INTRODUCTION

The first laparoscopy in a human was performed by Jacobeus of Sweden in 1910.1 Since then laparoscopic techniques have been in constant evolution. Over the last couple of decades it has emerged as the preferred option for a multitude of operative procedures.2 Laparoscopic cholecystectomy has become the treatment of choice for uncomplicated symptomatic cholelithiasis around the world.3-6 It is effective, associated with lesser complications, cost-effective and also has cosmetic benefits.6 Albeit its superiority over open cholecystectomy is established, it is not completely void of complications many of which are related to the entry technique and the establishment of pneumoperitoneum.7,8

One of the challenges of laparoscopic surgery is the insertion of surgical instruments through small incisions. Over 50% of the complications arise during this time9,10 and a great majority of these occur during the insertion of the primary umbilical trocar.9 To address these complications, various techniques have evolved to gain access to the peritoneal cavity. These include closed (Veress), open (Hasson), direct trocar insertion, the use of disposable shielded trocars, radially expanding trocars and visual entry systems along with their various modifications.11,12

There have been many studies comparing the efficacy and safety of the numerous access techniques although meta-reviews of these have turned out to be inconclusive, warranting the need for further evidence.11,12 Given this uncertainty, the choice of method is usually left to the surgeon’s preference. This works for experienced surgeons but is an area of confusion for residents and younger surgeons.

The most common methods used globally, and in Pakistan, are the open (Hasson cannula) and the closed (Veress needle) technique.13-15 The open (Hasson cannula) method involves making an incision and then dissecting the fascia to the peritoneal cavity, to introduce the Hasson cannula under direct vision.16 The closed (Veress needle) technique involves the blind insertion of the Veress needle into the peritoneal cavity.17

No study has ever been published in Pakistan comparing these two techniques. Thus, no local, evidence-based guidelines can be formulated. In view of

ABSTRACT

Objective: To compare the efficacy and safety of the Hasson cannula (open) and Veress needle (closed) method to gain access in the abdominal cavity for laparoscopic cholecystectomy.

Study Design: Randomized controlled study.

Place and Duration of Study: Ward 26, Jinnah Postgraduate Medical Centre, Karachi, from January to December 2007.

Methodology: All patients undergoing laparoscopic cholecystectomy during the study period were enrolled. Younger (< 20 years) and elderly (> 65 years) patients and those with co-morbid conditions were excluded. The remaining were randomized into two study groups. In one group, the Hasson cannula was used, while in the other Veress needle was used to establish pneumoperitoneum. Surgeries were performed by experienced surgeons of the ward. Variables comparing the safety and efficacy of the two methods were studied.

Results: There were a total of 60 patients in each group. In the Hasson cannula group 15 (25%) had complications of gas leakage, one developed a port-site hematoma and two patients developed wound infections. No complications occurred in the Veress needle arm. The mean access time in the Hasson cannula group (4.6±1.1 minutes) was less than that of for the Veress needle arm (5.4±0.7 minutes). Complications of visceral or vascular injury, port-site hernia or gas embolism did not occur in either arm.

Conclusion: Although complications occurred using the Veress needle technique, the Hasson cannula technique was faster. Further studies on larger sample sizes are necessary to establish corroborative evidence and formulate guidelines.

Key words: Laparoscopy. Cholecystectomy. Veress needle. Hasson cannula. pneumoperitoneum.
the mentioned confusions and the paucity of literature there is a need for local guidelines to be drafted. This study was conducted to compare the safety and efficacy of the Hasson cannula and Veress needle techniques for gaining entry and establishing pneumoperitoneum.

METHODOLOGY

This randomized controlled trial was carried out in Surgical Ward 26 of Jinnah Postgraduate Medical Centre (JPMC), Karachi. All patients admitted in this ward for laparoscopic cholecystectomy between January and December 2007 were screened for enrollment. Patients above 65 years or below 20 years of age and those with co-morbid conditions of chronic liver disease, chronic renal failure, and malignancy were excluded. Written informed consent was taken from the participants. Participants were then randomized to be in either of the two groups using a random number of table. Each patient had an equal chance of being enrolled in either of the two study arms. Surgeries were performed by experienced surgeons in all cases. A total of 120 cases were enrolled in the study. Sixty were randomized to the Veress needle (closed) technique, while the remaining 60 were in the Hasson cannula (closed) technique.

Data was collected on standardized questionnaires. Variables taken into consideration included the ability to create pneumoperitoneum, the time taken to establish it, leakage of carbon dioxide gas from the margins of the access site, conversion to laparotomy, mortality and the known complication of laparoscopic cholecystectomy these include abdominal wall hematoma, subcutaneous insufflations of gas, port-site wound infection, port-site hernia, penetrating injuries to blood vessels and intra-abdominal viscera. Patients were assessed in the immediate postoperative period and followed after one week, two months, 6 months and one year of discharge to assess for complications.

Data was analyzed and managed using SPSS version 13. Proportions were calculated for categorical variables while means and standard deviations were calculated for continuous variables. An unpaired t-test was used to calculate the difference between the means where applicable. The results were tabulated.

The study was approved by the institutional authorities. Confidentiality was strictly maintained and only the study investigators had access to the study data. Patients were managed as routine cases and there was no difference in their management in the ward.

