

Frequency of Visceral Injury and Post-Operative Port Site Hernia from Direct Trocar Insertion for Gaining Access to Peritoneal Cavity in Laparoscopic Cholecystectomy

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ABSTRACT

Aim: To see the frequency of visceral injury and port site hernia from direct trocar entry in laparoscopic cholecystectomy.

Study Design:

Place and Duration of Study: Department of Surgery, District Headquarters Teaching Hospital Abbottabad from 1st December 2017 to 20th September 2019.

Methodology: Two hundred and sixty patients requiring laparoscopic cholecystectomy were enrolled. Direct trocar technique was used for peritoneal first port entry using retractable trocar in all patients. Demographic characteristics of the patients, as well as intraoperative visceral injury and post operative port site hernia formation were recorded.

Results: Majority of study participants were females: 229 (88 %) women while remaining men. Mean age of study population was recorded as 37±8 years. Females were older than males ($p > 0.05$). We have not seen a single case of visceral injury or hernia formation in our study.

Conclusions: The blind technique with retractable port is safe for first port entry into peritoneum in terms of visceral injury and also hernia formation.

Key words: Direct trocar, Laparoscopic cholecystectomy, Visceral injury, Port site hernia

INTRODUCTION

Laparoscopic surgery was started in 1980s with the concept of minimal invasive surgery and it was thought that laparoscopic cholecystectomy (LC) can be more advantageous to the patient than open surgery.¹ Although laparoscopy is safe, minority of patients may experience complications that include damage to blood vessels or bowel. These complications can occur during start of procedure when the abdominal wall is pierced with specialized instrument to insert the gas.² This creation of pneumoperitoneum is the essential first step in laparoscopic surgery for abdominal surgeries. Bleeding from port site, subcutaneous emphysema, gastrointestinal tract perforation and vascular injury are the potential complications associated with abdominal access and creation of pneumoperitoneum.³⁻⁵

Amongst various means of entry into the peritoneal cavity in practice for creation of pneumoperitoneum, none is free of complications.^{4,5} Each procedure has advantages, disadvantages and morbidity.^{6,7} Initially open technique was used for achieving access to peritoneum known as Hasson's technique. Later Veres needle was designed to get blind entry into peritoneum and CO₂ was insufflated via Veres needle, followed by insertion of 10 mm port. Direct trocar and Veres needle are blind procedures for peritoneal entry but have potential for visceral injury.

The direct trocar (DT) technique for establishing pneumoperitoneum can be achieved using retractable trocar which pierces the rectus sheath and peritoneum. The pointed tip of trocar retracts spontaneously as the pressure on trocar is released once peritoneum is breached. This can result in early insufflation of abdomen with CO₂ followed by insertion of remaining ports.⁸ Direct trocar technique needs expertise but is advantageous on other ways because it saves time of surgery and also no need to repair the defect in rectus sheath^{9,10} but can result in complications including injury to gut, urinary bladder or to vessels (e.g. major abdominal and anterior abdominal wall vessels).² The available data in literature show the feasibility and effectiveness of direct trocar insertion.¹¹⁻¹³ Despite being a blind technique, it reduces the number of "blind steps" from three (Veres needle insertion, insufflation of CO₂, and 10mm trocar introduction), to just one that is trocar insertion.^{13,14} Infra umbilical port site hernia is a documented complication of port site even with closure of defect. It is usually associated with trocar size of more than 10 mm.¹⁵

In view of advantages offered by direct trocar technique we suggest to assess the efficacy and outcome in terms of visceral

injury and port site hernia using direct trocar technique in patients undergoing laparoscopic cholecystectomy at our hospital.

MATERIALS AND METHODS

This descriptive cross sectional study was conducted at Department of Surgery, District Headquarter Teaching Hospital, Abbottabad from 1st December 2017 to 30th September 2019. Adult patients of both sex having symptomatic gallstones willing to participate in study after detailed description of direct trocar technique and potential complication in above mentioned period were enrolled in this study. Patients younger than 18 years, pregnant women, coagulopathy or those reluctant to participate were excluded from the study. The statistical analysis included stratification of outcome variable by age, gender, hypertension and diabetes mellitus.

Patients were offered laparoscopic cholecystectomy using closed technique of infra umbilical first port entry without closing the defect. Laparoscopic cholecystectomies performed during the study period with above mentioned procedure performed by different surgeon were considered. Patients were followed up in the outpatient department on weekly basis for four weeks and then were told to come if any symptoms i.e. persistent pain, swelling etc develops regarding port site hernia. Those patients having suspicion of hernia were thoroughly examined including inspection of visible swelling, cough impulse or any tenderness followed by trans-abdominal sonography using high frequency probe to confirm any hernia defect.

