ORIGINAL ARTICLE

COMPARISON OF OPERATIVE COMPLICATIONS OF DIRECT TROCAR ACCESS VERSUS VERESS NEEDLE INSERTION TECHNIQUE FOR INITIAL PERITONEAL ENTRY IN PATIENTS UNDERGOING GYNECOLOGICAL LAPAROSCOPIC SURGERY

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Background: Laparoscopy is considered to be a good diagnostic and surgical way to replace open surgeries in all surgical fields. As it is a least invasive method, with advantages for patients and all associated with medical care. There is a significant increase in the use of laparoscopic surgery in gynecology. This study was done to compare the frequency of operative complications of direct trocar access versus Veress needle insertion technique for initial peritoneal entry in patients undergoing gynecological laparoscopic surgery. **Methods:** This Randomized Controlled Trial was conducted at the Department of Obstetrics & Gynecology, Lahore General Hospital, Lahore from 26-12-2019 to 25-6-2020. Four hundred consecutive patients were enrolled and divided randomly into two groups by blocked randomization. Direct trocar insertion (DTI) technique was used for initial peritoneal access in group A and Veress needle (VNI) was inserted first for peritoneal access in group B. **Results:** The mean age of the patients in DTI group was 35.76±8.38 years whereas that in VNI group was 35.85±8.38 years. In DTI group there were 8(4%) patients with extra-peritoneal insufflation and in VNI group there were 19(9.5%) patients with extra-peritoneal insufflation. There were 8(4%) patients in DTI group with Omental injury and VNI group there were 13(6.5%) patients with Omental injury. In DTI group there were 7(3.5%) patients with port-site infection compared to 15(7.5%) in VNI group. **Conclusion:** According to findings the rate of complications observed with VNI, DTI can be a preferred procedure for gynecological surgeries.

Keywords: Direct trocar access; Veress needle insertion technique; Initial peritoneal entry; Gynecological laparoscopic surgery

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INTRODUCTION

Laparoscopy is a diagnostic and surgical procedure applied in surgical fields these days. It is the minimally invasive procedure. It shows several benefits for patients, surgeons, health-care systems, and society. There is a significant increase in the use of laparoscopic surgery in gynecology.[1] For gynecological procedures, laparoscopy has high risk for minor complications which is <40% as compared to the laparotomy, while the hazard of major complications are comparable.[2]

Abdominal entrance is the initial step in a laparoscopic surgery to create the pneumoperitoneum. In this step, there is risk of injuries to visceral and abdominal wall. The rate of injury because of entry of trocar needle may raise up to 40% in all laparoscopic surgeries.[3,4]

Direct trocar insertion (DTI) & Veress needle insertion (VNI) are the two most common methods for laparoscopic needle entry in the abdominal wall.[5] Both of these techniques are associated with some minor complications (such as port site infections, extra-insufflation and omental injury) that are associated with significant morbidity after laparoscopy.[5,6] Concerning these complications, limited data is available and previous trial showed mixed results regarding the different needle entry methods.[7] A recent study conducted by Angioli *et al*., compared complications rate in patients in whom DTI was used for initial laparoscopic access with patients in whom VNI was used. In that study port site infections occurred in 2.6% patients in VNI group versus in 0.0% patients in DTI group. Similarly, omental injury, and extra-peritoneal insufflation rate was 3.11%, 3.11% in VNI versus 1.60% and 0.0% in DTI groups. While overall complications rate was 9.9% in VNI group and 2.6% in DTI group.[8]

As mentioned above, very little data is available on comparison of complications of laparoscopic gynecological procedures using VNI technique with DTI technique. So the aim of the proposed study is to

compare the frequency of complications in patients undergoing gynecological laparoscopic surgery using direct trocar access (DTI) with Veress needle assess (VNI) for initial peritoneal entry. The study would help us to decide which technique is associated with minimal number of complications and will help us to adopt a better entry technique in future during laparoscopy. By adopting a better entry technique, we could reduce the morbidity in these patients by preventing complications rate.

MATERIAL AND METHODS

It was a Randomized Controlled Trial (RCT) at the Department of Obstetrics & Gynecology, Lahore General Hospital, Lahore from 26-12-2019 to 25-6-2020. Ethical approval was obtained. A sample of 400 cases (200 in each group) was used with patients selected through non-probability consecutive sampling technique. Females aged 18-50 years undergoing any laparoscopic gynecological procedure including adnexal pathology/uterine myomas, vaginal hysterectomy, supracervical hysterectomy or diagnostic laparoscopy were included in the study. While females with history of abdominal surgery, irritable bowel syndrome, pelvic inflammatory disease or malignancy were excluded. After approval from hospital ethical committee, patients fulfilling the selection criteria were included. Patients were divided into two equal groups using blocked randomization. In DTI group, direct trocar insertion technique was used for initial peritoneal access. In VNI group, Veress needle was inserted first for peritoneal access. All the patients underwent gynecological procedures by a consultant gynecologist. Intravenous Cefazolin 2g prophylaxis was given 2 hours before laparoscopy. Skin at surgical site was disinfected with 2% solution of chlorhexidine di gluconate & 95% ethyl alcohol.

In the VNI group, **t**he needle was inserted at the angle of 45º. The quantity of CO_2 inserted according to the intra-abdominal pressure. Then first trans-umbilical trocar was inserted in sagittal plane, at the angle of 90º horizontally. In the DTI group, **t**rocar was inserted without pneumoperitoneum. Infraumbilical skin incision was given adequately to insert the sharp trocar. The abdominal wall was elevated manually by pulling on 2 towel clips, placed on umbilicus 3 cm on any side, and trocar was inserted at the angle of 90º.

