



IJMIRD 2015; 2(2): 302-303
www.allsubjectjournal.com
Received: 15-12-2014
Accepted: 25-01-2015
E-ISSN: 2349-4182
P-ISSN: 2349-5979
Impact factor: 3.762

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An open access technique to create Pneumoperitoneum in laparoscopic surgery

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Abstract

Background: Laparoscopic entry is of primary importance in laparoscopic surgery because of its potential association with serious complications such as visceral and vascular injuries. An open access technique through the umbilical cicatrix tube has been developed as a routine method with the goal to be easy, safe, and used by all surgeons in patients without a previous midline incision.

Aim: To evaluate the open technique in 158 consecutive laparoscopic operations regarding time for entrance and its complication rate.

Methods: This study was performed in 158 patients admitted at Bowring and Lady Curzon hospital. A 10 mm longitudinal umbilical incision was made with a scalpel including the skin, subcutaneous fascia and the peritoneum. Then 10 mm blunt trocar was directly inserted into the abdominal cavity through the opened umbilicus under no resistance.

Results: Mean time for access was 55 seconds. No bowel or visceral injury occurred during the creation of pneumoperitoneum. No gas leakage was seen.

Conclusion: The open access technique is applicable in all patients without a previous midline incision. It is fast, safe and easy to learn with very few associated problems.

Keywords: Laparoscopy, pneumoperitoneum, open access.

1. Introduction

In laparoscopic surgery a safe access to the peritoneal cavity is the first step towards a successful procedure.¹ The initial penetration of the abdominal cavity to produce a pneumoperitoneum can be a hazardous task and insertion of instrument can lead to injury to any underlying viscera therefore surgeons look for an expeditious, effective, reliable and safe technique to create pneumoperitoneum.^{2,3} Hasson introduced the open method of port insertion for laparoscopic procedures some three decades ago.⁴ Blind insertion of the Veress needle and of the first trocar is a significant cause of complications during laparoscopic surgery.^{5,6} Despite this risk, the closed technique is still more popular than the open one. Nevertheless, open laparoscopy has not been widely adopted mainly due to gas leakage from the wound and because it is time-consuming. Injuries to underlying viscera and vessels by needles and trocars have been reported even when the open technique is used. The aim of this article is to report the results of our experience with the routine use of the open technique in laparoscopic surgery.

2. Methods

One hundred and fifty eight consecutive patients without previous midline laparotomy were prospectively enrolled in the study. The operations were mainly laparoscopic cholecystectomies or appendectomies. Patients with a scar in the periumbilical area were excluded from the study. Time from skin incision to the camera visualizing the peritoneal cavity was recorded in seconds.

Operative technique

All patients received general anaesthesia and placed in supine position. The skin of the abdominal wall is prepared and draped. The umbilical scar is picked up by small allies forceps at the highest point and retracted up to facilitate the lifting up of the abdominal wall. A 10 mm longitudinal incision was made in the umbilical cicatrix. The whole layer of the umbilicus, including the skin, subcutaneous fascia and rectus sheath was incised. The peritoneum is gently entered with the tip of closed arteries forceps, while keeping the abdominal wall elevated with allies forceps or the peritoneum can be entered to the tip of the scalpel blade and a "black hole" – the abdominal cavity inside was seen.

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The peritoneum is dilated with the tip of closed artery forceps. The blunt tip cannula is inserted through the incision. After insufflation of carbon dioxide through the sleeve the camera is introduced in the usual manner. The abdominal cavity then visualized. Rate of success of procedure, time of establishment of pneumoperitoneum and complication/difficulty (air leak/visceral or vascular injury) encountered during the procedure were recorded. The result of present technique was compared with published literature in terms of visceral injury and air leak.

3. Results

A total of 158 patients were included (100 females and 58 males). The age range from 10 to 60 years (median age 35 years). The technique was used in 84 patients who underwent cholecystectomy, 58 appendectomy and 16 diagnostic laparoscopy. Mean time from skin incision to insertion of telescope was 55 seconds (range 35 to 95 seconds). No bowel or visceral injury occurred during the creation of pneumoperitoneum. Gas leakage did not occur in any case. In two cases the time (600 seconds) for open access was prolonged because of obesity. Trocar insertion into extra peritoneal space occurred in one case.

4. Discussion

Over the last two decades rapid advances have made laparoscopic surgery a well established procedure. However, because laparoscopy is relatively new, it still arouses controversy, particularly with regard to the best method for the creation of pneumoperitoneum. Four basic techniques are used to create pneumoperitoneum: blind Veress needle, direct trocar insertion, optical trocar insertion and open laparoscopy 7-11 Bleeding, subcutaneous emphysema, bowel perforation, minor and major vascular injury are the potential complications associated with creation of pneumoperitoneum.

Guidelines from the European Association for endoscopic surgeries conclude that available data does not favour the use of either technique. A meta analysis by Merlin et al found vascular injuries 0.003-1.33% using a blind technique and 0 – 0.03 % using an open technique, whereas visceral injuries were found in 0.04% using the blind technique and 0 – 0.03% using the open technique.¹² This analysis indicates a trend towards a reduced risk of major complications for the open access technique.

The umbilicus, a port with fewer blood vessels in the abdominal wall where muscles and fascias converge, is a preferred site for our laparoscopic entry. The maximum resistance of the umbilicus port comes from the incrusate skin and tenacious fascia. Cutting open the umbilicus directly may diminish or even avoid resistance.¹³ Moreover the blunt cannula is inserted directly into the abdominal cavity thus avoiding potential injuries from the sharp tip of the trocars. Since the incision is less than 1 cm which accommodates the port snugly, there was no gas leakage.

The other end point of our study was to assess the time taken for the pneumoperitoneum which was 55 seconds (mean). Direct trocar technique described by Bemelman WA has entry time of 138 +/- 58 seconds as compared to Hasson technique (350 +/- 103 seconds). Lal P in his modified open

technique described the time for obtaining pneumoperitoneum as 4 minutes^[14]. The time taken to create pneumoperitoneum in our method was shortest without the use of specialized and disposable instruments.

5. Conclusion

In conclusion the open access technique used in this study is applicable in all patients without a previous laparotomy. It is fast, safe and easy to practice.

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