DOI: https://doi.org/10.53350/pjmhs221651093

ORIGINAL ARTICLE

Comparison of Hasson (Open) and Veress Needle (Closed) Technique of Creating Pneumoperitonium in Laparoscopic Cholecystectomy

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ABSTRACT

Objective: The purpose of this study is to compare the outcomes between hasson (open) and veress needle (closed) technique of creating pneumoperitonium in laparoscopic cholecystectomy.

Study Design: Comparative/Randomized study

Place and Duration: PHFMC (ZCD 417,Toba Tek Singh). Jun 2019-May 2020

Methods: Ninety patients of both genders with ages 20-75 years were presented in this study. All patients provided written informed consent before having their full demographic information collected, which included their age, gender, and body mass index. All the patients had symptomatic gall stones disease was underwent for laparoscopic cholecystectomy. Patients were categorized into two equal groups. Group I had 45 patients and received veress needle (closed) technique and group II received hasson (open) technique for creating pneumoperitoneum. Post-operatively outcomes in terms of access time , gas leak, visceral injury, vascular injury, need for conversion, umbilical port site hematoma, umbilical port site infection, umbilical port site hernia were assessed and compared among both groups. To analyze the entire set of data, we used the SPSS 24.0 edition.

Results: Mean age of the patients in group I was 36.13 ±5.77 years with mean BMI 25.06 ±6.33 kg/m^2 and in group II mean age was 37.23 ±6.55 years with mean BMI 25.16 ±4.45 kg/m^2 . Majority of the patients 60 (30 in each group) were female. Mean access time in group II was lower 4.78 ±11.43 minutes as compared to group I 6.11±4.12 minutes. Mean closure time in group I was 7.33 ±7.23 minute and in group II mean closure time was 6.03±3.19 minutes. Frequency of gas leak in group I was higher found in 8 (17.8%) cases as compared to group II 3 (6.7%). Visceral injury was greater in group I 3 (6.7%) as compared to group II 1 (2.2%). Vascular injury among both groups was similar 2 (4.4%) and there is no any case found for conversion. Post-operatively complications hematoma, infection and umbilical hernia were greater in group II 4 (8.9%), 2 (4.4%) and 2 (4.4%) as compared to hasson (open) group.

Conclusion: Pneumoperitonium was created more quickly and efficiently in laparoscopic cholecystectomy using the hasson (open) approach in this comparative analysis than any other method. When it comes to problems and injuries, the open approach (rather than the closed technique) was determined to be less risky overall.

Keywords: Laparoscopic Cholecystectomy, Hasson (open) technique, Needle Veress, Outcomes, Pneumoperitonium

INTRODUCTION

As a result of the tiny incisions needed to get access to the abdominal cavity, laparoscopy poses a unique set of obstacles. As a diagnostic and therapeutic treatment, laparoscopy is widely employed in the medical industry today. Surgery for most abdominal conditions that demand a minimally invasive procedure has become the preferred option. However, laparoscopic procedures are not without their drawbacks. As a consequence of its blind nature, this technique is fraught with potential complications. When trying to enter the peritoneal cavity, problems from laparoscopic surgery are not uncommon [1]. Creating a pneumoperitoneum is the first and most critical step in a laparoscopic operation since inappropriate access to the gastrointestinal tract and major blood vessels may result in substantial complications, and at least half of all serious issues arise before the planned surgery. This complication rate has been stable over the last 25 years [2].

Laparoscopic surgeries may result in vascular damage in two of every ten thousand, and a significant complication linked to death occurs in 3.3 out of every ten thousand.[3] Developing a safe entrance plan is crucial to preserve patients' lives and keep up with the rising incidence of re-entry. Over the past three decades, rapid developments in laparoscopic surgery have made it an important part of general surgery, yet the ideal strategy of accessing the peritoneal cavity remains unclear.

Openness has been defined by Hasson since 1970, when he released his concept. An umbilical incision must be made under direct view to access the abdominal cavity, and a blunt trocar must be inserted into the abdominal cavity after this procedure. Pneumoperitoneum is a fast-developing disorder in the peritoneum. Preventing blind Veress needle and bladed trocar placement, avoiding visceral and vascular injuries, guarding against preperitoneal insufflation and gas emboli, ensuring pneumoperitoneum, and better reconstructing the abdominal wall after surgery are some of the potential advantages proposed by Hasson. [4] Anterior abdominal wall stabilisation or elevation may be required to stabilise or elevate the Verses needle if it is common in this situation. Patients with or suspected of having periumbilical adhesions, or those who have failed to induce pneumoperitoneum three times, may have the Veress needle implanted in a different location than originally intended. [5] Due to the absence of large-scale, randomised controlled trials, no one strategy has been shown better to the others, even though extensive literature studies have been conducted. Both of these methods have the potential to cause vascular and visceral damage. It's been over 30 years, yet the debate over the most safe approach continues. Open surgery seems to be favoured by the newer generation of general surgeons due to an abundance of questionable data. [6-9]

