

## Direct Trocar Entry Technique: A Safe Method of Primary Trocar Entry In Laparoscopic Surgery

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**Abstracts:** Primary trocar entry for implementation of pneumoperitoneum is the key step of laparoscopic surgery. Most of the complications like bleeding, haematoma, visceral injury and major vascular injury occur during this initial step of laparoscopic procedure. Various techniques like Veress needle, open (Hasson), optical trocar have been used to prevent such complications. Currently, none of the available methods of entry to the peritoneal cavity for producing pneumoperitoneum are free of complications. Direct trocar entry to the peritoneal cavity to produce pneumoperitoneum in laparoscopic surgery may be considered as an alternative and equally safe method like other methods of primary trocar entry.

**Keywords:** primary entry, laparoscopy, direct trocar puncture, pneumoperitoneum

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### I. Introduction

Laparoscopic abdominal surgery requires the implementation of successful pneumoperitoneum and in the vast majority of patients with more than half of all complications occurring at the time of entry<sup>1</sup>. Various techniques have been used including the Veress needle, open (Hasson), visual entry systems to prevent such injuries. Each of these methods of entry enjoys a certain degree of popularity according to the surgeon's training, experience and bias, and according to regional and interdisciplinary variability<sup>2</sup>. Direct trocar entry to the peritoneal cavity to produce pneumoperitoneum in laparoscopic surgery may be considered as an equally safe method like other methods of primary trocar entry.

### II. Materials And Methods

175 cases undergoing various laparoscopic surgery in our surgical unit of Gauhati Medical College from January 2015 to December 2016 on whom primary trocar entry was done by direct trocar puncture technique. 5mm metallic trocar was used for direct puncture. We did not use disposable trocar. Our preferred site of primary trocar entry was through the umbilicus. Criteria of exclusion to the study were presence of umbilical hernia or previous surgery where umbilicus was used and there is suspicion of underlying adhesion. Previous infraumbilical either midline or para median incision does not preclude the use of umbilical entry.

After cleaning the umbilicus 5mm incision was made over the skin of the center of the umbilicus. Then skin is separated slightly from the underlying fascia with the tip of artery forceps. Now two pairs of Backhouse towel clips were used to grasp the skin about 5 cm away on either side of umbilicus. The assistant then lifts the abdominal wall by lifting the towel clips which is grasping the abdominal wall. Elevation of the abdominal wall by this method would lift the abdominal wall far away from the underlying viscera preventing injury during direct trocar puncture. Surgeon with the left hand grasps the abdominal wall in suprapubic region midway between the umbilicus and pubic symphysis further elevates the abdominal wall from the underlying viscera. Then with the right hand a 5mm metallic trocar is introduced by twisting force directly into the peritoneal cavity through the initially made skin incision over the center of umbilicus. A feel of giving away resistance at the tip while thrusting the trocar indicates the entry into the peritoneal cavity. Insufflations with CO<sub>2</sub> are done through this port and peritoneal cavity is thoroughly inspected for any injury. After that other ports are made as required for the surgery.

### III. Results And Observations

Out of 175 cases 98 were female and 77 were male. Female outnumbered male because most of the cases were for laparoscopic cholecystectomy and cholelithiasis is more common in female than male. We observe that lowest time taken from umbilical skin incision to peritoneal entry is 60 seconds and highest time taken is 80 seconds with an average time of 70 seconds. Out of 175 cases 139 were lap cholecystectomy, 25 were

lap inguinal hernia, 4 cases of lap rectopexy, 2 cases of lap abdomino perineal resection, 2 cases of lap gastrojejunostomy, 2 cases of lap cystogastrostomy and one case of lap rt.hemicolectomy.

Type of lap surgery	No.
Lap cholecystectomy	139
Lap inguinal hernia	25
Lap Rectopexy	4
Lap Gastrojejunostomy	2
Lap Cystogastrostomy	2
Lap abdominoperineal resection	1
Lap CBD exploration	1
Lap rt. Hemicolectomy	1

**Table -I**

Complication	No.	Percentage (%)
Port site bleeding	1	0.6%
Failed attempt	2	1.1%
Vascular injury	Nil	0%
Bowel injury	Nil	0%
Bladder injury	Nil	0%
Omental injury	2	1.1%

