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Original Research Article

Direct Trocar Insertion Technique: A Rapid and Safe Method for Creation of Pneumoperitoneum

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Abstract: Background: Abdominal access during laparoscopic surgery sometimes creates difficulty despite of expertise and advancement in laparoscopy. This study was conducted analyze risks and benefits of direct trocar entry in various laparoscopic abdominal procedures. **Methods:** This was a prospective randomized study conducted at Government Medical College Srinagar for a period of two years. **Results:** Maximum number of patients was females with age group from 15 to 70 years. The average time taken from skin incision to creation of pneumoperitoneum was 1 minute. We faced difficulty in 12 patients due to obesity; however no bowel, vessels or other insufflation related complication were encountered. **Conclusion:** in our study no difficulty was faced during direct trocar access. No any major intra-abdominal or vascular injury was noted, we recommend direct trocar entry for creation of pneumoperitoneum.

Keywords: direct trocar entry, quick method, laparoscopy, pneumoperitoneum, quick method.

INTRODUCTION

Laparoscopic abdominal surgery needs proper and sustained pneumoperitoneum for successful results as majority of complications occurs at the time of creation of pnemoperitoneum. The method of directly inserting a trocar for laparoscopy without pneumoperitoneum was first described in (Dingfelder, J. R. 1978). Around 50% of complications have been occurred prior to the planned procedure and the rate of complications has remained the same as in the past (Cunanan, J. R. *et al.*, 1980). Although direct trocar insertion (DTI) is still a blind procedure but it reduces the blind three steps of Veress needile insertion, insufflations to trocar introduction in to a single step. The veress needle (VN) is the oldest practiced but still complication occurs with this technique (Catarci, M. *et al.*, 2001). The incidence of major injuries at the time of laparoscopic entry is 1.1 per 1000 (Molloy, D. *et al.*, 2002). As per data from recent Cochrane database of systematic reviews published in Cochrane library 2015, there was no evidence of advantage using any single technique for preventing major vascular or visceral complications (Ahmad, G. *et al.*, 2012). Usually three techniques are followed by surgeons for creation of pneumoperitoneum from insertion of the Veress needle (closed method), open laparoscopy, Hasson technique to direct trocar insertion, the controversy regarding the best and safest method for the creation of pneumoperitoneum still persists, and every laparoscopic surgeon wants to know the safest entry technique to be followed (Copeland, C. *et al.*, 1983).

MATERIAL AND METHODS

A prospective study was done in Government Medical College Srinagar for a period of two years from October 2016 to September 2018. In this study 400 patients were including and all the patients were operated as elective cases. An 11 mm skin incision was made at the level of umbilicus, infraumblical or supra umbilical in a horizontal direction. The abdominal wall was elevated with left hand and the tip of 10 mm was inserted through the incision at a 45-90 degree angle and advanced in a controlled manner into the abdomen into the peritoneal cavity with a twisting semi-circular motion. Entry into the peritoneal cavity was felt by the surgeon by feeling of giveaway sensation. The correct position of inserted trocar was confirmed by introducing laparoscope and direct visualization of the abdominal contents before insufflation is started. In our study patients of age from 15 to 70 years and undergoing various elective laparoscopic interventions

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were included and age<15 and >70 years, pregnancy and emergency surgeries were excluded from the study.

Results

Majority of patients were females (280 out of 400). The average operative time was 40±10 min in case of surgeries without intra operative complications. In our study we faced technical difficulty in 12 out of which 5 were converted to open procedure cases were converted to open procedures due to intra operative complications and previous surgery [Table 1]. Maximum number of patients was operated as laparoscopic cholecystectomy [Table 2]. No intra-abdominal injuries of bowel, mesentery or vessel were detected. Post operatively and on follow up no port site complication such as infection, granuloma formation, and herniation were encountered [Table 3] . The post-operative stay in hospital was 2 days ±1 day.

Table 1: Technical difficulties while creating pneumoperitoneum

Complications	Number of cases (400)
Technical difficulties	12
Injury to vessels and bowels	0
Subcutaneous emphysema	0
Gas embolism	0
Port site gas leak	0

Table 2: Showed different types of procedures done

Procedure done	Number of cases (400)
Laparoscopic cholecystectomy	305
Laparoscopic appendectomy	30
Laparoscopic inguinal hernia repair	28
Laparoscopic incisional hernia repair	20
Diagnostic laparoscopy	12
Laparoscopic ovarian cyst excision	5

Table 3: Showed postoperative complications

Postoperative complications	Number of patients
Port site infection	4
Port site hernia	1
Port site tuberculosis	2

Discussion

With the advancement and refinement in the laparoscopic surgery not a single method for creation of pneumoperitoneum from Veress needle to optical trocar has been found to be effective for preventing complications. To prevent complication with blind method other techniques has been tried, to prevent these complications other methods were introduced in practice like open technique as devised by Harrith Hasson, direct trocar insertion, optical trocars, and use of disposable shielded trocars (Lal, P. *et al.*, 2002). The direct trocar insertion (DTI) technique was first reported by Dingfelder in (1978) and later described by Copeland, C. *et al.*, in (1983), but so far it has been used mainly by gynecologists (Byron, J. W. *et al.*, 1989). According to Copeland *et al.*,, the keys to a successful DTI are adequate wall relaxation, proper skin incision, and the use of a sharp trocar (Copeland, C. *et al.*, 1983). Some studies have tried shielded trocars but none have shown them superior to nonshielded trocars (Dingfelder, J. R. 1978). Our main focus was to prevent vascular and visceral injuries while creating pneumoperitoneum. Copeland, C. *et al.*, (1983) described an incidence of vascular injuries of 0.04% and visceral injuries of 0.06% in more than 100000 patients using the Veress technique (Sreejith, V. *et al.*, 2019). The study conducted by Hurd *et al.*,, demonstrated modification of the Hasson technique without using special instruments, but gas leakage in 14% and an access time of 3 min vs 3.8 min using Veress needle technique (VN). A study conducted Alexandra hospital; London also concluded that, there is no major associated complications and very high feasibility (99.5%) in the case of DTI technique. DTI has statistically significantly lower incidence of bowel injury as compared to the technique (1.9/1000 for V.N. 1.5/1000 for open and 0.3/1000 for D.T.I) (Sreejith, V. *et al.*, 2019). Argesta *et al.*,-found that in a population of 598 thin and very thin patients, DTI was safe, has a slightly higher feasibility rate compared with the Veress needle technique and is associated with fewer minor complications but reported no differences in the incidence of major complications (Agresta, F. *et al.*, 2004). In our study 4 patients had port site infection, 1patient had port site hernia and 2 had port site hernia which were managed accordingly

CONCLUSION

In this study, DTI was found to be is safe, fast, efficacious and provides quick entry into peritoneal cavity without any major complications and has a very high feasibility rate. There remains no clear evidence as to the optimal form of laparoscopic entry; however, direct entry may be as safe as other alternative like VN and open entry techniques

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