A substantial difference in the frequency of complications was seen when pneumoperitoneum was generated using open and closed access techniques. According to one research, the rates of visceral and vascular harm following an open access approach were 0.048 percent and 0%, and 0.083 percent and 0.075 percent after an open access technique. Mortality after closed laparoscopy was 0.03 percent; mortality after open laparoscopy was zero percent. [10] There was no statistically significant difference between the two methods after a further analysis. 6. Open laparoscopy (OL) is a safer method than the VN approach. [11] It's been suggested by other studies that the open and close methods of primary access are equal in terms of primary access-related challenges, and that's what they've found. [12]

Identifying and minimising the difficulties associated with the initial port and generating a pneumoperitoneum have become increasingly important as laparoscopy has become more widely used for various surgical procedures. In order to compare the two alternative access approaches and, if possible, determine the procedure with the least amount of trouble, a study on this topic is being carried out.

MATERIAL AND METHODS

While conducting a Comparative/Randomized research, PHFMC (ZCD 417,Toba Tek Singh) and comprised of 90 patients. All patients provided written informed consent before having their full demographic information collected, which included their age, gender, and body mass index.

Exclusion Criteria: Those patients did not give any written consent and with severe medical illness, respiratory compromise, malignancy or any other comorbidity were excluded from this study.

Inclusion Criteria: Patients between the ages of 20-75 years old who had symptomatic gallstone disease and who did not have any other general contraindications to laparoscopic surgery were eligible for the procedure under consideration.

Using a simple convenient sampling method, all of the patients were chosen. Approximately 45 patients were in Group I, and all of them were randomized to receive closed technique, whereas the same number of patients were in Group II, and they all received open technique. A skin incision was made, and then the fascia was dissected to gain access to the abdomen through the use of a trocar, whereas the closed technique involves directly inserting a veress needle into the abdominal cavity to create a pneumoperitoneum, and then placing a trocar in the abdominal cavity after that. In this study, the following variables were compared: access time, gas leak, visceral and vascular injury, the necessity for conversion, umbilical port site hematoma, umbilical port site infection, and umbilical port site hernia.

To analyze the entire set of data, we used the SPSS 24.0 edition. For categorical variables, the mean standard deviation, frequency, and percentages were utilized to represent the data.

RESULTS

Mean age of the patients in group I was 36.13 ±5.77 years with mean BMI 25.06 ±6.33 kg/m^2 and in group II mean age was 37.23 ±6.55 years with mean BMI 25.16 ±4.45 kg/m^2 . Majority of the patients 60 (30 in each group) were female.(Table-1)

Table-1: Characteristics details of enrolled cases

Variables	Closed Technique	Open Technique
Mean age (years)	36.13 ±5.77	37.23 ±6.55
Mean BMI (kg/m^2)	25.06 ±6.33	25.16 ±4.45
Gender		
Male	30 (66.7%)	15 (33.3%)
Female	30 (66.7%)	15 (33.3%)

Mean access time in group II was lower 4.78 ±11.43 minutes as compared to group I 6.11±4.12 minutes. Mean closure time in group I was 7.33 ±7.23 minute and in group II mean closure time was 6.03±3.19 minutes.(Table-2)

Table-2: Comparison of access and closure time among cases

Variables	Closed Technique	Open Technique
Mean access time (min)	4.78 ±11.43	6.11±4.12
Mean Closure time (min)	7.33 ±7.23	6.03±3.19

Frequency of gas leak in group I was higher found in 8 (17.8%) cases as compared to group II 3 (6.7%). Visceral injury was greater in group I 3 (6.7%) as compared to group II 1 (2.2%). Vascular injury among both groups was similar 2 (4.4%) and there is no any case found for conversion.(Table-3)

Table-3: Comparison of gas leak and injuries among both groups

Variables	Closed Technique	Open Technique
Gas Leak		
Yes	8 (17.8%)	3 (6.7%)
No	47(82.2%).	42 (93.3%)
Injury		
Visceral	3 (6.7%)	1 (2.2%)
Vascular	2 (4.4%)	2 (4.4%)
Conversion Requirement		
Yes	0	0
No	45 (100)	45 (100)

Post-operatively complications hematoma, infection and umbilical hernia were greater in group II 4 (8.9%), 2 (4.4%) and 2 (4.4%) as compared to hasson (open) group.(Table-4)

Table-4: Post-operatively comparison of complications among both groups

Variables	Closed Technique	Open Technique
Complications		
Port site hematoma	4 (8.9%),	2 (4.4%)
Port site infection	2 (4.4%)	1 (2.2%)
umbilical hernia	2 (4.4%)	0

