Original Article

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Open Versus Closed Laparoscopy: Yet an Unresolved Controversy

Obstetrics and Gynaecology Section

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ABSTRACT

Introduction: Safe placement of the Verres needle or the primary trocar for establishment of pneumoperitoneum is the most critical step in laparoscopic procedure as it is associated with bowel, bladder and life threatening vascular injuries and embolism. In the last few decades many techniques and guidelines have been introduced to eliminate complications in creation of pneumoperitoneum. Classical closed technique (Verres needle) and the open classic technique (Hasson) are the most commonly used techniques for creation of pneumoperitoneum.

Aim: To compare the rate of occurrence and nature of complications in open and closed laparoscopy during establishment of pneumoperitoneum in different surgical and gynaecological procedures.

Materials and Methods: This was a comparative study conducted at three hospitals in Dibrugarh district, Assam, India from January 2012 to December 2014. Total 3000 cases were included in the study with 1500 cases of open laparoscopy and 1500 cases of closed laparoscopy. Complications occurring in both the groups were compared by using Fisher's-exact test.

Results: In closed laparoscopy group minor complications occurred in 80 (5.33%) and major complications in 20 (1.33%) cases. In open laparoscopy group minor complications were observed in 60 (4%) and major complications in 2 (0.13%). The p-value of the difference between the two groups for minor complications was 0.0834 and for major complications was 0.0001(significant).

Conclusion: Open laparoscopy was seen to be better than closed laparoscopy in terms of not only the rate of occurrence of complications but also the nature and severity of the complications. This study is clinically relevant as there is no consensus for a particular method of safe entry in to the peritoneal cavity warranting the need for more research. Open technique can be performed in all cases irrespective of previous operative scar, suspected intra peritoneal adhesions or obesity. Favourable outcome may be achieved in closed technique in cases of normal BMI, absence of postoperative scar in the abdomen, absence of abdominal and genital tuberculosis and pelvic inflammatory disease.

Keywords: Direct trocar, Laparoscopic complications, Pneumoperitoneum, Port entry, Verres needle

INTRODUCTION

Jacobeus of Sweden performed the first laparoscopy in humans in 1910. Since then laparoscopic techniques have been in continuous evolution. The Veress needle is the oldest method developed by Dr. Verres in 1938 and is the most used technique, especially in gynaecological procedure [1]. In closed classical technique Veress needle is inserted in the midline in sagittal plane at a 45 degree angle to the spine through a 3mm sub umbilical skin incision after lifting the abdominal wall below the umbilicus for counter traction. In this position the tip of the needle is directed between the iliac vessels, anterior to the sacrum but inferior to the bifurcation of the aorta and proximal aspects of the vena cava. The needle's shaft is held by the tips of the fingers and steadily and deliberately guided in to position only far enough to allow the tip's entry in to the peritoneal cavity. TT Vellinga et al., suggested that there is no problem with vertical orientation of the vessel needle provided the umbilicus is significantly elevated and the needle is only inserted at a distance of approximately 2-3 cm or until a negative pressure is encountered [2]. The intra peritoneal positioning is detected before insufflations by hiss test, double click sound and loss of resistance and confirmed by aspiration test, saline drop test and initial intra peritoneal pressure of less than 10mm Hg. Following confirmation the gas tube is connected to the Verres needle for insufflations. Trendelenburg (head down) positioning of the patient is not required during insertion of the needle rather it is criticized by many authors as it brings the sacrum to more cephald direction and pelvic vessels more anteriorly. After pneumoperitoneum the incision is enlarged up to 1cm and trocar is inserted in the same direction after lifting the abdomen. In direct trocar entry technique the primary trocar is inserted directly in to the peritoneal cavity in the same way as that of Verres needle following sub umbilical incision (1cm) without prior pneumoperitoneum with Verres needle.

Hasson first described the open laparoscopy in 1971 and it remains the favourite entry method for many laparoscopic surgeons [3]. In open technique 1-1.5 cm sub-umbilical incision is made, subcutaneous fat is dissected, rectus sheath and then peritoneum are incised under direct vision. The laparoscopic sheath without its trocar is then inserted into the peritoneal cavity followed by insufflations. After completion of the intended procedure the rectus sheath is closed with interrupted absorbable or purse string suture followed by the skin closure.

