LAPAROSCOPIC CHOLECYSTECTOMY–A COMPARISON BETWEEN OPEN VERESS NEEDLE TECHNIQUE

Khalid Hussain, Aurangzeb*, Jovaria Masood

Combined Military Hospital Multan Pakistan, *Military Hospital Rawalpindi Pakistan

ABSTRACT

Objective: To compare the open versus Veress needle method of producing pneumoperitoneum in laparoscopic cholecystectomy in terms of time required to induce pneumoperitoneum and to close the port site wounds.

Study Design: Randomized clinical trial.

Place and Duration of Study: Department of Surgery, Military Hospital, Rawalpindi from Aug 10, 2011 to Aug 10, 2012.

Material and Method: One hundred and thirty patients between 27 and 60 years of age undergoing laparoscopic cholecystectomy during the study period were enrolled. Patients were divided into two equal groups by lottery method. Group A had pneumoperitoneum by open method and Group B by Veress needle. All surgeries were performed by the same surgical team by using standard four post technique. General anesthesia was given by the same anesthesia team. Time required to induce the pneumoperitoneum and to close the port site wounds was calculated using stop watch. Data were entered on a given proforma and analyzed statistically.

Results: There were a total of sixty five patients in each group. Time required to create pneumoperitoneum ranged from 6.30 to 10.89 minutes in group A and 6 to 16.59 minutes in group B. Mean time to create pneumoperitoneum was 8.35 minutes in group A and 10.10 minutes in group B. Time spent on wound closure ranged from 4.45 to 10 minutes in group A and 6.45 to 13 minutes in group B. Mean wound closure time was 5.74 minutes in group A and 10.45 minutes in group B.

Conclusion: Open method to create pneumoperitoneum and to close port site wounds is less time consuming than veress needle method

Keywords: Cholecystectomy, Laparoscopy, Open method, Pneumoperitoneum, Veress needle.

INTRODUCTION

Laparoscopy (Gr: Laparo-abdomen, scopein-to examine) is the art of examining the abdominal cavity and its contents. It requires working space intra abdominally that can be created by insertion of a cannula through the abdominal wall, distention of the abdominal cavity with gas or air, and visualization of the abdominal contents with an illuminated telescope. With the advent of video cameras, laparoscopy rapidly advanced from being a diagnostic procedure to the one used in vide variety of therapeutic surgical procedures among which laparoscopic cholecystectomy is the most commonly performed world wide[1,2]. The creation of pneumoperitoneum is an essential step to carry out this procedure[3]. Several techniques, instruments, and approaches have been introduced during the last century for the creation of pneumoperitoneum. These include Veress needle, open method, direct trocar insertion without prior pneumoperitoneum, Hasson's technique, optical Veress needle, optical trocars and shielded disposable trocars. Each surgeon has his own preferred method of creating pneumoperitoneum based on his training, experience, bias and according to regional and interdisciplinary variability[1,2]. However open and Veress needle method with their different modifications are the two widely used methods nowadays[1].

The Veress needle was introduced by Veress in 1938 and remains the most commonly used method of creating pneumoperitoneum. Historically, gynecologists have been frequent user of the closed method for creation of pneumoperitoneum[4]. Open technique was

Correspondence: Dr Khalid Hussain, Department of Surgery, CMH Multan, Pakistan
Email: khalid2170@gmail.com
Received: 15 Jan 2014; revised received: 30 June 2014; accepted: 20 Aug 2014

initially described by Hasson in 1971[5]. It required 3-4 cm incision and special cone shaped trocar to minimize gas leakage. We used ordinary umbilical cannula and relatively small incision to prevent gas leakage instead of Hasson cannula in open method in our study.

Controversy exists concerning the importance of operative time on the patient's outcome. It is unclear whether faster is better or haste makes waste or similarly whether slower procedures represent a safe, meticulous approach[6,7,8]. Operative time has an important effect on the outcome of patients undergoing Laparoscopic Cholecystectomy as increased operative time is associated with an increase in the rate of complications[9]. Several studies have been done to compare these two techniques in terms of operative time and to find out the best method for producing pneumoperitoneum. Every experienced surgeon has his own preferred technique but it is an area of confusion for residents and young surgeons[10].

This study was designed to find out an optimal method of inducing pneumoperitoneum and to close the port site wounds that is less time consuming and therefore results in short operating time.

MATERIAL AND METHODS

This randomized controlled trial was carried out at the department of surgery, Military Hospital, Rawalpindi over a period of one year from Aug 10, 2011 to Aug 10, 2012. A total of 130 patients, both male and female, between 27 and 60 years of age admitted with symptomatic gall stones, confirmed on ultrasonography between the study period were enrolled in the study. Patients having para umbilical hernia, previous upper abdominal surgery and hepatitis B and C were excluded from 'the study.