DISCUSSION

During the previous two decades, remarkable advancements have transformed laparoscopic surgery into a well-accepted surgical method. However, because it is still in its infancy, there is some debate about the ideal strategy for creating the pneumoperitoneum, which is particularly pertinent in this instance. Pneumoperitoneum can be created using one of two well-established methods: A laparoscopic trocar or a Hassan trocar can be used to do the procedure in an open manner. If this is not possible, a verres needle can be placed blindly into the midline of the abdominal wall. The latter strategy is the one that is most commonly employed. Procedures such as symptomatic and minor gallbladder stones, appendectomies, and hernia repair are among those for which minimum access surgery has emerged as the method of choice in recent years (TAPP and TEP). The creation of pneumoperitonium, which is not physiological and has unfavourable hemodynamic and respiratory implications, is one of the most critical phases in this type of surgery.

In our study total ninety patients of both genders were presented with ages 20-75 years. Mean age of the patients in group I was 36.13 ±5.77 years with mean BMI 25.06 ±6.33 kg/m^2 and in group II mean age was 37.23 ±6.55 years with mean BMI 25.16 ±4.45 kg/m^2 . Majority of the patients 60 (30 in each group) were females. Our findings were comparable to the studies conducted in past.[13,14] Mean access time in group II was lower 4.78 ±11.43 minutes as compared to group I 6.11±4.12 minutes. Mean closure time in group I was 7.33 ±7.23 minute and in group II mean closure time was 6.03±3.19 minutes. Open approach was shown to be faster by the European Association for Endoscopic Surgery, however neither technique was deemed superior to the other. [15] On the basis of their findings, Petigen et al. proposed that the open technique be used instead of the closed technique because it takes half the time. [16] As can clearly be seen, the open method requires less time. In the closed technique, the difficulty of access to pneumoperitonium is encountered.

Frequency of gas leak in group I was higher found in 8 (17.8%) cases as compared to group II 3 (6.7%). Visceral injury was greater in group I 3 (6.7%) as compared to group II 1 (2.2%). Vascular injury among both groups was similar 2 (4.4%) and there is no any case found for conversion. In their meta-analysis of 31 research, Opilka et al.[17] found that the open method (Hassan) was the safest in trials (54.84 percent), whereas the closed approach (veress Needle) was safe in just three research (9.68 percent). [18] Only 474 surgeries were completed using the closed approach while 4873 procedures utilising open technique. In the closed-access sector, three cases of significant vascular damage have been documented. One patient had a damage to the external iliac vein while two others had abdominal aortic injuries. [19]

Post-operatively complications hematoma, infection and umbilical hernia were greater in group II 4 (8.9%), 2 (4.4%) and 2 (4.4%) as compared to hasson (open) group. A clinical experiment conducted by Closed and open entry techniques were compared by Jansen et al. and the complication rate for the closed method was 0.7 percent and the open technique was 0.17 percent. [20] They concluded that both closed and open techniques of peritoneal access are safe. When comparing the open and closed methods, we found that the former saved more time. Despite this,

there were a number of additional issues that arose throughout the treatment. [21]

It is impossible to establish a pneumoperitoneum if the patient's stomach does not contain enough air. Only four (11.4 percent) of the 70 instances studied by Akbar et al. (35 cases each) were found to have a method failure, while none were found in the open methodology (p-value 0.039). [22]

Firstly, since men have a muscular physique and well-developed rectus muscles, it requires a large amount of effort to insert the first port in a man. A blind verres needle must be inserted with extreme precision and any uneven force might result in these injuries (which have been shown to be severe) in the group. Using an open technique, you can see and cut into these muscles directly, rather than blindly sending force to them. Compared to the close approach, which had a higher rate of complications, the open method was shown to be much safer and to have a reduced incidence of issues.

Limitation: The study's biggest drawback was the small sample size. There are so few risks associated with laparoscopic cholecystectomy complications that we were unable to make a meaningful comparison between them. In terms of the vast majority of the study's variables, the sample was a good fit. In addition, since this was a research conducted in a single location, no generalizations can be made about the findings. The limited sample size necessitated the use of co-morbid conditions and an age range to compensate for potential confounding factors. Even so, it will be intriguing to observe how these two methods compare when applied to more complicated cases..

CONCLUSION

Pneumoperitonium was created more quickly and efficiently in laparoscopic cholecystectomy using the hasson (open) approach in this comparative analysis than any other method. When it comes to problems and injuries, the open approach (rather than the closed technique) was determined to be less risky overall.

REFERENCES

1 R. Varma and J. K. Gupta et al. “Laparoscopic entry techniques: clinical guideline, national survey, and medicolegal ramifications,” Surgical Endoscopy and Other Interventional Techniques, vol. 22, no. 12, pp. 2686–2697, 2008.