Other methods under evaluation for safe insufflations are palpation of aorta [4], the spinal needle test [5], imaging (CT, MRI) and direct measurement of the distance [6]. In a study USG was used for predicting infra umbilical adhesions by observing visceral movement and reported infra umbilical adhesion was 12%. A visceral slide threshold <1cm to predict adhesion had sensitivity of 86%, specificity 91%, positive predictive value of 55% and negative predictive value of 98% [7]. The USG observation of bowel movement can be combined with peri umbilical ultrasound guided saline infusion (PUGSI) of 8-10ml in to the peritoneum for detection of fluid pocket which indicates presence of adhesion. The PUGSI test was able to detect all cases of obliterating sub umbilical adhesion, demonstrating sensitivity and specificity of 100% [8].

Complications arising from laparoscopic surgery are rare and commonly occur when attempting to gain access to the peritoneal cavity [9]. The rate of carbon dioxide embolism was 0.001% in a review of 489335 closed laparoscopies [10]. Several life threatening coronary, cerebral or other gas embolism have been reported in the literature in closed laparoscopy. Such type of complication has not been reported in open laparoscopy [1].

Creation of the pneumoperitoneum is the first and most critical step of a laparoscopic procedure because that access is associated with injuries to the gastrointestinal tract and major blood vessels and at least 50 % of these major complications occur prior to the commencement of the intended surgery [11]. Tinelli et al., reported direct optical entry (DOE) in patients with previous pelvic abdominal surgery and compared with classical open laparoscopy. The author suggested that DOE is as safe as open laparoscopy and can be used in patients with previous abdomino-pelvic surgery [12].

In last few decades laparoscopy has gained more importance than conventional laparotomy procedure in day to day surgical practices. In common surgical and gynaecological procedures laparoscopy results in smaller surgical scar, faster recovery, lesser pain and earlier return of bowel function [13].

But there is still no consensus regarding how to introduce the primary trocar inside the peritoneal cavity without complications. The different types of trocars, different sites and different positions adopted for safe entry means that the controversy is yet to be resolved. There has been many studies comparing the different access techniques but these have turned out to be inconclusive, warranting the need for further research. This study was conducted to compare the rate of occurrence and nature of complications during the creation of pneumoperitoneum in open and closed laparoscopy.

MATERIALS AND METHODS

This comparative study was conducted during the period of January 2012 to December 2014. A total of 3000 cases were included with 1500 cases of open laparoscopy and 1500 cases of closed laparoscopy. The complications that occurred with the primary trocar, the Verres needle or opening the peritoneal cavity during open laparoscopy were only included in this study. The cases excluded from this study were: postoperative scar in the abdomen, past history of abdominal or pelvic tuberculosis, past history of puerperal sepsis, extremes of age (less than 10 years and more than 70 years), the cases with confusion regarding the time of injury or complications, and the cases of machinery failure for establishment of pneumoperitoneum. There were 16 cases with obesity and divided equally in both groups. Patients were followed up for 14 days following operation for delayed manifestation of complications which may occur during the phase of pneumoperitoneum or intended procedure. The results were presented in terms of percentages. The statistical significance of the differences between the two groups was tested by Fisher's-exact test using Graph Pad online calculator and a p-value of less than 0.05 was considered as significant.

The cases were performed by one accredited general laparoscopic surgeons, one accredited gynaecological laparoscopic surgeons, one newly trained general laparoscopic surgeon and one newly trained gynaecological laparoscopic surgeon in three different institutions at Dibrugarh district, Assam, India.

Out of these 3000 cases; 800 were cases of cholecystectomy; 550 were laparoscopic assisted vaginal hysterectomy (LAVH); 450 were appendectomy only; 300 were diagnostic laparoscopy with chromopertubation for infertility; 250 were laparoscopic tubal occlusion (LTO) under GA; 250 were endometriosis; 150 were cholecystectomy with appendectomy; 150 were appendectomy with LTO and 100 were total laparoscopic hysterectomy (TLH).