RESULTS

A total of 120 cases were enrolled. Sixty were randomized to the Veress needle (closed) technique while the remaining 60 were in the Hasson cannula (closed) technique. Majority of the participants were middle-aged (mean age 43±7 years), married (83%), Muslim (97%) women (89%). There were no differences in the demographic profile of both the study groups.

The comparative analysis of the study variables are presented in Table I. The time to establish pneumoperitoneum was much less in the Hasson cannula technique (4.6±1.1 minutes) as compared to the Veress needle technique (5.4 ± 0.7 minutes, p = < 0.001). Pneumoperitoneum was achieved in all 120 cases. In the Hasson cannula arm, gas leak occurred in 15 (25%) cases, port-site hematoma occurred in 1 (1.7%) case while port site wound infection occurred in 2 (3.3%) cases. No complication occurred with the Veress needle technique.

There were no complications of extraperitoneal insufflation, visceral or vascular injury or port-site hernia in either of the study arm. No case needed conversion to open laparotomy and there were no peri-operative mortalities.

Table I: Comparison of the Hasson cannula and Veress needle techniques for the establishment of pneumoperitoneum for laparoscopic cholecystectomy (n=120).

<table>
<thead>
<tr>
<th>Variables</th>
<th>Hasson cannula technique</th>
<th>Veress needle technique</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Need for conversion</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Post site hernia</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Port site wound infection</td>
<td>2 (3.3)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Vascular injury</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Gas leak</td>
<td>15 (25%)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Extra peritoneal insufflations</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Access time (p &lt; 0.001)*</td>
<td>4.6±1.1 minutes</td>
<td>5.4±0.7 minutes</td>
</tr>
</tbody>
</table>

* T-test used to calculate difference.

DISCUSSION

This study showed a slightly better safety profile with the Veress needle over the Hasson cannula. There were less complications, which makes it difficult to give conclusive evidence about the superiority between the two techniques. However, a trend towards better safety of the Veress needle was demonstrated. Using the Veress needle (closed) method to establish pneumoperitoneum was as effective as the Hasson cannula method and may even be safer. With the Hasson method, there was one complication of port-site hematoma, which resolved on its own and 2 cases with port-site infection, which were treated successfully with antibiotics. The complications were due to the larger incision associated with the Hasson cannula method. Indeed, the incision is a mini laparotomy as opposed to the needle puncture of the closed technique.

The results conform to those found in other studies. Schafer et al. while comparing the complications of both
techniques concluded that the open access method failed to show any superiority over the closed technique.\textsuperscript{18} However, Bonjer et al. in their comparison between open and closed techniques found that the rates of visceral and vascular injury were respectively 0.08\% and 0.07\% after closed laparoscopy, and 0.05\% and 0\% after open laparoscopy (p=0.002). There was no significant difference in the mortality rates.\textsuperscript{19} In this study, there was no mortality in either of the two study arms. Chapron et al. on the other hand, reported that the bowel and major vessel injury rates were 0.04\% and 0.01\% in the closed technique (n = 8324) and 0.19\% and 0\% in the open technique (n = 1562), respectively. They concluded that open laparoscopy does not reduce the risk of major complications during laparoscopic access.\textsuperscript{20} Chandler et al. also found that the open technique had no advantage over the closed technique in terms of safety.\textsuperscript{21} In this study, we encountered no major complication in either of the groups.

In its clinical practice guideline, the European Association for Endoscopic Surgery states that, the randomized controlled trials comparing closed versus open approach have an inadequate sample size to find a difference in serious complications. In large outcomes studies, there were fewer complications in the closed group, although RCTs found the open approach faster and were associated with a lower incidence of minor complications.\textsuperscript{22} The panel did not favour the use of either technique over the other.

In this study, we found that the open technique (Hasson cannula) was faster than the closed (Veress needle) technique. This is also similar to previous studies. Petigen et al. found that the open technique took half the time required by the closed technique and recommended its use on the basis of it being more cost-effective.\textsuperscript{23} The European Association for Endoscopic Surgery also concluded that the insertion of the first trocar with the open technique is faster compared to the Veress needle method.\textsuperscript{22} Sigman et al. also found that less time was required for the open method and advocated its use on this basis.\textsuperscript{24} The entry of open method was faster in this study, but in one out of four cases, we encountered the problem of ‘gas leak’. This was resolved by tightening the anchorage of the cut fascia to the trocar. This consumes time and causes a disturbance in the middle of the procedure.

The main limitation of this study was the number of participants. Many of the complications of laparoscopic cholecystectomy have a low incidence and thus, we were not able to compare the safety of these two methods comprehensively. However, the sample suited the objectives of this study with regard to most of the variables. Another limitation is that this was a single center study and like all single centre 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 method compare when used on more complex patients. Since data was collected for only one year and there has been no long-term follow-up of the study participants, complications, such as port-site hernias and other unforeseen complications, which may have arisen, which were not recorded.

**CONCLUSION**

Both the closed (Veress needle) and the open (Hasson cannula) method for gaining access into the peritoneal cavity are safe. The open technique had a time advantage over the closed method. However, there were more complications associated with it. Further studies are needed in multiple centres and on larger samples for conclusive evidence. Since laparoscopic cholecys-tectomies are now routine procedures, the safest method should be sought and guidelines should be formulated.

**REFERENCES**