**Table -II**

#### IV. Discussion

Primary direct trocar entry is a very fast and effective method of inserting the trocar for pneumoperitoneum formation in laparoscopic surgery. In our study the minimum time taken was 60 seconds and maximum time taken was 80 seconds. The average time taken for primary trocar entry was 70 seconds which is very faster than other technique of primary trocar entry. The point of umbilical scar is the thinnest one and only covered by skin underlying the fascia. So through this point after making a small incision and separating the skin from the underlying fascia, when a 5 mm trocar is thrust, it enters the peritoneal cavity very easily. It is very easy to lift the abdominal wall away from the underlying viscera by applying skin traction with two pair of backhouse towel clip hold by the assistant on either side of umbilicus. Elevating the abdominal wall by surgeon's left hand grasping the infraumbilical region further increases the safety of the procedure. Closure of the 5mm port is very easy as it does not require fascial closure only skin closure is sufficient. Over and above the umbilical scar will not be visible afterwards and produces better cosmetic result.

MS Zakherah et al (2010)<sup>3</sup> concluded that direct trocar entry has the advantage of less cost and rapid creation of pneumoperitoneum in a study of 500 cases with a mean time entry to be 2.2±0.7 minutes.

In a study conducted by Ertugrul et al (2015)<sup>4</sup> on 39 patients the mean time taken for direct trocar entry was 79.6 ± 94.6 seconds. According to them, direct trocar entry in obese patients significantly shortens entry time in comparison to Veress needle technique, but there can be severe complication with it.

Rajesh Godara et al (2015)<sup>5</sup> found on 100 patients direct trocar entry as a fast and reliable alternative to traditional technique of primary port placement with a mean time taken of 1 minute (42 sec-3 min. 0 4 sec).

In our study few cases needed multiple attempts to enter to the peritoneal cavity by direct trocar puncture. If first attempt was not successful to enter the peritoneal cavity then we took out the trocar and tried again to prevent inadvertent injury. But 3 unsuccessful entries were considered as failed entry of primary trocar insertion and were converted to open Hasson's technique immediately. In two cases (1.1%) attempt for direct trocar entry was failed and converted to Hasson's technique.

G Ahmed et al (2015)<sup>6</sup> stated in his study that there were three advantages with direct-trocar entry when compared with Veress Needle entry, in terms of lower rates of failed entry (Peto OR odds ratio) 0.21, 95% CI (confidence interval) 0.14 to 0.31, extra peritoneal insufflation (Peto OR 0.18, 95% CI 0.13 to 0.26), and omental injury (Peto OR 0.28, 95% CI 0.14 to 0.55).

M Kosouta et al (2014)<sup>7</sup> reported 0.72% incidence of failed entry with Veress needle. Ertugrul et al (2015)<sup>4</sup> reported 5% incidence of failed entry with Veress needle technique.

In a study of H M Hasson et al (2000)<sup>8</sup> on 5284 patients the incidence of bowel injury using Hasson's method was found to be 0.019%.

In our study of direct trocar insertion method we did not record any bowel or other visceral injury.

M M Rahman et al (2003)<sup>9</sup> reported an incidence of 0.22% of bowel injury with direct trocar entry and F Agresta et al (2012)<sup>10</sup> reported no bowel injury in the study of 2175 cases

H Shyani-Nasab et al (2013)<sup>11</sup> reported vascular injury of 1.9% with direct trocar entry and J L Azevado et al (2009)<sup>12</sup> reported 0.01% of vascular injury with Veress needle.

In our study we had not found any vascular injury except one (0.6%) case of port site bleeding which was controlled by diathermy introducing the instrument through another port. Omental injury was found in 2 cases (1.1%) due to adhesion with previous operation scar near umbilicus. Bleeding from omental injury was easily managed by using bipolar diathermy. Elevation of the abdominal wall by skin traction with towel clips hold by the assistant at the time of direct trocar entry is a crucial step to prevent injury. Mary T .Jacobson et al (2002)<sup>13</sup> reported no vascular injury in his study group 1385 cases of direct trocar entry technique.

## V. Conclusion

Direct trocar entry technique may be considered as a safe alternative technique for primary trocar entry in laparoscopic surgery. But to have the power to establish whether one method of abdominal entry is superior to another it would need a time tested large scale study. Currently, none of the available method of trocar entry to the peritoneal cavity for insufflation of pneumoperitoneum are free of complication.

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