The accredited general laparoscopic surgeons and gynaecological laparoscopic surgeons have experience of more than 8 years in laparoscopy and performed more than 1000 thousand cases individually and as assistant. The newly trained gynaecological and general laparoscopic surgeon performed all their cases in presence of the accredited gynaecological surgeon and accredited general laparoscopic surgeon respectively. In closed laparoscopy the primary trocar entry was tried through sub- umbilical longitudinal skin incision in 66.77% (1000) of the cases following pneumoperitoneum with Verres needle and in 33.33% (500) of the cases directly into the peritoneal cavity without prior pneumoperitoneum. The entry of the Verres needle was detected by double click sound, hiss test, loss of resistance and confirmed by aspiration test , saline drop test and initial intra-peritoneal pressure. In all the cases of open laparoscopy {Hasson technique} (1500) the cannula (without the trocar) entry was done after opening the peritoneal cavity with a small longitudinal sub-umbilical skin incision (1.3-1.5cm) followed by opening the rectus sheath with a triangular knife (size 11) in the same direction and separating it and the rectus muscle with straight artery forceps both transversely and longitudinally and picking up the peritoneum with same artery forceps and making a nick with separate triangular knife to open the peritoneal cavity.

Two different types of trocars were used in this study- metallic trocar with pyramidal tip 10mm (Olympus America) and WOM PM 1287-13-11;11mm (Germany). Both the trocars were used in equal number of cases in both obese and normal cases in both the techniques to avoid bias.

The abdominal cavity was thoroughly inspected after pneumoperitoneum for complications before the intended procedure and the complications were divided into major and minor depending upon the nature and severity of injuries. As this was a comparative study between open and closed laparoscopy, when closed laparoscopies were converted to open laparoscopies or laparotomies due to failure of pneumoperitoneum then it was considered as a major complication. On the same ground the cases which required laparotomy due to failure in opening the peritoneal cavity in open laparoscopy were considered as major complication. Difficulty in inserting the Verres needle or primary trocar is considered when two attempts fail to enter in to the peritoneal cavity. The minor complications were difficulty in primary trocar entry, abdominal bruise, localized emphysema, small haematoma, omental injury and bowel serosal injury. The major complications were failure to create pneumoperitoneum, emphysema extending up to the neck causing dyspnoea, bowel perforation, bladder perforation and mesenteric vascular injury.

RESULTS

Difficulty in primary trocar entry and bruise in the abdomen were the commonest minor complications observed in closed laparoscopy. In open technique difficulty in primary entry was not observed as the primary trocar was inserted only after opening the peritoneal cavity. As gripping of the abdominal wall was not required, bruising was rare in open technique and significantly high in closed technique. Leakage of gas was observed significantly more in the early part of the study in open laparoscopy because of a bigger incision which were managed by high flow rate (3L/min) of gas and purse string suture along with a wet piece of gauge in the skin in early part and by a absorbable purse string suture in the rectus sheath in the later part to maintain intra peritoneal pressure around 12 mmHg. Omental injury was observed in a few cases of closed technique which were dealt with bipolar coagulations. Injury to the bowel serosa was also observed only in early part of the study in open technique because of incising the peritoneum without properly lifting it with small curved artery forceps in three cases of endometriosis and in three cases of appendicitis.

Failure to create pneumoperitoneum was the commonest major complication observed in closed technique. In seven of these cases open technique was adopted and in three cases conventional

Complication	Closed laparoscopy (n = 1500)	Open laparoscopy (n = 1500)	p-value
Minor	**80 (5.33%)**	**60 (4%)**	**0.0834**
Difficulty in primary entry	26(1.73%)	-	-
Bruise	16(1.07%)	3(0.21%)	0.004
Localized emphysema	13(0.87%)	17(1.13%)	0.5828
Leakage of gas	12(0.8%)	27(1.8%)	0.0228
Small haematoma	8 (0.53%)	7 (0.47%)	1.00
Omental injury	4 (0.27%)	0	-
Bowel serosal injury	0	6 (0.4%)	-
Haematoma + emphysema	1(0.07%)	0	-
Major	**20 (1.33%)**	**2(0.13%)**	**0.0001**
Failure to create pneumoperitoneum	10 (0.67%)	2(0.13%)	0.0382
Emphysema extending upto the neck	2 (0.13%)	-	
Bowel perforation	3 (0.21%)	-	
Bladder perforation	2 (0.13%)	-	
Mesenteric vascular injury	2 (0.13)	-	
Death	1 (0.07%)	-	

