

# FIRST PORT PLACEMENT FOR PNEUMOPERITONEUM

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## ABSTRACT

*Objective* To find out utility of a modified method of creating pneumoperitoneum for laparoscopic surgery.

*Study design* Quasi-experimental study.

*Place & Duration of study* Ziauddin Medical University Hospital and Kutiyana Memon Hospital, Karachi from September 2007 to March 2008.

*Patients and Methods* The modified method for the creation of pneumoperitoneum for laparoscopic surgeries was applied to all patients. Approximately 1.2 cm vertical incision was made below the umbilicus and subcutaneous fat separated by blunt dissection till the rectus sheath visualized. A small incision approximately 5 mm was made in the full thickness of linea alba without opening the peritoneum. An artery forcep was then introduced in the peritoneum to open it. Rate of success of the procedure, time from sub umbilical incision to insertion of telescope and complication / difficulty encountered during the procedure were recorded in the operative notes and pre designed proforma. Results of the present technique was analyzed and compared with published literature in terms of visceral injury and air leak.

*Results* A total of 55 patients were included in this study. Scar of previous abdominal surgery was present in 16 patients. Mean time from skin incision to insertion of telescope was 55 seconds (ranging from 35 to 95 seconds). Trocar insertion into extra-peritoneal space occurred in 6 patients. Withdrawl and re-insertion into peritoneal space was successful in all cases except in 2(3.63%) patients in whom procedure was converted to open technique. No bowel or visceral injury occurred during the procedure. Gas leakage was not encountered during entire surgical procedure in all the patients.

*Conclusion* This modified technique for the creation of pneumoperitoneum for laparoscopic surgery is safe, quick and without the use of any specialized or disposable instruments.

*Key words* Laparoscopy, Pneumoperitoneum, Port placement, Technique, Visceral injury.

## INTRODUCTION:

In laparoscopic surgery a safe access to the peritoneal cavity is the first step towards a successful procedure.<sup>1</sup> The initial penetration of the abdominal cavity to produce a pneumoperitoneum can be a hazardous task and insertion of instrument can lead to injury to any underlying viscera therefore surgeons look for an expeditious, effective, reliable and safe technique to create

pneumoperitoneum.<sup>2,3</sup> To access the peritoneal cavity, commonly two techniques are in practice, close peritoneal insufflation (by Veress needle and trocar insertion) and open trocar placement (Hasson's technique).<sup>3</sup> Regardless of the method applied for pneumoperitoneum, penetrating injury to the underlying structures occurs in approximately 1 in 1000 cases,<sup>4</sup> hence an individual surgeon should assess which technique best suits to his/her operating circumstances<sup>5</sup>.

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Authors have been using open technique but air leak in most cases led to modify the method and an experience of this technique for creating pneumoperitoneum is presented in this article.

### **PATIENTS AND METHODS:**

This study includes patients on whom the modified technique was used for the creation of pneumoperitoneum for various laparoscopic procedures at Ziauddin Medical University Hospital and Kutiyana Memon Hospital, Karachi from September 2007 to March 2008. Patients with a scar in peri-umbilical area were excluded from the study however patients with scar in right iliac fossa and lower abdomen were included.

All patients received general anaesthesia and placed in supine position. Instruments used in our technique were all re-usable. Approximately 1.2 cm vertical incision was made below the umbilicus. The margins of wound were retracted with small Langenbeck's retractors and subcutaneous fat was separated by blunt dissection with an artery forceps / peanut swab on holder till the rectus sheath visualized. Rectus sheath was held in two artery clips and a small incision approximately 5 mm, was made in the full thickness of linea alba without opening the peritoneum. An artery forcep was then introduced in the peritoneum to open it. A 10 mm port with blunt trocar (round tip) was then introduced. Trocar was withdrawn and gas connected to the port to induce pneumoperitoneum. Rate of success of procedure, time of establishment of pneumoperitoneum and complication / difficulty (air leak and visceral injury) encountered during procedure were recorded in the operative notes and on a pre designed proforma. The result of present technique was compared with published literature in terms of visceral injury and air leak.

