

The Generation of Pneumoperitonium by DCI Technique

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ABSTRACT

Background: The safe and effective insertion of a primary port is the first and most crucial & risky of a laparoscopy. Open laparoscopy, optical trocar insertion, direct trocar insertion (DTI) and direct cannula insertion of traditional technique of insufflation following Veress needle (VN) insertion via the umbilicus.

Aim: To assess the safety of DCI technique to generate the pneumoperitonium in our set up.

Methodology: This prospective study was conducted at AIMEC sheikhpura from Feb.2019 to Feb.2020. All the 150 patients with symptomatic gall bladder disease were admitted. All consecutive patients who underwent successful LC under the care of a single consultant. GA was used to operate in every case. After painting and draping, a 10 mm infra umbilical incision was made. With the use of towel clips, the anterior abdominal wall was raised, and a direct cannula was inserted into the abdominal cavity. All the LC was performed with four-port technique. Three doses of second-generation cephalosporin were administered in every case. Data was entered and analyzed in SPSS.

Result: Total 150 patients were included. There were 30(20%) male and 130(80%) female. The mean age was 42.5 ± 12.2 years. Out of 150(100%) patients 18(12%) were having acute gallbladder disease while rest 132(88%) were chronic cases. Most of the operated patients 81(54%) were discharged at 48 hours, 45(30%) at 24 hours while rest of the patients stayed longer, including 15(10%) stayed for 72 hours, 9(6%) for 96 hours and one of the patients who was converted to open procedure for an accessory duct stayed for 7 days.

Conclusion: The conclusion of the study that DCI technique to generate pneumoperitonium for laparoscopic procedures remains safe and rapid technique.

Keywords: Laparoscopic surgery, DCI technique, pneumoperitonium, gall bladder disease

INTRODUCTION

Laparoscopic surgery has become the standard of care for so many diseases like symptomatic gallstone disease, achalasia, acute appendicitis & gastroesophageal reflux disease. The safe insertion of the first trocar and the acquiring of pneumoperitoneum are important phases in the surgery. A Veress needle is often inserted through the abdominal wall and into the peritoneal cavity to create closed pneumoperitoneum. To establish that the needle tip is inside the peritoneal cavity, a number of tests are reported in the literature.¹ For patients, LC is the most effective and efficient surgical treatment. Previous studies have shown that LC has advantages over open cholecystectomy, including less and mild pain and fast recovery.² The postoperative phase following LC is distinct in quality and shorter than the postoperative period following a classical cholecystectomy. This advancement has been aided by improved surgical experience as well as developments in anesthesiology and analgesia. Because patients recover more quickly, ALC's feasibility has gained support from surgeons, however, only if patient satisfaction has been verified and morbidity and mortality rates are comparable to those seen with normal LC.³

Mostly patients undergoing laparoscopic abdominal surgery must successfully adopt pneumoperitoneum, with more than half of all problems happening at the time of entrance. So, optimizing the entry technique is necessary. The directly inserting a trocar method for laparoscopy without pneumoperitoneum was firstly described in 1978⁴. This procedure is said to have the advantages of being quicker to perform, detecting visceral vascular damage right away, and almost completely eliminating entry failure.⁵ Direct trocar insertion is still a blind procedure and it reduces the number of "blind steps" from three when using a Veress needle (insertion, insufflation, and trocar introduction) to just one when using DTI. One study reports the experience of a single consultant surgeon in the creation of pneumoperitoneum using this technique over a period of time⁶. The workers are of the opinion that this technique has an edge over VN as it has just one blind step i.e. insertion of cannula, as compared to three in VN technique i.e. insertion of VN, insufflation & introduction of trocar. According to Byron et al all that

is necessary for the safe introduction of a cannula is good relaxation, a sharp cannula, and good lifting of the anterior abdominal wall⁷

Therefore, the objective of this study was to assess the safety of DCI technique to generate the pneumoperitonium in our set up.

METHODOLOGY

This prospective study was conducted at AIMEC Sheikhpura from February 2019 to February 2020. Permission by the Institutional Ethical Committee was granted. All the 150 patients with symptomatic gall bladder disease were admitted. A proforma was filled up with the whole history, clinical examination, and investigations. All consecutive patients who underwent successful LC under the care of a single consultant. GA was used to operate in every case. After painting and draping, a 10mm infra umbilical incision was made. With the use of towel clips, the anterior abdominal wall was raised, and a direct cannula was inserted into the abdominal cavity. Using a stopwatch, the duration needed to produce the required pneumoperitonium was recorded. All the LC was performed with four port technique. Three doses of second generation cephalosporin were administered in every case.

