FREQUENCY OF COMMON COMPLICATIONS OF VERESS NEEDLE USED FOR CREATING PNEUMOPERITONEUM IN LAPAROSCOPIC CHOLECYSTECTOMY

Rashid Aslam[1], Muhammad Kalim[1], Habib Shamsi[2], Ayaz Gul[3], Zahid Aman[1]

ABSTRACT

Objective: To determine the frequency of common complications of Veress Needle used for creating Pneumoperitoneum in Laparoscopic Cholecystectomy.

Methodology: This descriptive Cross Sectional study was conducted at Surgical B unit Hayatabad Medical Complex Peshawar from Jan 2014 to Dec 2015 with total duration of 02 years. All patients undergoing Laparoscopic Cholecystectomy for Cholelithiasis, ASA class1 and 2, both genders (range, 14-65 years) were included in the study while those patients with co-morbid diseases that were contra-indication for Laparoscopic surgery were excluded. Informed written consent was taken from all patients and patient's particulars like age, gender, address and complications of veress needle were documented on predesigned proforma, SPSS version 20 was used for the analysis of the results and represented in the form of tables.

Results: total 177 patients were included in the study in which majority were in the 4th and 5th decades with females predominance. Frequency of common complications among 177 patients was analysed as 18(10%) patients had abdominal wall Emphysema, 39(22%) patients has abdominal wall haemorrhage and 32(18%) patients had omental injury.

Conclusion: Veress needle technique of primary access in Laparoscopic Cholecystectomy is safe, easy and cost effective.

Key words: Veress Needle, Pneumoperitoneum, Laparoscopic Cholecystectomy

INTRODUCTION

Cholelithiasis is the formation of stones in the gall bladder. Cholelithiasis is a common condition leading to frequent hospital consultation and admission. Its prevalence in the Western world is 10-20% while in India it is 3-6% in the adult population[1]. The mainstay of treatment of cholelithiasis is surgical removal of gall bladder. It can be open or Laparoscopic but Laparoscopic Cholecystectomy is the gold standard procedure nowadays[2]. Laparoscopic Cholecystectomy (LC) was first performed in 1987 by Philippe Mouret, it has been accepted as the standard of care in patients with Cholelithiasis and has essentially replaced open Cholecystectomy for the management of gall stones. Its advantage are a shorter hospital stay, a shorter recovery time, less scarring and comparatively less pain after surgery[3,4] as compared to open chole. It is a minmal access approach with early return to daily activity and minimal postoperative morbidity and good cosmesis[5,6].

[1] Department of Surgery, Hayatabad Medical Complex, Peshawar, Khyber Pakhtonkhwa.
[2] Department of Surgery DHQ Bahabalnagar
[3] Department of Surgery LRH Peshawar Pakistan

Address for correspondence:
Dr. Muhammad Kalim
General Surgery, Hayatabad Medical Complex Peshawar, Pakistan
E-mail: drmuhammadkalim@gmail.com
Contact # 0345-9118412

The common and distressing complications of postoperative pain, nausea & vomiting are the main concerns of 40-70% of patients undergoing Laparoscopic Cholecystectomy[7]. In Laparoscopy, the establishment of pneumoperitoneum requires the introduction of a sharp insufflating needle or trocar[8]. Laparoscopic entry is a blind procedure, and it represents a problem for all the related complications. Complications arising from Laparoscopic surgery are rare and commonly occur when attempting to gain access to the peritoneal cavity[9]. 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 commencement of the intended surgery. This complication rate has remained the same during the past 25 years.

The number of vascular complication/ injuries in Laparoscopic surgery is 2 in 10,000 procedures. Making procedure safe is important for life of the patient, however, despite of decades passed and lots of studies done, there is no clear consensus on portal of entry for Laparoscopic surgery[11]. Among the different methods of primary access in Laparoscopy, the popular one being the veress needle and hasson canula. The veress needle is still being used by many surgeons and considered as a better technique while other consider the open method of access as a better technique. Some studies have shown that almost 50% of complications in Laparoscopic surgery are related to primary access[12,13].

The visceral injury can occur during introduction of veress needle as well as over judicious dissection of adhesions. Visceral injuries may be evident per operatively or may remain unrecognized during operations and later manifest as peritonitis, abscesses or sepsis[14].