[Table/Fig-1]: Comparison of complications in closed and open laparoscopy.

laparotomy was carried out. The cases in which conventional laparotomy was required had adhesions under the umbilicus and they were not suspected at the time of primary trocar entry. The cases were later on diagnosed as endometriosis in one case and abdominal tuberculosis in two cases in histopathology. Only in two cases there was failure of pneumoperitoneum in open laparoscopy which later on came out to be abdominal tuberculosis on histopathology. The cases of emphysema extending up to the neck required ventilatory support for 12 hours. These cases were associated with difficulties in inserting the Verres needle because of obesity. Bowel perforations were observed in two cases with Verres needle and in one with primary trocar (Pyramidal tip). All of the bowel injuries occurred in the ileum and required laparotomy for repair. Bladder injuries caused by Verres needle were repaired laparoscopically. Mesenteric vessel injuries observed, one with Verres needle and in the other case with WOM trocar were detected & ligated following laparotomies. The complications occurred in the hands of the both accredited and newly trained surgeons. In one case of LTO sudden death occurred at the time of creation of pneumoperitoneum, which was likely to be due to major vessel injury and/or carbon di-oxide embolism. The cause could not be elucidated properly as the relatives refused to do autopsy [Table/Fig-1].

DISCUSSION

Technique of primary trocar entry in laparoscopy is still a debatable topic. No single method is suitable for all cases. Entry technique may be individualized in each case depending on proper preoperative evaluation and surgical skill. The different methods under evolution, to reduce complications need multi-centric studies for their safety and routine practical applicability. Our study was an effort to compare the complications in both the techniques and we feel more studies with bigger sample are required to compare both and their uses in different cases.

In our study, we did not find bowel perforation, bladder injury and mesenteric vessel injury in open laparoscopy. On the other hand, three (0.2%) cases of bowel perforations, two (0.13%) cases of bladder injury and two (0.13%) cases of mesenteric vessel injury occurred in closed laparoscopy. Shailesh kumar et al., reported abdominal wall emphysema in 12 (0.3%) cases, omental injury in 11 (0.28%) cases, small bowel injury in 2 (0.050%) cases, mesenteric vascular injury in 2 (0.050) cases of their total 4014 cases with Verres needle [14].

Christopher et al., in their national survey of 248 registered members of Canadian Association of General Surgeons reported that 50% of laparoscopic complications were entry related and most injury related litigations were trocar related [15]. In our study 13 (0.87%) cases of localised emphysema and two (0.13%) cases of severe emphysema occurred with closed laparoscopy. Pawan Lal et al., reported 2.91% (22) periumbilical haematoma out of 755 cases of modified open laparoscopy, but in our study sub umbilical haematoma was only 0.47% (7) in the open method [16]. A Pickersgill et al., reported leakage of gas in less than 5% cases out of 647 open laparoscopy [17]. We have found leakage of gas in 0.8% (12) and 1.8% (27) in closed and open laparoscopy respectively. Though leakage of gas was found more in cases of open laparoscopy, this as such did not increase the risk of the operation or delayed complication. Chapron et al., reported in a nonrandomized comparison of open versus closed laparoscopic entry practiced by university affiliated hospital teams. The bowel and major vessels injury rates were 0.04 % and 0.01% in the closed technique and 0.19% and 0% in the open technique respectively. They concluded that open laparoscopy does not reduce the risk of major complications in laparoscopic access [18]. Jansen et al., conducted a clinical trial that compared closed and open entry techniques and the complications rate were 0.07% and 0.17% for the closed and open technique respectively. The number of entry related complications with the open technique was significantly higher than with the closed technique [19]. Hasson et al., concluded that there is no evidence to support abandoning the closed entry technique in laparoscopy; however, the selection of patient for an open or alternative procedure is still recommended [3]. M Larobina and P Nottle in a meta analysis of 760,890 closed laparocopy and 22,465 open laparoscopy cases reported that the incidence of vascular injury rate in closed laparoscopy was 0.44% compared with 0% in open laparoscopy. The incidence of bowel injury was 0.7% compared to 0.5% respectively. The authors concluded that the open (Hasson) technique eliminates the risk of vascular injury and gas embolism and reduces the risk of bowel injury and recommended open technique to be adopted for primary laparoscopic entry [20].

