

Direct Trocar Insertion for Laparoscopic Cholecystectomy

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ABSTRACT

Objective: To determine direct trocar insertion for laparoscopic cholecystectomy.

Study Design: Descriptive / case series study

Place and Duration of Study: This study was conducted at the Pima Al Hajri Hospital, Muzaffarabad from November, 2016 to November, 2017.

Materials and Methods: Total 100 patients who underwent elective laparoscopic cholecystectomy were included in the study and the technique used to create pneumoperitoneum was direct insertion of the trocar in all the patients. The injuries were classified as minor or major, depending on their ability to significantly affect the surgical procedure and eventual outcome. The injuries were assessed for up to six months follow up.

Results: Creation of the pneumoperitoneum with direct trocar insertion (DTI) was successful in 100% (n=100) patients. No major complication was encountered during the study. Immediate minor post-operative complications like wound infection 0.5% (n=1) and hematomas 1.5% (n=3) were infrequent.

Conclusion: This study shows that DTI is a safe and effective alternative for creation of pneumoperitoneum in laparoscopic cholecystectomy.

Key Words: Pneumoperitoneum, direct trocar insertion (DTI), laparoscopy.

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INTRODUCTION

Laparoscopic abdominal surgeries depend primarily on the creation of successful pneumoperitoneum. Most of the patients suffer from complications like bleeding, sub-cutaneous emphysema, GI tract perforations and major or minor vascular injuries during this first step of the procedure i.e. creation of pneumoperitoneum¹⁻⁵. There are four basic techniques used for the creation of pneumoperitoneum which include blind Veress needle insertion, direct trocar insertion, optical trocar insertion and open laparoscopy.⁶ Direct trocar insertion (DTI) was used for the first time by Dingfelder in 1978 but so far it is reportedly the least used entry technique and is mainly used by the gynaecologists.⁷⁻¹⁵ The literature is suggesting one or the other technique's superiority without sufficient corroborating evidence.^{6-10,13,15} In clinical practice, the senior surgeons normally advocate the open technique or Veress needle technique for the trainees considering it to be the safer technique than others.

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Our institution is a community hospital in Muzaffarabad, Azad Jammu and Kashmir. We have been using DTI technique for creating pneumoperitoneum in laparoscopic cholecystectomies in all cases where there is no contraindication for the last one year. The reported benefits of DTI are decreased operating time, early recognition of visceral / vascular injuries and very rare entry failure.

The study was aimed at evaluating the risks in patients undergoing laparoscopic cholecystectomy with DTI technique of pneumoperitoneum, focusing primarily on the safety and benefits of the procedure. This study reports the experience of a single consultant surgeon using direct trocar insertion for the creation of pneumoperitoneum in laparoscopic cholecystectomy.

MATERIALS AND METHODS

It was descriptive case series study which was conducted at surgical Dept. PIMA hospital from Nov 2016 to Nov, 2017. All patients of either sex who underwent laparoscopic cholecystectomy were included in the study and DTI technique was used for the establishment of pneumoperitoneum. More than two abdominal incisions (at least one which was mid line) was the sole contraindication for DTI technique. A single consultant laparoscopic surgeon performed all surgeries. Injuries were classified as major or minor, which depends on their effect on the procedure and the outcome. The outcome measures were defined as

- Minor complications: They include conditions that do not influence the duration of the post-operative

hospital stay and do not require additional surgical intervention.

- b. Major complications: These are the ones that require conversion to an open surgery, leading to prolong stay in the hospital, and/or re-admission in the hospital or leading to death.

For the purpose of evaluation, the trocar insertion time was considered as, the time interval between skin incision and introduction of laparoscope.

RESULTS

There was one laparoscopic surgeon who used the DTI technique in 100 consecutive patients who were planned for elective laparoscopic cholecystectomies. Out of these 100 patients, 84% (n=84) were females and 16% (n=16) were male (table 1). The patient's age ranged from 21-62 years with a mean age of 34 ± 3.44 years. DTI was found successful in 100% of cases. There was no major complication. Minor post-operative complications were also infrequent. They included 0.5% (n=1) wound infection and 1.5% (n=3) hematomas. At mean follow-up of 6 months, 1.5% (n=3) umbilical wound stitch granulomas at the umbilical port site were observed (table 2). Duration of DTI was 55 ± 13 seconds.