Requisite permission from the hospital ethical committee was obtained and informed consent was taken from each patient included in the study. Patients were randomly divided into two equal groups (n=65) by lottery method. Group A patients had pneumoperitoneum by open method while group B patients had pneumoperitoneum by Veress needle. Hospital registration number, name, age, gender, address and phone number (optional) was noted. General anesthesia was given by same anesthesia team. All of the operations were performed by the same surgical team by using standard four port technique. The laparoscopy instruments used were from Olympus and KARL STORZ Company. In open method, midline infra umbilical incision was made and dissected to the fascia to open peritoneal cavity, Vicryl 1/0 stay sutures were placed and 10 mm umbilical trocar was introduced under direct vision for gas insufflation. At the end of the procedure, stay sutures were used to close the fascial defect. In closed method, infra umbilical transverse incision was made through skin and subcutaneous tissue and spring loaded Veress needle was inserted blindly into the peritoneal cavity for gas insufflation. Port site wound closure was done using vicryl 1/0 for fascial closure of umbilical and epigastric port sites and Prolene 3/0 for skin closure in all four port sites.

Time was calculated in minutes from start of first incision to the insertion of telescope by using stop watch and was documented as time required to induce pneumoperitoneum in patient's proforma. Time was also calculated from removal of last trocar to the last skin stitch at the end of procedure and was entered as time taken to close the wounds.

Control of bias and confounding factors were dealt with by strictly following the exclusion criteria. Ethical issues like consent; privacy of the patients and financial problems were addressed properly.

Data were entered into SPSS version 16. Descriptive statistics was used to calculate frequency and percentage for gender and mean and standard deviation for the time required to induce pneumoperitoneum and to close the wounds. Independent samples t-test was applied at 95% confidence interval to compare the time required to induce pneumoperitoneum and to close the wounds between the two groups. The p-value ≤ 0.05 was considered as statistically significant. Results were tabulated.

RESULTS

Out of 130 patients enrolled in this study, 65 were randomized in group A and 65 in Group B. Majority of patients were female with frequency of ninety six female (73.80%) and thirty four male (26.20%). Age ranged from 27 to 60 years with mean age 41.83 years. Mean age in group A was 42.58 ± 8.20 years. Mean age in group B was 41.07 ± 7.63 years. Group A had 29.2% males and 70.8% females. Group B had 23.1% males and 76.9% females. Both the groups were comparable with respect to age ($p > 0.05$) and gender ($p>0.05$). Time required to create pneumoperitoneum ranged from 6.30 to 10.89 minutes in group A (mean ±SD 8.35±1.21) and 6 to 16.59 minutes in group B (mean ±SD of 10.10 ± 2.06) $p=0.006$. Time spent on wounds closure ranged from 4.45 to 10 minutes in group A (mean ± SD 5.74 ± 0.75) and 6.45 to 13 minutes in group B (mean ± SD 10.45 ± 1.74). $p=0.000$

Mean time required to create pneumoperitoneum and to close port site wounds was significantly less in group A as compared to group B.

Table-1: Comparison of the open and veress needle method for the establishment of pneumoperitoneum and to close port site wounds for laparoscopic cholecystectomy (n=130).

Variable	Open method technique (Group A) N=65		Veress needle technique (Group B) N=65		*p*- value
	Range	Mean ± Standard Deviation	Range	Mean ± Standard Deviation	
Time required to create pneumoperitoneum(min)	6.30-10.89	8.35 ± 1.21	6.00-16.59	10.10 ± 2.06	*0.006
Time required to close the port site wounds(min)	4.45-10.00	5.74 ± 0.75	6.45-13.00	10.45 ± 1.74	*0.000

*Statistically significant

DISCUSSION

Less time required to induce pneumoperitoneum in open method in our study is due to exploitation of umbilical stalk. This method relies on the anatomy of the anterior abdominal wall at the umbilicus. Umbilical cord in fetal life is attached to the anterior abdominal wall by a ring of thickened fascia. This ring persists in adult life and has no intraperitoneal attachments to it. An opening made superior or inferior to umbilicus can be used as entry point for insertion of cannula and trocar. This method is being used by many surgeons. By adopting this new technique, open method may become the gold standard. It is also due to the reason that we as general surgeons are well versed with the anatomy of abdominal wall[11].

More time consumption in our blind technique is due to routine performance of Veress needle entry tests like waggling test, saline test, aspiration test, and first Veress intraperitoneal pressure (VIP) test. Some authors do not recommend routine use of these tests. Our extra time spent in closed technique is also due to the reason that some cases in which the Veress needle was withdrawn and reinserted and verification tests performed again.

The less time consumed to close the port site wounds in open method group is due to already placed suture to rectus sheath that only need tying at the end of procedure. The other reason being, in open technique depth of wound is comparatively lesser, so access is easy. In group B as the facial margins were difficult to be grasped and stitched in the depth through a small opening.

A local study conducted by Akbar et al. showed similar results with less time required to induce pneumoperitoneum(8.11 ± 1.02 min)in open method than Veress needle group (9.17 ± 2.86 min).Similarly, time required to close port site wounds was also less in open method group as compared to Veress needle group (4.9 7 ± 0.7 versus 9.88 ± 1.98 min)[12].

