

Hospital Based Assessment of a Simple and Safe Technique of Creating Closed Pneumoperitoneum

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Abstract

Aim: We described a simple technique which detects the precise entry point when the reusable metallic Veress needle enters the peritoneal cavity. This technique prevents overshooting of the needle inside the abdomen, thereby lessening the chance of any visceral injury.

Methods: The present study conducted in the Department of General Surgery, Fort U Mediemergency Hospital, Patna, Bihar, India . 20 patients of either sex were selected who undergone operative procedure for laparoscopy surgery were included in this study.

Results: Technical difficulties like multiple attempts, gas leak at port site and port site bleeding are less in closed method, which is attributed to larger size of incision in open method, Furthermore, a significant higher incidence of such minor complications is found in case of BMI >25 p=-5.33 (p<0.05) at confidence level of 95%).

Conclusion: The closed (Veress needle) method for gaining access into the peritoneal cavity is safe. Further studies are needed in multiple centres and on larger samples for conclusive evidence. Since laparoscopic cholecystectomies are now routine procedures, the safest method should be sought and guidelines should be formulated.

Keywords: Abdominal, Bariatric, Bowel, Cholecystectomy, Complications, Pneumoperitoneum

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Introduction

Laparoscopic surgery has become the standard of care for many diseases such as symptomatic gallstone disease, acute appendicitis, achalasia and gastroesophageal reflux disease. One of the key steps in the procedure is to obtain

pneumoperitoneum and insert the first trocar safely. Closed pneumoperitoneum is usually obtained by inserting a Veress needle through the abdominal wall inside the peritoneal cavity. There are various tests described in the literature to confirm

the position of the needle tip inside the peritoneal cavity. Atmospheric air is sucked into the abdomen with an audible hiss (Hiss test), aspiration of air into a partially filled syringe, free instillation of saline through the needle, sucking in of a drop of saline placed onto the hub of the Veress needle due to negative intraperitoneal pressure (Drop test), etc.– all these tests confirm the needle tip position once it is inside the peritoneal cavity. [1]

Laparoscopic surgery might produce technique specific complications. The use of Veress needle followed by blind trocar placement, major injuries to large vessels like the aorta, iliaca artery/vein and the vena cava have been reported in 0,003–0,08% of cases. [2-4]

One of the challenges of laparoscopic surgery is the insertion of surgical instruments through small incisions. Over 50% of the complications arise during this time [5,6] and a great majority of these occur during the insertion of the primary umbilical trocar. [5] To address these complications, various techniques have evolved to gain access to the peritoneal cavity. These include closed (Veress), open (Hasson), direct trocar insertion, the use of disposable shielded trocars, radially expanding trocars and visual entry systems along with their various modifications. [7,8]

The establishment of pneumoperitoneum requires the introduction of a sharp insufflating needle or trocar. Peritoneal access and creation of pneumoperitoneum are key initial steps of laparoscopic surgery. Methods available for creating pneumoperitoneum and inserting the laparoscope at the beginning of laparoscopic procedure can be divided into open or closed entry technique. There are five basic technique used to create pneumoperitoneum: blind verrees needle insertion, direct trocar insertion, optical trocar insertion, open method and modified open technique. Most commonly

used method of peritoneal access is blind insertion of verrees needle through infra umbilical stab incision and then creating pneumoperitoneum. [9] There are five basic ways available at present to create pneumoperitoneum - blind Veress needle insertion, direct trocar insertion, optical trocar insertion, open method, and modified open method, out of which direct Veress needle insertion is the most commonly used. [10]

We described a simple technique which detects the precise entry point when the reusable metallic Veress needle enters the peritoneal cavity. This technique prevents overshooting of the needle inside the abdomen, thereby lessening the chance of any visceral injury.

Material and Methods

The present study conducted in the Department of General Surgery, Fort U Mediemergency Hospital, Patna, Bihar, India for 1 year.

Inclusion and exclusion criteria

Criteria for selection includes, All patients undergoing elective laparoscopic surgery and hemodynamically stable patients; And excludes Patients undergoing emergency laparoscopic surgery, Past history of abdominal tuberculosis or puerperal sepsis, cases of machinery failure for establishment of pneumoperitoneum, Patients having intestinal obstruction.

Methodology

Total 20 patients of either sex were selected who undergone operative procedure for laparoscopy surgery were included in this study.

Per operative findings like method of pneumoperitoneum creation and its duration, multiple attempts, incision size, extra peritoneal insufflation, port site bleeding, gas leak, total gas used were recorded. Per operative complications like visceral or vascular injury, port site hematoma, conversion to open surgery noted. Patients were assessed in post-

operative period for wound hematoma, wound infection, gas embolism and port site incisional hernia noted in follow up to

3 months. Methods used for getting statistical significance are Chi square test.

Results

Table 1: Size of incision

AVG size of incision (mm)	13.5
Maximum size of incision mm	14.5
Minimum size of incision mm	13.5

Technical difficulties like multiple attempts, gas leak at port site and port site bleeding are less in closed method, which is attributed to larger size of incision in open method. Furthermore, a significant higher incidence of such minor complications is found in case of BMI >25 $p=5.33$ ($p<0.05$) at confidence level of 95% (Table 1)

Table 2: Duration of pneumoperitoneum

Avg duration of Pneumoperitonium creation (sec)	137
Maximum duration of pneumoperitonium creation (sec)	177
Minimum duration of pneumoperitonium creation (sec)	90

Discussion

A 5 cc syringe (without the plunger) with about 3 ml saline in it is fitted with the reusable Veress needle. Keeping the air channel locked the needle is inserted as usual through the skin nick. When the needle is in the muscle layer, the lock is released. After that the needle is pushed further. As soon as the needle punctures the peritoneum the water of the syringe starts flowing through the needle. The flow of water confirms the intraperitoneal position of the needle tip. By this technique one can make pneumoperitoneum with the most superficial position of the needle tip inside the abdomen. We have used this technique in 25 consecutive patients of laparoscopic procedures without any difficulty in creating pneumoperitoneum.

The complications in open method are usually due to the larger incision size associated with the open method. Indeed, the incision is a mini laparotomy as opposed to the needle puncture the closed technique. Schafer et al while comparing the complications of both techniques concluded that the open access method failed to show any superiority over the closed technique. [11] However, Bonjer et al in their comparison between open and

closed techniques found that the rates of visceral and vascular injury were respectively 0.08% and 0.07% after closed laparoscopy, and 0.05% and 0% after open laparoscopy ($p=0.002$). There was no significant difference in the mortality rates. [12]

The Veress needle followed by blind trocar placement or direct trocar insertion without creating pneumoperitoneum are the most common approaches to access the abdominal cavity in laparoscopic surgery. [3,13,14]

A randomised controlled trial comparing blind versus open approach requires 10 000 patients in each group to detect a difference in serious complications and such a study does not exist. Guidelines from The European Association for Endoscopic Surgery conclude that available data does not favour the use of either technique. [15] However, they agree that major vascular injuries most often occur with the Veress approach. [16]

Conclusion

The closed (Veress needle) method for gaining access into the peritoneal cavity is safe. Further studies are needed in multiple centres and on larger samples for conclusive evidence. Since laparoscopic

cholecystectomies are now routine procedures, the safest method should be sought and guidelines should be formulated.

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