Table No.1: Demographics : gender of patients

Gender	Percentage	Number (N)
Male	16%	16
Female	84%	84

Table No.2: Complications of DTI

Complications	%n	n
Subcutaneous emphysema	0.5 %	1
Vascular trauma	0 %	0
Visceral injury	0 %	0
Bleeding(Hematoma)	1.5 %	3
Conversion to open surgery	0 %	0
Port site (wound) infection	0.5 %	1
Umbilical wound stitch granuloma	1.5 %	3

DISCUSSION

The establishment of pneumoperitoneum is the first and inevitable step in the laparoscopic surgery and it is also considered as the first difficulty encountered by trainee laparoscopic surgeons. This step is potentially considered to be associated with various complications owing to its blind nature. Bleeding, sub-cutaneous emphysema, GI tract perforations and minor and major vascular injuries are the potential complications linked with first trocar insertion for the creation of pneumoperitoneum.¹⁻⁴ There are four basic techniques used for the creation of pneumoperitoneum: blind varess needle insertion, direct trocar insertion, optical trocar insertion and open laparoscopic technique.⁶ DTI technique was first reported by Dingfelder in 1978 and later described by Copeland et al in 1983¹⁶ but till now it is probably the least used entry technique. It is mainly

used by the gynaecologists⁷⁻¹⁰. Copeland et al emphasized that the key to successful DTI are adequate wall relaxation, proper skin incision and the use of sharp trocar.¹⁶ The introduction of shielded trocar has encouraged few more surgeons to practice DTI but as yet no experimental or clinical study has shown the superiority of the shielded trocar over the non-shielded one⁷. DTI is reported to be a safe alternative to varess needle technique¹². DTI, still a blind technique, decreases the number of blind steps from 3 (insertion, insufflation and first trocar introduction) with varess needle to just one (trocar introduction). It is also reported that with DTI it is possible to immediately recognize any iatrogenic injury and to repair it laparoscopically at once.^{7,9,10,17} DTI has been reported to be associated with fewer insufflation related complications such as gas embolism and was faster technique than varess needle.¹⁴ In a randomized prospective study of 84 patients, Prieto-Diaz-Chavez et al reported complication rates of 2-3% and 23.8% after DTI and varess needle technique respectively.¹² Akbar et al found DTI to be highly feasible alternative to open laparoscopic technique for the creation of pneumoperitoneum in laparoscopic cholecystectomies.² Angioly et al in his study found that open technique with Hassan's cannula, which was initially considered a very safe alternative, is not complication free, and its time consuming nature and cost have made its use very selective in laparoscopic surgery.¹⁵ Some surgeons report open laparoscopic technique as the gold standard, yet in the international literature it is shown that in cases where midline is not safe to approach, varess needle is a very valid alternative with good results and minimal to no morbidity.¹⁷ Open laparoscopy does not totally eliminate the possibility of injury to the bowel particularly if it is abnormally situated as in adhesions. More-so, open laparoscopy does not allow good visualization of the peritoneal cavity unless the initial incision is enlarged, which results in decreasing the benefits of small laparoscopic incisions. This is more evident in cases of obese patients having abdominal wall laden with fat. As a result, there might be a need to make a larger incision thus invalidating the pain reduction advantage of laparoscopy and increasing the risk of port site hernias.³ Almost all the international surgical and gynecological associations in setting down the guide lines for abdominal entry do not recommend one method over the other as the preferred method.^{6,8,18,19,20} The study was carried out to assess the safety and efficacy of DTI technique in laparoscopic cholecystectomy. In accordance with the literature we found it to be highly feasible, safe and effective technique for the establishment of pneumoperitoneum with no significant major or minor complications. But it should also be emphasized that the preference of first trocar introduction technique varies with surgeon to surgeon and it largely depends on how a particular surgeon is trained and how his supervisor/mentor used to carry out the procedure. We cannot recommend a specific procedure to all the surgeons who are not

trained enough in DTI technique but if learnt, we consider DTI, as effective as any other technique, with much safer results and decreasing the time of creating pneumoperitoneum so that the prime focus of the surgeon is not deviated from actual procedure towards successful creation of pneumoperitoneum.

CONCLUSION

In this study, DTI was found to be a very effective and fast alternative for the establishment of pneumoperitoneum in laparoscopic cholecystectomies and other laparoscopic procedures but it should also be emphasized that the technique for the creation of pneumoperitoneum rests solely on the surgeon and the way they have been trained. We believe that along with other techniques DTI should be regarded as a valuable part of surgical technique for skilled laparoscopic surgeon. We also recommend that DTI should be practiced in selected patients so that the surgeons can have ability to choose from different techniques whenever required and possible.

Author's Contribution:

Concept & Design of Study: Asad Bilal Arif
 Drafting: Sadaf Fasih
 Data Analysis: Mazhar ul Haque
 Revisiting Critically: Asad Bilal Arif, Sadaf Fasih
 Final Approval of version: Asad Bilal Arif

Conflict of Interest: The study has no conflict of interest to declare by any author.

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