The present study is designed to determine the frequency of common complications observed after using veress needle for creating pneumoperitoneum for LC. Gall bladder diseases requiring Cholecystectomy are not uncommon in our population and due to increasing trend of LC, it is most common surgical operation performed in our populations at major hospitals. Although literature has controversies in achieving primary access in Laparoscopic surgeries, veress needle is commonly utilized in our population undergoing LC to gain primary access and achieving pneumoperitoneum. However, despite of its common utilization in LC in our populations, no study has been done to see the magnitude of its complications. This study will be first of its kind in our population undergoing LC with veress needle being used for primary access. The results of this study will be crucial in getting fresh local data in light of these results we will be able to draw future research strategies.

MATERIALS AND METHODS

This descriptive Cross Sectional study was conducted at Surgical B unit Hayatabad Medical Complex, Peshawar from Jan 2014 to Dec 2015 with total duration of 2 years. All patients undergoing Laparoscopic Cholecystectomy for Cholelithiasis, ASA class 1 and 2, both genders (range, 14-65 years) were included in the study while those patients with co-morbid diseases that are contra-indication for Laparoscopic surgery were excluded. The study was conducted after approval from hospitals ethical and research committee. All patients meeting the inclusion criteria were included in the study through OPD and shifted to operation theater for Laparoscopic Cholecystectomy. The purpose and benefits of the study was explained to the patients and they were assured of the research purpose and a written informed consent was obtained. Complete history, general physical and relevant anesthesia fitness examination was done. All the Laparoscopic Cholecystectomies were performed by single experienced Laparoscopic surgeon and all the patients were monitored throughout surgery for recording complications of veress needle like abdominal wall emphysema, abdominal wall hemorrhage and omental injury. All the above mentioned information including name, age, gender and address were recorded in a predesigned proforma. Strictly exclusion criteria had followed to control confounders and bias in the study results. Data was stored and analyzed in SPSS version 17. Mean + SD was calculated for quantitative variables like age. Frequencies and percentages were calculated for categorical variables like gender and common complications (abdominal wall emphysema, abdominal wall hemorrhage and omental injury). Common complications was stratified among age and gender to see the effect modification. All results were presented in the form of tables and graphs.

RESULTS

This study was conducted at Surgical Department, Hayatabad Meidical complex Hospital, Peshawar. Duration of the study was 2 years in which a total of 177 patients were observed to determine the frequency of common complication of veress needle used for creating pneumoperitoneum during Laparoscopic Cholecystectomy and the results were analyzed as: Age distribution among 177 patients was analyzed as 26(15%) patients were in age range 21-30 years, 57(32%) patients were in age range 31-40 years, 50(28%) patients were in age range 41-50 years, 44(25%) patients were in age range 51-60 years. Mean age was 40 years with SD + 11.34. (as shown in /table No.1).

Gender distribution among 177 patients was analyzed as 62(35%) patients were male and 115(65%) patients were female (as shown in Table No.2). frequency of common complication among 177 patients was analyzed as 18(10%) patients had abdominal wall emphysema, 39(22%) patients had abdominal wall hemorrhage and 32(18%) patients had omental injury (as shown in Table No.3). Stratification of common complication with age and gender is given in Table No.

Table 1: Age Distribution (n=177)

Age	Frequency	Percentage
21-30 years	26	15%
31-40 years	57	32%
41-50 years	50	28%
51-60 years	44	25%
Total	177	100%

Mean age was 40 years with SD + 11.34.

Table 2: Gender Distribution (n=177)

Age	Frequency	Percentage
Male	62	35%
Female	115	65%
Total	177	100%

Table 3: Common Complication (n=177)

Common Complications	Frequency	Percentage
Abdominal Wall Emphysema	18	10%
Abdominal Wall Hemorrhage	39	22%
Omental Injury	32	18%
Total	177	100%

Table 4: Stratification of Common Complication with Age (n=177)

Common Complications	20-30 years	31-40 years	41-50 years	51-60 years	Total
Abdominal Wall Emphysema	3	6	5	4	18
Abdominal Wall Hemorrhage	6	12	11	10	39
Omental Injury	5	10	9	8	32

Table 5: Stratification of Common Complication with Gender (n=177)

Common Complications	Male	Female	Total
Abdominal Wall Emphysema	6	12	18
Abdominal Wall Hemorrhage	14	25	39
Omental Injury	11	21	32

4,5.