The study included both elective and emergency cases. All gallbladders were removed using the conventional four-port procedure and placed in a bag. The study did not include patients whose planned LC was changed to an open surgery. Demographic information was collected. Information regarding the perioperative period was collated from the patient notes, and postoperative data including visits to accident and emergency departments or the general practitioner were also documented. Following the administration of wound swabs, microbiological data were obtained from the computerized hospital database and utilized to confirm the presence or absence of infections. Data was entered and analyzed in SPSS. Age was presented as mean and SD. Gender, Duration of time and acute gall bladder were presented as frequency and percentage.

RESULT

Total 150 patients were included. There were 30(20%) male and 130(80%) female. The mean age was 42.5 ± 12.2 years. Out of 150(100%) patients 18(12%) were having acute gallbladder

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disease while rest 132(88%) were chronic cases (Table 1). There were 33(22%) of the operated cases were diabetic, 47(31.3%) were hypertensive and in the operated patients 7 (4.6%) were having HCV positive and 4(2.66%) HBsAg positive (Table 1).

Most of the operated patients 81(54%) were discharged at 48 hrs, 45(30%) at 24 hrs while rest of the patients stayed longer, including 15(10%) stayed for 72 hours, 9(6%) for 96hours and one of the patients who was converted to open procedure for an accessory duct stayed for 7 days (Table 2). All the patients were given second generation cephalosporin as prophylactic antibiotic. No gut, CBD or vascular injury was noted. There was no mortality.

Table 1: Descriptive of age, gender and gall bladder

		Frequency (%)
Age	In years	42.5±12.2
Gender	Male	20 (20%)
	Female	130 (80%)
Gall Bladder	Acute	18 (12%)
	Chronic	132 (88%)
Comorbidity	Diabetes	33 (22%)
	Hypertension	47 (31.3%)
	HCV positive	7 (4.6%)
	HBsAg	4 (2.66%)

Table 2: Frequency of discharging patients

Discharging Day	Frequency (%)
At 24 Hour	45(30%)
At 48 Hour	81(54%)
At 72 Hour	15(10%)
At 96 Hour	9(6%)

DISCUSSION

Veress first reported the widely used blind puncture technique for inserting a cannula to establish pneumoperitoneum in 1938. This procedure has a number of serious and particular risks, including gas embolism, subcutaneous inflation, failed pneumoperitoneum, and intestine or visceral insufflation. It is safe and efficient to insert a cannula directly. A number of 550 consecutive laparoscopies using this approach resulted in no main problems. Direct cannula insertion would appear to be just as effective at serving the patient as the Veress needle method at doing it safely⁸.

Due to the possibility of iatrogenic injury to major arterial systems (like vena cava & iliac arteries) or abdominal organs during abdominal entry, establishing pneumoperitoneum is a crucial step in laparoscopic surgery (intestine, spleen, liver & omentum)^{9,10}. Initial abdominal entry causes more than 50% of major vascular and intestine damage. The initial Veress needle, trocar, or cannula insertion is directly responsible for 80% of difficulties that arise.⁵ Even though some research preferred open abdominal entry (i.e., the Hasson technique), the majority of studies found no main differences between these techniques^{11,12}.

A variety of tools have been developed to make safe initial entrance possible, including the Veress needle, visual bladeless cannula, reusable, threaded, disposable optical trocar, and micro-optical system¹³⁻¹⁵. The aim of the Cannula procedure is to facilitate quick & simple initial abdominal entry through a tiny incision and to decrease problems associated to the track (e.g. leakage of gas, major vascular & abdominal organ injury). The DCI technique is getting popularity among young surgeons, due to the quick production of pneumoperitoneum and thus short operating times. People like Ahmed G. Kaistha S et al and Abdullah, AA et al, in their studies mentioned that the DCI technique takes less time to produce pneumoperitoneum than the verres needle method, and in most studies, that time is around 120 seconds, which is equivalent to our time of 125+ 12 seconds^{5,11,13}.

In one study (0.8%) of our patients we could not introduce the cannula due to obesity and we had to place it by open technique under vision. Ahmed et al., Tariq et al & Mustaq et al, mentioned figures of 2.5%, 1.5%, and 1.5% respectively in their studies^{6,11,16}. The success rate to create the pneumoperitoneum safely remained 99% that is comparable to that of workers world over. There was no gut, vascular or visceral injury during DCI technique and no mortality during the study time.

