

# Veress Needle Related Complications in Laparoscopic Surgery: Our Experience

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## ABSTRACT

**Background:** A retrospective analytical, multicenteric study conducted to evaluate closed technique for creating pneumoperitoneum in terms of procedural safety.

**Methods:** 5244 patients undergoing laparoscopic surgery from January 2001 to December 2009 for different indications in which pneumoperitoneum was created using closed technique by veress needle. Evaluation of results was done by analyzing the data in SPSS V-17

**Results:** Only 31 (0.6%) patients developed

complications like small bowel injury(0.04%), liver injury(0.02%), omental vascular injury(0.13%), omental emphysema(0.19%) and extra peritoneal emphysema(0.2%) while using the closed method for primary access. Only one patient required major intervention while all the rest were managed by simple measure laparoscopically.

**Conclusion:** closed technique using veress needle for creating pneumoperitoneum is as safe as Hasson's technique and no method has advantage over the other.

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## INTRODUCTION

Laparoscopy is being widely used for different surgical and gynaecological procedures. Access to the peritoneal cavity and creation of pneumoperitoneum is the initial and an important step in laparoscopy.<sup>1</sup>

There are different methods of primary access in laparoscopy. The popular ones being the Veress needle technique<sup>2</sup> and Hasson's technique<sup>3</sup>. Veress needle technique still being used by many surgeons and gynaecologists is regarded by them as the Gold standard<sup>4,5</sup> while others advocate the open method to be set as gold standard. Different studies show almost 50% of complications in laparoscopic surgery are related to primary access. Several complications, such as gas embolus (0.001%), major vascular injuries (MVI) (0.003-1.33%) and visceral injuries (0.04-4%), have been reported but most of the authors are of the opinion that these injuries are under reported.<sup>4,6</sup>

In large outcome studies there are similar bowel injuries but no major vascular injuries with the open technique. Few studies have shown complications with open technique to be higher than closed technique.<sup>7</sup>

We use veress needle for primary access in most of our cases and found it to be more convenient than open technique and having a complication rate not significantly higher than open technique. The open technique is, so far, reserved for children, pregnant

females, patients with previous surgery (major abdominal) and when there is failure of closed technique.

In this study we present our experience of 5244 cases laparoscopic procedures done from January 2001 to December 2009. In all these cases closed method (veress needle technique) was used for primary access to peritoneum. Cases where open method was used are not included in this study.

## PATIENTS AND METHODS

In this retrospective analytical study a total of 5244 patients were included who underwent laparoscopy for different indications by selected teams of surgeons and gynaecologists in Allied hospital Faisalabad, D.H.Q. hospital Faisalabad and Saad Surgimed hospital Faisalabad from January 2001 to December 2009.

In all these patients primary access was with veress needle. In 5125 patients veress needle was introduced through umbilical scar. After giving a longitudinal incision in infra umbilical region, the linea alba was bluntly dissected with an artery forceps and then veress needle was introduced with right hand while the left hand was used to lift the abdominal wall. A double click and initial low pressure  $\leq 9$ mmHg on CO<sub>2</sub> insufflation were taken as indicators of intra peritoneal position of veress needle.<sup>8</sup> No other test was used in routine.

In case of failure of three attempts at umbilical site or in patients with history of previous surgery in peri-umbilical area (119 patients), left upper quadrant (LUQ) (Palmer's point) was used for introduction of veress needle. In all cases abdominal wall was lifted with non dominant hand or by the assistant to facilitate safe introduction of veress needle and CO<sub>2</sub> insufflation. The record of complications occurring during primary access as reported in patients' record were noted on data sheets and analyzed by using SPSS-V 17.

## RESULTS

Out of 5244 cases operated 4145(79%) were female and 1099(21%) were male. The median age of study population was 45 years. Laparoscopic cholecystectomy for symptomatic gallstones was done in 3439(65.6%) patients with 3029 patients having chronic cholecystitis or recurrent attacks of biliary colic. 410 patients were having acute cholecystitis.

1730(33%) patients had laparoscopic surgery for different gynaecological indications including tubal pregnancy, ovarian cysts and endometriosis. 75(1.4%) patients underwent diagnostic laparoscopy for chronic abdominal pain in which 14 turned out to have intestinal tuberculosis.

295 patients had previous abdominal surgery, 78 patients with lower midline incision and 217 patients had pfannenstiell incision. In all patients with lower midline incision veress needle for primary access was introduced through LUQ.

<b>Demography of the 5244 patients studied and the types of operation performed</b>	
Median age	45 yr
Gender % male/female	21/79
<b>Type and number of laparoscopic operations ( % )</b>	
Cholecystectomy	3439(65.4)
Diagnostic laparoscopy	75(33)
Gynaecological indications	1730(1.4)

Regarding the complications, 2(0.04%) patients had small bowel injury. In one patient there was gut injury due to unexplained intra peritoneal adhesions, injury was recognized per operatively and gut was repaired through a small incision. One(0.02%) patient had penetrating liver injury by veress needle and bleeding

was controlled with spongiston. 7(0.13)% patients had minor omental vascular injuries and all were managed laparoscopically with electrocautry/ suture.

The most common complication was extra peritoneal emphysema in 12(0.2%) patients and omental emphysema in 9(0.1%) patients which resolved on its own without requiring any intervention. There was no reported MVI, mesenteric vascular injury or major port site bleeding in our study.