DISCUSSION

Laparoscopy is currently widely used in the practice of medicine, for both diagnostic and therapeutic purpose. The minimally invasive approach has become the methods of choice for treating most benign abdominal diseases that require surgery. However, it is obvious that Laparoscopic procedures are not risk-free[15]. The veress needle is inserted blindly into the abdomen, which increases the risk of iatrogenic injury. Albeit relatively rare, these injuries still occur despite the increasing experience of surgeons and the use of safety methods. Injury to the great vessels (aorta, vena cava and iliac vessels), commonly referred to as major vascular injury, is the most serious complication that might arise from a Laparoscopic procedure. "Without a doubt, the most dramatic event a surgical team can experience is major vascular injury[16]. Even if the reported prevalence is very low (0.05%), the mortality rate arising from these lesions reportedly ranges between 8% and 17%". Hemorrhages can lead to death by hypovolemic shock and bowel injuries can lead to peritonitis and death from septicemia. It is difficult to determine the exact prevalence of iatrogenic injury during Laparoscopy because certain complications are not usually reported, [17,18] for obvious reasons. In addition, several studies do no distinguish between injuries caused by the insertion of the veress needle and those caused by the first trocar, which makes it difficult to assess the injuries that were caused exclusively by the veress needle.

Our study shows that 15% patients were in age range 21.30 years, 32% patients were in age range 31-40 years, 285 patients were in age range 41-50 years, 25% patients were in age range 51-60 years. Mean age was 40 years with SD + 11.34. 35% patients were male and 65% patients were female. Moreover, 10% patients 10% patients had abdominal wall emphysema, 22% patients had abdominal wall hemorrhage and 18% patients had omental injury. Similar results were found in study conducted by Rohatgi A et al[19] in which 10% patients were in age range 21-30 years, 33% patients were in age range 31-40 years, 30% patients were in age range 41-50 years, 27% patients were in age range 51-60 years. Mean age was 42 years with SD + 12.11. 30% patients were male and 705 were female. Moreover, 15% patients had abdominal wall emphysema, 27% patients had abdominal wall hemorrhage and 23% patients had omental injury. In one study, abdominal wall emphysema was observed in25% of patients and omental injury was seen in 27% of patients with an overall complications rate of 22%[13]. In another study, abdominal wall hemorrhage was seen in 8% of patients[8]. However, another study reported by Misro AK et al reported no complications with closed method of trocar insertion using veress needle[14]. In another study, the overall complications rate observed using veress needle were 9%[15]. In study done by Kaloo P et al[20] 3.7% cases were considered major injuries with 42 vascular injuries (71.2%) and 17 (2.8%) bowel injuries of both the small and large intestines. Although the incidence of bowel and retroperitoneal vascular injuries during blind insertion of the veress needle is low (1 in every 11, 805 needle insertion), such accidents should not be dismissed because they are potentially fatal if undetected. However, the prognosis is good when they are detected quickly and treated properly.

In study done by soong YK et al[21], the major injuries, all reports specified the site of injury and 70.6% of the studies reported the outcome of the case. The studies reviewed for injury to hollow viscera caused by the veress needle are very homogenous with regard to the site of the injury (28.6% occurred in the large intestine, 32.1% in the small intestine and 32.1% in the stomach). However, when the outcomes of the cases were analyzed, we noticed that among the injuries to the large intestine, two developed into peritonitis, sepsis, multiple laparomtomies and considerably longer hospital stay; three others were repaired by laparomtomy. All Laparoscopic documented, were converted to laparotomies, with reports of enterectomy. With regard to injuries to the stomach, almost half were treated conservatively (44.4%) and the remaining ones were repaired by laparotomy and simple suture of the stomach wall, without further complications. These injuries could certainly have been repaired laparoscopically, with no need of conversion to laparotomy.

Considering that puncture wounds in the stom-

ach are less severe than undetected injuries to major retroperitoneal vessels and hollow viscera because of the dangers of hypovolemic shock and the higher risk of peritonitis and septic complications resulting from increased bacterial concentration along the digestive tract[18] and considering that the closed technique using a veress needle has advantages over other methods of creating pneumoperitoneum, e.e. it is easier to perform, it takes less to create a pneumoperitoneum, and there is less gas leakage, further studies should be carried out to investigate alternative sites for veress needle insertion, as most studies currently found in the literature have used insertion sites in the midline. Some of these studies have used other insertion sites such as Palmer's point19 in patients who have undergone previous abdominal surgery because of the higher incidence of peritoneal adhesions in these patients, in obese patients, or in very thin patients because of the short distance between the abdominal wall and the retroperitoneal vessels. However, it is rarely described in the literature how many patients have undergone veress needle insertion into alternative sites. This makes it impossible to use this information as an inclusion or an exclusion criterion for analysis. Gulogly R et al[22] did not cause any injuries in any of the 17 cases in which the veress needle was inserted at Palmer's point.

