10mm in skin and subcutaneous fat at sub umbilical region with No. 11 scalpel and then by direct trocar insertion followed by creation of pneumoperitoneum. Cholecystectomy performed. Study variables included first port access time, no. of attempts for DTI, extraperitoneal CO<sub>2</sub> insufflation, port site bleeding, visceral injury, port site infection and port site hernia and were recorded on predesigned proforma. Variables like extraperitoneal CO<sub>2</sub> insufflation, port site bleeding and visceral injury were expressed as percentage.

**Conclusion:** We conclude that direct trocar insertion is the safe, quick and effective method for creation of pneumoperitoneum and should be employed routinely in all laparoscopic procedures.

**Keywords:** Laparoscopy, Cholecystectomy, Trocars

## INTRODUCTION

Laparoscopic cholecystectomy is the gold standard procedure for treatment of cholelithiasis<sup>1 2 3 4</sup>. 1<sup>st</sup> laparoscopic cholecystectomy was performed in Germany in 1985<sup>5</sup>. Superiority of laparoscopic cholecystectomy over open procedure is well established due to its cost effectiveness, lesser complications and cosmetic benefits<sup>6 7 8 9</sup>, however it is still not totally free of complications<sup>10</sup>. Gaining access to peritoneal cavity & Creation of pneumoperitoneum is the first and the most crucial step in every laparoscopic surgery including laparoscopic cholecystectomy<sup>11</sup>. Bleeding, subcutaneous emphysema, gastrointestinal tract perforation, and minor and major vascular injuries are the potential complications associated with abdominal access and creation of pneumoperitoneum<sup>12</sup>. Various access techniques have been tried and have come in practice like closed technique using Veress needle, open technique (Hasson), direct trocar insertion, the use of disposable shielded trocars, radially expanding trocars and visual entry systems<sup>13 14</sup>. There are proponents and opponents to every access technique. Practically the choice of method is left to the surgeon's preference<sup>15</sup>. Overall the open Hasson technique is proven as the safest of all. In 1978 Dingerfelder first used the term direct trocar insertion. Although its efficacy and safety profile is reasonable, it is probably the least used entry technique<sup>17 18 19 20</sup>. Our institution is practicing laparoscopic cholecystectomy for last 12 years and since 5 years we have started trying direct trocar method for creation of pneumoperitoneum. Rationale of performing this study was to test the efficacy and safety profile of direct trocar insertion so that it can be adopted as the preferred method for entry into abdomen with all its benefits.

## MATERIALS & METHODS

This prospective study was performed at Surgical Unit-II, Ghulam Mohammad Mahar Medical College Hospital Sukkur from January 2016 to December 2020 after IRB permission. All the patients who underwent laparoscopic cholecystectomy were included in the study. Sampling technique as Non-probability consecutive. Informed and written consent was obtained from every patient to participate as study subject. Under general anesthesia with patient in supine posture, a small 10mm supra/infraumbilical incision was made into the skin and subcutaneous tissue with No. 11 scalpel. A 10 mm trocar was inserted perpendicular to abdominal wall after lifting it with two hands. Peritoneal cavity was accessed and pneumoperitoneum was created. Telescope was inserted and vicinity of trocar checked for any bleeding or visceral injury. Cholecystectomy performed and at the end before removing the telescope and umbilical trocar, vicinity of trocar was again checked for any trocar related trauma. 1<sup>st</sup> port access time, time to establish pneumoperitoneum, complications due to direct trocar insertion like extra peritoneal CO<sub>2</sub> insufflation, port site bleeding and any visceral injury were noted. Patients were discharged on 1<sup>st</sup> or 2<sup>nd</sup> postoperative day and followed up for a period of 6 months. All data recorded on predesigned proforma. Data was analyzed on SPSS version 16. Mean +/- standard deviation was calculated for age, first port access time and time to establish pneumoperitoneum. Variables like extra peritoneal CO<sub>2</sub> insufflation, port site bleeding and visceral injury were expressed as percentage.