Standard four port laparoscopic cholecystectomy was done in all patients. The entry to peritoneum was achieved by blind technique using 10 mm retractable trocar via infra umbilical incision. The technique that was adopted for direct trocar insertion was as follows: an infra-umbilical transverse skin incision was made followed by holding of umbilical cicatrix with towel clip and elevation of the abdominal wall with the non-dominant hand and pushing the blunt trocar along with the port to achieve direct entry into the peritoneal cavity. The other hand was used for balanced counter traction to prevent inadvertent uncontrolled entry and possible overshoot. As soon as peritoneal penetration was sensed, the trocar was withdrawn; Carbon dioxide gas insufflation was commenced and telescope introduced into the cannula. Open technique was used to get entry into peritoneum in those patients where blind entry failed, but these patients were not included in our study. All the patients were assessed for any visceral injury before

proceeding to other ports. The data was entered and analyzed through SPSS-26.

RESULTS

Out of 260 patients, 229 (88%) were females and 31 (12%) males. Mean age of study population was 37±8 years, where females were 41±9 years and male 36±6 years old. Amongst the study population 15% were diagnosed cases of diabetes and 11% had hypertension. No single case of any visceral injury was documented. Four patients presented in follow up period with mild swelling in infra-umbilical scar but examination revealed absent cough impulse and no tenderness. Sonography also confirmed no signs of herniation. Two patients presented with moderate pain but no signs of hernia were found. Since none of our patient developed outcome (visceral injury and hernia) so stratification not done.

DISCUSSION

Creating pneumoperitoneum is essential for all laparoscopic abdominal procedures. Most of the complications occur during gaining access into the peritoneal cavity.^{9,10,16} Therefore the technique of gaining entry into peritoneal cavity is critical and must be optimized. Changing any surgical technique or any step of a procedure must have a lesser morbidity and should be easy and reproducible in most of situations.¹⁷⁻¹⁹

To first entry into peritoneal cavity for developing pneumoperitoneum is one of the difficult steps for surgeons who are learning skills of laparoscopy.¹ Hason's technique is considered to be safe for first port entry but is time consuming, needs slightly bigger incision and also needs closure of defect.²⁰ To overcome these issues Veress needle has also been used for entry into peritoneum by sub-umbilical incision.²¹ The purpose of current study was to evaluate the affects of blind entry into peritoneum in terms of visceral injury and port site hernia using 10 mm retractable trocar which is used nowadays and considered safe.²² Direct trocar insertion has advantages over Veress needle entry into peritoneal cavity, such as limiting the duration of access to short intervals as well as unsuccessful entry or insufflation attempts.²³

The defect in rectus sheath is not closed in this technique contrary to open or Hason's technique. The studies previously done on this subject have also favored the use of retractable trocar without any need of closure.²⁴ The important point in direct trocar technique is a give way feeling when retractable trocar enters peritoneum. Due to the retraction mechanism, the pointed end retracts back into blunt end once force is withdrawn making it atraumatic.²⁵ Our study shows that direct trocar insertion is quite safe and comparable to studies where Veress needle was used for entry into the peritoneal cavity regarding the risk of complications arising from access into the abdominal cavity. Our study confirmed its safety because we have not seen a single case of visceral injury after insertion of first port. The same findings were seen by Akbar et al⁴ where they compared open versus Veress needle entry into peritoneum.

The pointed end of trocar only splits the sheath, so there is no need to close the defect. This blind way of entry needs some practice but learning curve is not very steep.²⁶ The patients operated were followed for 6 months to see development of port site hernia. The patients on follow up were specially asked for any swelling or persistent pain in sub umbilical scar. As mentioned in results only four patients presented with swelling that was not evident on clinical examination and there was no cough impulse as well. These patients were sent for sonography which also confirmed absence of hernia sac or any defect. The other two patients who had moderate pain were also assessed and no hernia was documented. Bruyere et al²⁷ has studied port site complications including hernia in series of cases where they have

not found any case of port site hernia. We have not noted any patient who developed hernia even without closure of sheath which is a promising finding.

CONCLUSION

The blind technique with retractable trocar is safe for first port entry into peritoneum in terms of visceral injury and also hernia formation. Surgeons can safely use blind technique for first port entry using retractable trocar; however experience of a surgeon in laparoscopy is very important pre-requisite.

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