CONCLUSION

Based on the above mentioned discussion we conclude that the veress needle technique of primary access is quiet comparable or even superior to open one in terms of primary access realted complications. It is recommended that veress needle technique is still a safe, easy and cost effective technique, but surgeon must continue with the primary access technique in which they feel more comfortable and confident.

REFERENCES

1. Poddar U, Gandhi S. Gallstone diease in children. Indian Paediatrics. 2010;47:945-53.
2. Kumar S. Understanding gall stones and its management. Basic Research J med clinical sciences. 2012;1:1-4.
3. Sandhu T, Tanvatcharaphan P, Cheunjongkolkul V, Ondansetron versus metoclopramide in prophylaixis of nausea and vomiting for laparoscopic Cholecystectomy: a prospective double-blind randomized study. Asian J Sur. 2008;31(2)50.
4. Shah AQ, Misger AS, Mir IS, Hussain Z, Bukhari PS, Sherwani AH, et al. Laparosopic Cholecystectomy experience in rural health sector of Kashmir. J K Paract. 2007;13(4):200-3.
5. Benefit of laparoscopy. Available on htt://www.laparosocopicsurgeon-online.come/benefits of laparoscopy.htm. Accessed On 18/12/2013.
6. Advantages and disadvantages of laparoscopy. Available on http://www.laparoscopy.am/index.php?-mod=pages&act=show&menu_id=189&lang=en. Accessed on 18/12/2013.
7. GuptaP, Khanna J, Mitramustafi AK, Bhartia VK. Role of preoperative dexamethasone as prophylaxis for postoperative nausea and vomiting in laparoscopic surgery. J Min Access Sur. 2008;2:12-5.
8. Agarwal V, Thekdi P, Sutariya P, Mamdani MI, A coparative study of open and close method of primary trocar insertion in laparoscopy. Int J Res Med.2013;2 (2):131-135.
9. Varma R, Gupta JK, Laparoscopic entry techniques: clinical guideline, national survey, and medicolegal ramifications. Surgical Endoscopy and Other Interventional Techniques, 2008;22(12):2686-2697.
10. Krishnakumar S, Tambe P. Entry complications in laparoscopic surgery. Journal of Gyncological Endoscopy and surgery, 2009;1(1):4-11.
11. 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: doi:10.1155/2012/305428.
12. Samsal PK, Tantia O, Jain M. Primary access related complications in laparoscopic Cholecystectomy via the closed technique: Experience of a single surgical team over more than 15 years. 2009:23:2407-15.
13. Kumar S, Bhaduri S, Ansari AM, Tripathi S, Dikshit P. Veress Needle: A safe technique in modern laparoscopic era. WJOLS 2013;6(1):1-5.
14. Misro AK, Sapkota P, Misro R. Our experience of open technique of creating pneumoperitoneum through umbilical cicatrix from a remote health facility of Nepal. WJOLS 2013;(3):141-143.
15. Scha"fer M, Lauper M, Kra"henbu"hl L.Trocar and Veress needle injuries during laparoscopy. Surg Endosc 2001;15:275-80.
16. Harkki-Siren P. The incidence of entry-related laparoscopic injuries in Finland. Gynaecol Endosc 2000;8:335-8.
17. Simon GL, Gorbach SL. Intestinal microflora. Med Clin North Am 2004'66:557-74.
18. Rohatgi A, Widdison AL. Subcostal (Veress needle) approach is safe method for reating a pneumoperitoneum. J Laparoendosc Adv Surg Tech 2004;14:278-80.
19. Kaloo P, Cooper M, Molloy D. A Sruvey of entry techniques and complications of members of the Australian Gynaecological Endoscopy Society. Aust N Z J Obstet Gynaecol 2002;42(3)264-66.
20. Soong YK. Use of Veress needle insertion of the operative laparoscope in patients with severe pelvic adhesion: experience of seventeen cases. J Am Assoc Gynecol Laparosc. 2000;1(4, Part 2):S7.
21. Guloglu R, Dilege S, Aksoy M, Alimoglu O, Yavuz N, Mihmanli M, Gulmen M. Major retroperitoneal vascfular injuries during laparoscopic Cholecystectomy and appendectomy. J Laparoendosc Adv Surg Tech A 2004'14:73-6.
22. Leonard F, Lecuru F, Rizk E, Chasset S, Robin F, Taurelle R. Perioperative morbidity of gynecological laparoscopy: a prospective monocenter observational study. Acta Obstet Bynecol Scand. 2000;79:129-34.