## RESULTS

A total of 2120 patients who underwent laparoscopic cholecystectomy using direct trocar insertion method were included in this study. Age ranged from 20 to 65 years with mean age of 41.4 +/- 5.04 years. Majority of patients were female 1866(88%) with male: female of 1: 7.3. BMI was recorded in every

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patient. Mean BMI was 30.05 +/- 3.33 kg/m<sup>2</sup>. Important procedural and outcome variables are shown in table No 1 and 2.

Table 1: Mean +/- standard deviation

Outcome variables	Range	Mean +/- SD (Average)
1 <sup>st</sup> port access time	10 -59 seconds	15.1 +/- 1.3 seconds
No: of attempts of DTI	1 –3 attempts	1 attempt
Time to establish pneumoperitoneum	40 seconds - 4 minutes	1.5 +/-0.9 minutes

Table 2: Complications related to DTI

Outcome variables	n	%age
Extra peritoneal CO2 insufflations	69	3.2%
Visceral injury	0	0
Port site bleeding	34	1.6
Port site infection	102	4.8
Port site hernia	05	0.23

## DISCUSSION

Gaining access to peritoneal cavity & creation of pneumoperitoneum is the first and the most crucial step in every laparoscopic surgery including laparoscopic cholecystectomy<sup>11</sup>. Various access techniques have been tried and have come in practice like closed technique using Veress needle, open technique (Hasson), direct trocar insertion, the use of disposable shielded trocars, radially expanding trocars and visual entry systems<sup>13 14 15</sup>. Although the open Hasson technique is proven as the safest of all; efficacy and safety profile of Direct trocar method is also reasonable but it is still the least used entry technique<sup>17,18,19,20</sup>. We as proponents of direct trocar technique carried out this study to add a little more in favour of DTI.

This study was carried out on 2120 patients. Age ranged from 20-65 years. Mean age was 41.4 +/- 5.04 years. Age ranged from 40 to 47 years in few other studies<sup>12 13 14</sup>. In current study M:F ratio was 1:7.3. In a study done by Mohammad Tariq et al, M:F ratio was 1:1.43<sup>12</sup> which is quite different from our study; while in another study it was 1:11<sup>13</sup>. Mean BMI was 30.05 +/- 3.33 kg/m<sup>2</sup> in our study while in other studies it ranged from 24.73 -26.1 kg/m<sup>2,12,14</sup>.

First port access time in current study ranged from 10 to 59 seconds (Mean=15.1 +/- 1.3 seconds); which is comparable to other studies (55-69 seconds)<sup>14 21</sup>, while in one study done by Muneer Imran mean access time of DTI was 4.4 minutes which is quite long<sup>13</sup>. In our study, peritoneal cavity was accessed in first attempt in majority of patients 96.7% (n=2,051), while in remaining cases 2<sup>nd</sup> & 3<sup>rd</sup> attempts went successful. In two studies DTI was successful in 1<sup>st</sup> attempt in 91-92% patients<sup>12 21</sup>. Failure of DTI was not observed in any patient 0% in our study. Mohammad Tariq reported failure rate with DTI of 2.5%<sup>12</sup>. Time to establish pneumoperitoneum ranged from 40 seconds to 4 minutes in our study. In a study done by Muneer Imran et al time to establish pneumoperitoneum was 4.4 minutes +/- 1.2 minutes<sup>13</sup>. Frequency of Complications due to Direct trocar insertion in our study is shown in table no: 2. Mohammad Tariq et al and Agresta reported no major or minor immediate or long term complication with DTI<sup>12 14</sup>. Muneer imran reported just two complications port site hematoma 2% and port site infection 3%<sup>13</sup>. In another study only skin bleeding and ecchymosis was observed in 0.34% cases<sup>22</sup>.

## CONCLUSION

We conclude that direct trocar insertion is the safe, quick and effective method for creation of pneumoperitoneum and should be employed routinely in all laparoscopic procedures.

**Conflict of interest:** None to declare

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