Catarci et al., in retrospective analysis of 12919 cases reported major vessel injury 0.5% (7), visceral injury 0.6% (8) and minor vascular lesion in 0.07% (9) during creation of pneumoperitoneum. The rate of complications was 0.18% (20/10664), 0.09% (1/1135) and 0.27% (3/1009) in closed, open and optical trocar method respectively. They concluded that there is no foolproof method for the creation of pneumoperitoneum [21]. Adriana Toro et al., in their review literature cited that major vascular injuries caused by abdominal midline insertion of Verres needle occur even in the hands of experienced surgeons [1]. Schafer et al., evaluated 26 major vascular injuries and reported that only four (15%) of them caused by inexperienced surgeon (surgeons who had performed fewer than 50 laparoscopic procedures). The other 22 (85%) injuries had been caused either by experienced surgeons (51and 100 procedures) or very experienced surgeons (>100procedures) [22].

CONCLUSION

We have observed statistically significant difference in major and a few of minor complications in our study. It appears that open method is relatively safer technique as major complications are rare so in learning and beginning phase of the laparoscopic procedure this technique may be adopted. There is no safety mechanism in the Verres needle or primary trocar to prevent bowel injuries in case of sub umbilical adhesions. The safety of Verres needle or primary trocar entry in closed technique mostly depends on proper selection of cases, skill of the surgeon and must be considered as the utmost important part of the laparoscopic operation.

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REFERENCES

[1] Toro A, Mannino M, Cappello G, Di Stefano A, Di Carlo I. Comparison of Two Entry Methods for Laparoscopic Port Entry: Technical Point of View. *Diagnostic and Therapeutic Endoscopy*. 2012;2012:305428. 7 pages,. Doi: 10.115/2012/30542. (http://www.hindawi.com/journals/dte/2012/305428/)

[2] Vellinga TT, de Alwis S, Suzuki Y, Einarsson JI. Laparoscopic entry: the modified Alwis method and more. *Reviews In Obstetrics And Gynaecology*. 2009;2(3):193-98. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2760894/

[3] Hasson HM. A modified instrument and method for laparoscopy. *American Journal of Obstetrics and Gynaecology*. 1971;110(6):886–87. http://www.popline.org/node/520292

[4] Polyzos D, Papadopoulos N, Chapman L, et al. Where is the aorta? Is it worth palpating the aorta prior to laparoscopy? *Acta Obstetricia et Gynaecologica Scandinavica*. 2007;86(2):235–39. http://www.tandfonline.com/doi/full/10.1080/00016340601090147

[5] Nezhat F, Brill AI, Nezhat CH, Nezhat A, Seidman DS, Nezhat C. Laparoscopic appraisal of the anatomic relationship of the umbilicus to the aortic bifurcation. *Journal of the American Association of Gynaecologic Laparoscopists*. 1998;5(2):135–40. http://www.sciencedirect.com/science/article/pii/S1074380498800790

[6] Cohen MR, Scoccia B. Double laparoscopy: an alternative two-stage procedure to minimize bowel and blood vessel injury. Journal of Gynaecologic Surgery. 1991;7(4):203–06. http://www.scopus.com/record/display.uri?eid=2-s2.0-0026263690&origin=inward&txGid=0

[7] Tu FF, Lamvu GM, Hartmann KE, Steege JF. Preoperative ultrasound to predict infraumbilical adhesionuds: a study of diagnostic accuracy. *An American Journal of Obstetrics and Gynaecology*. 2005;192(1):74-79.