### **RESULTS:**

A total of 55 patients were included (43 females and 12 males). The age ranged from 26 to 63 years (mean age 42.3 years). This technique was used in 31 patients who underwent cholecystectomy, 7 ovarian cystectomy, 4 appendectomy and 13 diagnostic laparoscopy. Scar of previous abdominal surgery was present in 6 patients. Four patients had scar of cesarean section and 2 had scar of appendectomy. Mean time from skin incision to insertion of telescope was 55 seconds (ranging from 35 to 95 seconds). Trocar insertion into extraperitoneal space occurred in 6 patients. With drawl and re-insertion into peritoneal space was successful in all cases except in 2(3.63%) in whom the technique was converted to open Hasson method. No bowel or visceral injury occurred during the creation of pneumoperitoneum. Gas leakage did not occur during entire procedure in all the patients.

### **DISCUSSION:**

Laparoscopic surgery has a close interaction between surgical techniques/innovations and medical engineering. In recent past laparoscopic surgery brought a very quick and widespread revolution in the surgical practice and within two decades it has altered the trends in surgical

management of various diseases.<sup>6,7</sup> Future of laparoscopic surgery is focusing on what can really be performed by this approach but at the same time assessment of safety and effectiveness of current practice is working towards the modification and development of newer and safer techniques (surgical as well as instrumentation). Creation of pneumoperitoneum is the first step towards successful laparoscopy and despite many advances, this critical step has been associated with recognized complications.<sup>2,8</sup>

Veress needle was first used for the creation of pneumoperitoneum in 1944 by French gynaecologist Raoul Palmer<sup>7</sup> and its blind insertion has been causing vascular and visceral injury.<sup>2,9,10</sup> To minimize the risk of peritoneal entry, an open method was introduced by Hasson in 1971.<sup>7,11</sup> Although Hasson technique is not a guarantee against visceral injury,<sup>12</sup> but it is utilized and favoured by laparoscopic surgeons all over the world because if a visceral injury occurs it is more immediately recognized and dealt with.<sup>2,9,13</sup> The risk of severe vascular injury has been eliminated with the use of open technique.<sup>6,14</sup>

Different modifications of these two techniques with the use of disposable shielded trocar, radially expanding trocars and visual entry system have been introduced but their advantages have not been fully established.<sup>12,15</sup> Meta-analysis of different techniques were performed which showed a trend towards reduced incidence of major complications in open method of creating pneumoperitoneum.<sup>16</sup> In different studies mainly from gynaecological centres open method is criticized for more time consumption and CO<sub>2</sub> leakage.<sup>6,12,17-19</sup> To overcome these problems, different modifications were proposed in literature with the aim to enter the peritoneal cavity under vision with smallest incision. Semi open technique described by Senapati PS and use of Killian nasal speculum for creating pneumoperitoneum for a tight and leak proof entry port under vision are some of the examples.<sup>8,20</sup>

Authors have been practicing open Hasson's technique since 1998 but frequently encountered problem of air leak led us to modify the technique. Since the incision in linea alba is usually less than 1 cm which accommodates the port snugly, therefore no gas leakage occurred in 53 patients. Insertion of artery forceps through thin and flimsy peritoneum requires minimal pressure to enter, hence reducing the chances of major visceral/vascular injury.

The other end point of our study was to assess the time taken for creation of pneumoperitoneum which was 55 seconds (mean). TrocarDoc technique described by Bemelman WA has entry time of 138 +/- 58 seconds

as compare to Hasson technique (350 +/- 103 seconds).<sup>18</sup> Lal P in his modified open technique described the time for obtaining pneumoperitoneum as 4 minutes.<sup>9</sup> The time taken to create pneumoperitoneum in this method was shortest without the use of specialized and disposable instruments. Shortest time consumption and no gas leakage makes the procedure safe, quick and attractive to practice.

#### CONCLUSION:

The modified technique for the creation of pneumoperitoneum was quick, effective and safe to practice.

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