In a recent study conducted by Sangrasi et al. pneumoperitoneum was produced in less time in open method as compared to closed

method. Similarly port site wound closure was faster in open method as compared to closed method[13].

Prieto et al. reported similar results with less time required to induce pneumoperitoneum in direct trocar group (direct trocar 1.5 ± 0.5 versus veress needle 3.0 ± 0.4 minutes $p<0.001$)[14]. They named the method as direct trocar group however the method used was the open method with direct opening of the fascia and peritoneum and insertion of trocar[14]. These studies are consistent with other studies showing similar results[10,15,16].

The main limitation of this study was the number of participants. More sample size is needed to study the difference in parameters comprehensively. However, the sample suited the objectives of this study with regard to the variables. Another limitation is that this was a single center study and like all single center trials, the results cannot be widely generalized. Co-morbid conditions and the age group were controlled to limit the confounding variables since the sample was small. However, it would be interesting to see how these two methods compare when used in multicenter study and on wide variety of patients.

CONCLUSION

This study concludes that open method of producing pneumoperitoneum and to close the port site wounds is less time consuming as compared to Veress needle method.. Further studies are needed in multiple centers and on larger samples for conclusive evidence. Since laparoscopic cholecystectomy is a routine procedure, the less time consuming method should be sought and guidelines formulated.

CONFLICT OF INTEREST

The authors of this study reported no conflict of interest.

REFERENCES

1. Vilos GA, Ternamian A, Dempster J, Laberge PY. The society of obstetricians and gynaecologists of Canada. Laparoscopic Entry: A Review of Techniques,Technologies, and Complications. J Obstet Gynaecol Can 2007;29(5):433–447.
2. Merlin TL, Hiller JE, Maddern GJ, Jamieson GG, Brown AR, Kolbe A. Systematic review of the safety and effectiveness of methods used to establish pneumoperitoneum in laparoscopic surgery. Br J Surg 2003; 90:668-79.
3. Sun H, Tang H, Jiang S, Zeng L, Chen EQ, Zhou TY. Gender and metabolic differences of gallstone diseases. World J Gastroenterol 2009; 15:1886-91.
4. Byron JW, Markenson G, Miyazawa K. A randomized comparison of Veress needle and direct trocar insertion for laparoscopy. Surg Gynecol Obstet. 1993; 177:259-62.
5. Hasson HM: A modified instrument and method for laparoscopy. Am J Obstet Gynecol. 1971;110:886–887
6. Dexter SP, Martin IG, Marton J, McMahon MJ. Long operation and the risk of complications from laparoscopic cholecystectomy. Br J Surg. 1997; 84: 464–66.
7. Subhas G, Gupta A, Bhullar J, Dubay L, Ferguson L, Goriel Y, et al. Prolonged (longer than 3 hours) laparoscopic cholecystectomy: reasons and results. Am Surg. 2011; 77: 981–84.
8. Zdichavsky M, Bashin YA, Blumenstock G, Zieker D, Meile T, Konigsrainer A. Impact of risk factors for prolonged operative time in laparoscopic cholecystectomy. Eur J Gastroenterol Hepatol. 2012; 24: 1033-38.
9. Jackson TD, Wannares JJ, Lancaster RT, Rattner DW, Hutter MM. Does speed matter? The impact of operative time on outcome in laparoscopic surgery. Surg Endosc 2011 Feb 7. [Epub ahead of print]
10. Ahmad G, Daffy JM, Philips K, Watson A. Laparoscopic entry techniques. Cochrane Database Syst Rev 2008; 16(2):CD006583.
11. Ahluwaila HS, Burger JP, Quinn TH. Anatomy of the anterior abdominal wall. Oper Tec Gen Surg. 2004; 06(03):147-55.
12. Akbar M, Khan IA, Naveed D, Khattak I, Zafar A, Wazir MS, et al. Comparison of closed and open methods of pneumoperitonium in laparoscopic cholecystectomy .J Ayub Med Coll Abbottabad 2008;20: 85-9.
13. Sangrasi AK, Shaikh AR, Muneer A. Open versus close pneumoperitoneum: A pursuit for safer technique. Pak J Med Sci 2011; 27(3):523-27
14. Prieto-Díaz-Chávez E, Medina-Chávez JL, González-Ojeda A, Anaya-Prado R, Trujillo-Hernández B, Vásquez C. Direct trocar insertion without pneumoperitoneum and the Veress needle in laparoscopic cholecystectomy: a comparative study. Acta Chir Belg 2006; 106:541-4.
15. Gulla N, Patriti A, Lazzarini F, Tristaino B. Our choice of the method to induce pneumoperitoneum in videolaparoscopic surgery. Minerva Chir. 2000; 55(5): 371-75.
16. Wasty WH, Mirza MR, Habib L. First port placement for pneumoperitoneum. Journal of surgery Pakistan(International) 2009;14(02): 63-66