[8] Nezhat C, Cho J, Morozov V, Yeung P. Preoperative periumbilical ultrasound-guided saline infusion (PUGSI) as a tool in predicting obliterating subumbilical adhesions in laparoscopy. *Fertility and Sterility*. 2009;91(6):2714– 19.

[9] Varma R, Gupta JK. Laparoscopic entry techniques: clinical guideline, national survey, and medicolegal ramifications. *Surgical Endoscopy and Other Interventional Techniques*. 2008;22(12):2686–97. http://link.springer.com/article/10.1007/s00464-008-9871-6#/page-1.

[10] Bonjer HJ, Hazebroek EJ, Kazemier G, Giuffrida MC, Meijer WS, Lange JF. Open versus closed establishment of pneumoperitoneum in laparoscopic surgery. *British Journal of Surgery*. 1997;84(5):599–602. http://onlinelibrary.wiley.com/doi/10.1046/j.1365-2168.1997.d01-1355.x/abstract

[11] Krishnakumar S, Tambe P. Entry complications in laparoscopic surgery. *Journal of Gynaecological Endoscopy and Surgery*. 2009;1(1):4–11. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3304260/

[12] Tinelli A, Malvasi A, Guido M, et al. Laparoscopy entry in patients with previous abdominal and pelvic surgery. *Surgical Innovation*. 2011;18(3):201–05. http://sri.sagepub.com/content/18/3/201

[13] Ülker K, Anuk T, Bozkurt M, Karasu Y. Large bowel injury during gynaecological laparoscopy. *World Journal of clinical cases*. 2014;846-851. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4266832/

[14] Kumar S, Bhaduri S, Ansari AM, Tripathi S, Dikshit P. Verres Needle: A safe Technique in Modern Laparoscopic Era. *World Journal of Laparoscopic Surgery*. 2013;6(1):1-5. (http://www.jaypeejournals.com/eJournals/ShowText.aspx?ID=4531&Type=FREE& TYP=TOP&IN=_eJournals/images/JPLOGO.gif&IID=353&isPDF=YES)].

[15] Compeau C, McLeod NT, Ternamian A. Laparoscopic entry: a review of Canadian general surgical practice. *Can J Surg*. 2011;54(5):315-20. (http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3195650/).

[16] Lal P, Singh L, Agarwal PN, Kant R. Open Port Placement of the First L aparoscopic Port: A Safe Technique. IJSLS. 2004;8(4):364–66. (http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3016831/).

[17] Pickersgill A, Slade RJ, Falconer G, Attwood S. Open laparoscopy: the way forward. *British Journal of Obstetrics and Gynaecology*. 1999;106:1116-19. (http://onlinelibrary.wiley.com/doi/10.1111/j.1471-0528.1999.tb08134.x/epdf)

[18] Chapron C, Cravello L, Chopin N, Kreiker G, Blanc B, Dubuisson JB. Complications during set-up procedures for laparoscopy in gynaecology: open laparoscopy does not reduce the risk of major complications. *Acta Obstetricia et Gynaecologica Scandinavica*. 2003;82(12):1125–29.

[19] Jansen FW, Kolkman W, Bakkum EA, De Kroon CD, Trimbos-Kemper TCM, Trimbos JB. Complications of laparoscopy: an inquiry about closed- versus open-entry technique. *American Journal of Obstetrics and Gynaecology*. 2004;190(3):634–38. http://www.ncbi.nlm.nih.gov/pubmed/15041992

[20] Larobina M, Nottle P. Complete evidence regarding major vascular injuries during laparoscopic access. *Surgical Laparoscopy, Endoscopy and Percutaneous Techniques*. 2005;15(3):119–23.

[21] Catarci M, Carlini M, Gentileschi P, Santoro E. Major and minor injuries during the creation of pneumoperitoneum: a multicenter study on 12,919 cases. *Surgical Endoscopy*. 2001;15(6):566–69.

[22] Sch¨afer M, Lauper M, Kr¨ahenb¨uhl L. Trocar and Veress needle injuries during laparoscopy. *Surgical Endoscopy*. 2001;15(3):275–80.

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