Complications e.g. extra-peritoneal insufflation (presence of air into retroperitoneal space with communication into the peritoneal cavity or retro-peritoneal space alone, assessed at the time of surgery), omental injury (diagnosed on x-rays, assessed at the time of surgery) and port-site infections (if there was any presence of inflammation, redness and pus at port site within 10 days after surgery) were noted. Data was recorded on a *pro forma*. Data analysis was carried out using computer software SPSS v23. Complications e.g. extra-peritoneal insufflation, omental injury and port-site infection were described as frequencies and percentages. Chi-square test was applied to compare complications in both groups keeping p-value ≤ 0.05 as statistically significant.

RESULTS

The mean age of the patients in DTI group was 35.76±8.38 years whereas in VNI group was 35.85±8.38 years. Basic data of independent variables is given in Table-1. Complications are compared in Table-2.

Table-1: Characteristics of patients

	DTI Group	VNI Group
n	200	200
Age (years)	35.76±8.38	35.85±8.53
BMI		
Normal	69 (34.5%)	58 (29%)
Overweight	51 (25.5%)	69 (34.5%)
Obese	80 (40%)	73 (36.5%)
Type of Surgery		
Laparo-assisted vaginal hysterectomy	42 (21%)	50 (25%)
Laparoscopic supracervical hysterectomy	56 (28%)	50 (25%)
Operative laparoscopy for adnexal pathology	53 (26.5%)	44 (22%)
Diagnostic Laparoscopy	49 (24.5%)	56 (28%)

Table-2: Complications in both groups

	DTI Group	VNI Group	*p*-value
Extra-Peritoneal Insufflation	8(4%)	19 (9.5%)	0.028
Omental Injury	8(4%)	13 (6.5%)	0.262
Port-site infection	7(3.5%)	15 (7.5%)	0.079

DISCUSSION

VNI and DTI are the two most common techniques for blind abdominal entry, and morbid obesity is also the major risk factor for abdominal entry injuries.[9] There are no trials available which can demonstrate the better and safer method for abdominal entry in morbidly obese candidates. Though, all randomized controlled trials were conducted in candidates with normal body mass index for VNI & DTI. And all those trials favored the DTI as more safe and better method for laparoscopic procedures.[8,10] This study also is in agreement.

One meta-analysis pooled 7 randomized controlled trial and presented four major complications,i.e., liver complications in two cases, small bowel injury in one case, and mesentery in one case, and all these complications were observed with VNI method.[10] But, the Cochrane analysis recommended that further randomized controlled trials must be done to obtain more improved outcomes and lessen the complications.[11]

But Erturgrul *et al*., presented conflicting results. They reported that there were no major complication detected with VNI, contrasting in other trials, while with DTI, there was 1 case of meso-colon injury and 1 case had severe injury to jejunal branch of superior mesenteric vein and underwent open surgery. Omental mass was observed significantly higher in morbidly obese candidates than cases with normal body mass index.[5]

Borgotta *et al*.,[12] found that the rate of omental injury was 6.3% with VNI and 3.9% with DTI, in non-obese cases. These were similar to the findings of our trial, i.e., the Omental injury rate in DTI group was 4% whereas that in ANI group was 6.5%. According to the findings of one more study [13] the rate of omental injury with VNI was 9.5% and with DTI was 5.1% which are greater as compared to the Omental injury rate in our study which was 4% and 6.5% in DTI group and VNI group respectively. Altun *et al*., proved that major complications were noted 2.2% with VNI, but 0% with DTI. They also observed few minor complication, i.e., 6.7% with VNI while 2.05% with DTI. Thus they concluded that the most determine factors to select the mode of technique are preference and skills of surgeon, anatomic information, and experience. The thick abdominal-wall and peritoneum can cause another attempt to enter the needle and difficulty in lifting the abdominal wall efficiently may raise the risk of injury to omentum in morbidly obese candidates.

According to Erturgrul *et al*[5] omental injuries were not more frequent in morbidly obese patients similar are the findings of our study as in our study there was no significant association between Omental injuries in study groups among obese patients (*p*-value: 0.34). It is also supposed that because of thick omental layer / mass in morbidly obese cases, the injuries of deeper vascular and visceral parts are rare.

Angioli *et al*.,[8] when outcome of DTI & VNI were compared in non-obese candidates, the omental injuries were more with VNI. These findings were different from the findings of our study as in our study rate of Omental injury was almost the same in both the groups with very little difference. Similar findings were presented by Gunenc *et al*.,[14] & Zakhera,[15] where the extra-peritoneal insufflation was observed only with VNI while in our study extra-peritoneal insufflation was common among both groups: the rate of extra-peritoneal insufflation in VNI group was 9.5% and that among DTI group was 4%. But Erturgrul *et al*[5] reported that in their groups, no patient had extra-peritoneal insufflation which is again different from the findings of our study as discussed above.

According to Altun *et al*.,[16] rate of extra-peritoneal insufflation was high with VNI than DTI. It is the minor complication; but, fatal pneumo-embolism is also reported.[17] The rate of failure of first attempt was usually with VNI as compared to DTI, i.e., 21.8% & 7.8%, respectively.[12]

The strengths of our study include appropriate sample size and rigorously collected data. However, limitations are that it was a single centre study and detailed analyses was not done which could have added to more elaborate results.

CONCLUSION

There was no apparent significant difference among these two techniques but according to findings the rate of complications we can suggest DTI for laparoscopic gynecological surgeries.

Recommendations / suggestions: Multi-centric trials with more independent variables should be done to obtain more authentic and better results to confirm the expertise of surgeons in this field.

Conflict of interest: No conflict of interest to be declared by any author involved in the research.

AUTHORS'S CONTRIBUTION

AR: Write-up. AFZ: Supervision. MJ: Write-up. MI: Data collection, analysis. SSU: Data collection. RT: Data interpretation.

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