So out of 31 complications only one patient required major intervention, all the rest were managed by simple measures with laparoscopically.

<b>Distribution of primary access related complications (n=31)</b>		
Complications	No. of patients	%
Extra peritoneal emphysema	12	38.7
Omental emphysema	9	29
Omental vascular injury	7	22.6
Small bowel injury	2	6.4
Liver injury	1	3.3

**Table 1:**  
**Type of complication during primary access \* site of entry of veress needle**

Type of complication during primary access	site of entry of veress needle		Total
	umbilical scar	luq	
none	5145	68	5213
bowel injury	2	0	2
liver injury	0	1	1
extra peritoneal emphysema	9	3	12
omental emphysema	7	2	9
minor omental vascular injuries	3	4	7
Total	5166	78	5244

**Table 2:**  
**Type of complication during primary access**

	Frequency	%age	Valid %age	Cumulative %age
None	5213	99.4	99.4	99.4
bowel injury	2	.0	.0	99.4
liver injury	1	.0	.0	99.5
extra peritoneal emphysema	12	.2	.2	99.7
omental emphysema	9	.2	.2	99.9
minor omental vascular injuries	7	.1	.1	100.0
Total	5244	100.0	100.0	

## DISCUSSION

Laparoscopy is being widely used in common surgical and gynaecological practices as an effective diagnostic and therapeutic tool. Both the number of surgeons doing laparoscopy and the number of procedures being performed with laparoscopically are on rise.<sup>9,10</sup>

One of the crucial steps in laparoscopic surgery is creation of pneumoperitoneum. There are different methods for primary access but none is free from complications. In 1974 Royle Palmer introduced the veress needle for creation of pneumoperitoneum<sup>2</sup> and soon it became the most popular method. As the veress needle and the first trocar afterward are introduced blindly, this method is called closed method contrary to the open technique named as Hasson's technique where peritoneum is approached by open dissection of tissues and the 1<sup>st</sup> trocar is introduced under vision. Different types of trocars including shielded trocars and optical trocars have also been introduced but none, so far, have proved to be superior to other and are more expensive as well.<sup>11,12</sup>

Although many surgeons reported more number of injuries with closed technique as compared to open method but according to available evidence open laparoscopic entry has not eliminated bowel and vascular injuries.<sup>13,14</sup>

Reports from general surgeons demand the use of Hasson's technique in all circumstances<sup>15</sup> but cohort studies reported by gynaecologists like Swiss Association of Laparoscopic and Thoracic surgeons

(SALTS) showed no superiority of open method over the close method regarding the primary access related complications.<sup>16</sup>

In many other studies there is no difference of bowel injuries in the two methods but vascular injury in open method is reported to be 0.0%<sup>7</sup>

A dutch study, supplemented by MEDLINE search, concluded that the number of entry related complications was higher in open technique than the closed technique and hence the closed technique should not be abandoned.<sup>17</sup>

Jansen et al in a study on 25764 patients found that 83 of 145 complications were related to primary access and there was no significant reduction of complications with the open method.<sup>17</sup>

Different comparative studies found major vascular injury in 0.04% cases with closed primary access and 0.01% of open primary access. In our study there was no reported MVI (0.0%). Visceral injury was reported to be 0.07% in closed and 0.05% in open method but<sup>4,18,19</sup> in our study it was 0.04% that is not higher than as reported by open method in other studies.

Different authors reported rate of trocar injury to bowel and major vessel as higher as 1.0 %<sup>1,16,20</sup>. Most of trocar related injuries occur by the first trocar as others are inserted under vision<sup>21</sup>. Champault et al in a French survey of 103852 laparoscopic operations found that 83% of vascular injury, 75% of bowel injury and 50% of local hemorrhage were caused during primary trocar insertion.<sup>22</sup>

George et al describes three steps: step 1-the low initial veress pressure (VIP-Pressure) <10mmHg, step 2-transient high pressure pneumoperitoneum (HIP-Entry) up to 15-30mmHg, step 3-visual entry with trocarless cannula, during closed laparoscopic entry. It reduces the rate of trocar related injury.<sup>14</sup>

Jared et al described approach by an incision on left side of umbilicus and the abdomen is opened at the point where base of umbilicus joins linea alba and claims that it reduces the incidence of visceral and vascular injuries.<sup>23</sup>

H.J.Bonjer in a review favoured the open technique again confirming the low incidence of injuries with open technique and adding that it is safe, simple and cuts the cost as it can be performed with a reusable trocar.<sup>19</sup>

F. Agresta favours direct trocar insertion in non-obese patients rather than the veress needle insertion as it has a higher feasibility rate as compared to veress needle technique, and is associated with fewer minor

complications but there seems to be no difference in both techniques regarding the major complications.<sup>10</sup>

Jensen FW et al, Garry R. and most of the gynaecologists continue to use close laparoscopic entry and conclude that none of the methods is superior or inferior to the other.<sup>13,14,17</sup>

So it is not only the method of entry that matters, proper selection of patients, site of entry, H/o previous abdominal surgery, obesity, expertise of the surgeon are the factors which determine the increased or decreased primary access related complications in laparoscopic surgery.

## CONCLUSION

On the basis of above discussion we conclude that no method of primary access is superior to the other in terms of primary access related complications and the closed primary access is as safe as open access and it is recommended that surgeons must continue with the primary access technique in which they are expert.

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