The main drawbacks of this study are the relatively small sample size and absence of long-term follow-up data. All procedures were carried out by a single surgeon to prevent confounding bias.

CONCLUSION

The conclusion of the study that DCI technique to generate pneumoperitoneum for laparoscopic procedures remains safe and rapid technique.

Conflict of interest: Nil

REFERENCE

- Gharti B, Shrestha P, Shrestha A, Basnet R, Shah C, Adhikari B. Comparison between Simple and Classical Techniques to Create Closed Pneumoperitoneum. Kathmandu Univ Med J. 2021;75(3):309-13.
- Campbell M, Ng D, Albatat B, Lowen D, Bird D, Hodgson R. Quality of recovery assessment of day case and multiday stay patients undergoing elective laparoscopic cholecystectomy. Turkish Journal of Surgery. 2021;37(4):355.
- Qu J-W, Xin C, Wang G-Y, Yuan Z-Q, Li K-W. Feasibility and safety of single-incision laparoscopic cholecystectomy versus conventional laparoscopic cholecystectomy in an ambulatory setting. Hepatobiliary & Pancreatic Diseases International. 2019;18(3):273-7.
- Dingfelder J. Direct laparoscope trocar insertion without prior pneumoperitoneum. The Journal of reproductive medicine. 1978;21(1):45-7.
- Kaistha S, Kumar A, Gangavatiker R, Br S, Sisodiya N. Laparoscopic access: direct trocar insertion versus open technique. Journal of Laparoendoscopic & Advanced Surgical Techniques. 2019;29(4):489-94.
- Mushtaq U, Naikoo GM, Gilkar IA, Ahmad P, Dar A, Wani YH. Classical closed technique by veress needle insertion versus direct trocar insertion in the creation of pneumoperitoneum in various laparoscopic surgeries. Int J Contemp Med Res. 2019;6(7):9-13.
- Kumar R, Hastir A, Bandlish M. Pneumoperitoneum by direct trocar insertion: safe laparoscopic access. Journal of Evolution of Medical and Dental Sciences. 2015;4(15):2432-8.
- Hill DJ, Maher PJ. Direct cannula entry for laparoscopy. The Journal of the American Association of Gynecologic Laparoscopists. 1996;4(1):77-9.
- Şahan A, Ozkaptan O, Cubuk A, Şimşek B, Tanidir Y, Akça O. Fast, Easy, and Safe Establishment of Pneumoperitoneum in Laparoscopic Surgery: The Fingertip Technique. JSL: Journal of the Society of Laparoscopic & Robotic Surgeons. 2021;25(1).
- Alkatout I. Complications of laparoscopy in connection with entry techniques. Journal of gynecologic surgery. 2017;33(3):81-91.
- Ahmad G, Baker J, Finnerty J, Phillips K, Watson A. Laparoscopic entry techniques. Cochrane database of systematic reviews. 2019(1).
- Mikhail E, Tamhane N, Sarkar P, Sappenfield E, Tanner JP, Imudia AN. Laparoscopic entry technique using a veress needle insertion with and without concomitant CO2 insufflation: a randomized controlled trial. Journal of Minimally Invasive Gynecology. 2019;26(7):1383-8.
- Abdullah AA, Abdulmageed MU, Katoof FM. The efficacy of direct trocar versus veress needle method as a primary access technique in laparoscopic cholecystectomy. Mustansiriya Medical Journal. 2019;18(1):47.
- Ikechebelu JI, Eleje GU, Joe-Ikechebelu NN, Okafor CD, Okpala BC, Ugwu EO, et al. Randomized control trial on effectiveness and safety of direct trocar versus Veress needle entry techniques in obese women during diagnostic laparoscopy. Archives of Gynecology and Obstetrics. 2021;304(3):815-22.
- Silay MS, Tepeler A, Sancaktutar AA, Kilincaslan H, Altay B, Erdem MR, et al. The all-seeing needle instead of the Veress needle in pediatric urologic laparoscopy. Journal of Endourology. 2013;27(11):1376-80.
- Tariq M, Ahmed R, Rehman S, Sajjad M. Comparison of direct trocar insertion with other techniques for laparoscopy. Journal of the College of Physicians and Surgeons Pakistan (JCPSP). 2016;26(11):917-9.