2 S. Krishnakumar and P. Tambe et al. “Entry complications in laparoscopic surgery,” Journal of Gynecological Endoscopy and Surgery, vol. 1, no. 1, pp. 4–11, 2009.

3 D. C. Wherry, M. R. Marohn, M. P. Malanoski, S. P. Hetz, and N. M. Rieh et al. “An external audit of laparoscopic cholecystectomy in the steady state performed in medical treatment facilities of the Department of Defense,” Annals of Surgery, vol. 224, no. 2, pp. 145–154, 1996

4 Fuller J, Scott W, Ashar B, Corrado J et al. Laparoscopic trocar injuries: a report from US FDA center for devices and radiological health. Systematic Technology Assessment of Medical Products Committee 2005;25:1-14

5 Kovachev S, Ganovska A, Atanasova V, Sergeev S, Mutafchiyski V, Vladov N et al. Open laparoscopy: a modified Hasson technique. Akush Ginekol (Sofiia) 2015;54(4):52-56

6 Dunne N, Booth MI, Dehn TC et al. Establishing pneumoperitoneum: verres or hasson? The debate continues. Ann R Coll Surg Engl 2011 Jan;93(1):22-24.

7 Ballem RV, Rudomanski J et al. Techniques of pneumoperitoneum. Surg Laparosc Endosc 1993;3(1):42-43

8 Hurd WW, Randolph JF Jr, Holmberg RA, Pearl ML, Hubbell GP et al. Open laparoscopy without special instruments or sutures. Comparison with a closed technique. J Reprod Med 1994;39(5):393-397

9 Catarci M, Carlini M, Gentileschi P, Santoro E et al. Major and minor injuries during the creation of pneumoperitoneum: a multicenter study on 12,919 cases. Surg Endosc 2001;15(6):566-567

10 Bonjer H, Hazebroek E, Kazemier G, Giuffrida M, Meijer W, Lange J et al. Open versus closed establishment of pneumo-peritoneum in laparoscopic surgery. Br J Surg 1997; 84(5): 599-602.

11 Opilka M, Starzewski J, Lorenc Z, Tarnowski A, Zawada Z et al. Open versus closed laparoscopy entry - which are the evidences? Hepatogastroenterology 2009; 56(89): 75-9

12 Sajid M, Latif A, Misbah J, Rehman S et al. Veress needle related complications in Laparoscopic surgery: Our experience. APMC 2010; 4(1): 72-6.

13 Jamil M, Niaz K, Tahir F et al. Closed vs. open method of pneumoperitonium at infra-umbilical site in laparoscopic surgery — A comparative study. October 2018, Volume 68, Issue 10

14 Taye MK, Fazal SA, Pegu D, Sakia D et al. Open vs closed laproscopy: Yet an unresolved controversy. J Clin Diagn Res 2016; 10: 4-7.

15 Neudecker J, Sauerland S, Neugbauer E, Bergamaschi R, Bonjer HJ, Cuschieri A, et al. The european association for endoscopic surgery clinical practice guideline on the pneumoperitoneum for laparoscopic surgery. Surg Endosc 2002; 16: 1121-43.

16 Peitgen K, Nimtz K, Hellinger A, Walz MK et al. Open approach or Veress needle in laparoscopic interventions? Results of a prospective randomized controlled study.

17 Opilka M, Starzewski J, Lorenc Z, Tarnowski A, Zawada Z et al. Open versus closed laparoscopy entry - which are the evidences? Hepatogastroenterology 2009; 56(89): 75-9

18 Simforoosh N, Basiri A, Ziaee SA, Tabibi A, Nouralizadeh A, MH et al. Major vascular injury in laparoscopic urology. JSLS 2014; 18(3)

19 Taye MK, Fazal SA, Pegu D, Saikia D et al. Open versus closed laparoscopy: yet an unresolved controversy. J Clin Diagn Res 2016; 10(2).

20 Jansen FW, Kolkman W, Bakkum EA, De Kroon CD, TrimbosKemper TCM, Trimbos JB et al. Complications of laparoscopy: an inquiry about closed - versus open-entry technique. Am J Obs Gynaecol 2004; 190(3): 634–38

21 Channa G, Siddiqui A, Zafar S et al. Open versus closed method of establishing pneumoperitoneum for laparoscopic cholecystectomy. J Coll Phy Surg Pak 2009; 19(9): 557-60.

22 Akbar M, Khan IA, Naveed D, Khattak I, Zafar A, Wazir MS et al. Comparison of closed and open methods of Pneumoperitoneum in laparoscopic cholecystectomy. J Ayub Med Coll Abbottabad 2008; 20(2): 85-9.