Modified optical port entry site for laparoscopic cholecystectomy: Our experience

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INTRODUCTION

Since the introduction of laparoscopic cholecystectomy using the standard four-port technique, various modifications have been explored in terms of the number and positioning of ports in order to improve patient satisfaction and enhance the technical ease for surgeons [1]. The conventional four-port technique envisages placing a 10-mm optical port at the umbilicus and three more working ports: a 10-mm port at the epigastric region, a 5-mm port in the right hypochondrium in the midclavicular line, and another 5-mm port in the right lumbar region.

We modified the conventional four-port laparoscopic cholecystectomy with the idea that the optical port position can be varied, the entry point need not be at the umbilicus, and a 5-mm optical port can be used instead of the standard 10-mm one. The umbilicus varies based on the BMI, body habitus, and height of the patient and is therefore not a reliable landmark for port placement [2]. Furthermore, the distance of the operating site – i.e., the gallbladder fossa – from the umbilicus varies based on the anatomy of the patient. The distance is comparatively larger in obese patients and comparatively smaller in patients with a small abdomen or short stature. This leads to a discrepancy between the available instrument length and the required length. Besides occasional serious complications, suboptimal trocar placement can lead to frustration due to poor visualization, with longer operative times and potential complications. If a longer laparoscope is available, it can help overcome poor placement, although a longer laparoscope may not be readily available to many surgeons. This method can lead to the placement of additional trocars. The umbilicus should be considered an unreliable landmark.

MATERIAL AND METHODS

This study was conducted in the Department of Surgery of Seth GS Medical College and KEM Hospital, Mumbai, India between January 2022 and July 2022. Sixty selected patients with cholelithiasis underwent modified laparoscopic cholecystectomy in a prospective study. The surgeries were carried out by a single consultant surgeon with the experience of more than 500 laparoscopic cholecystectomies. Prior to the surgical procedures, informed consent was obtained from each patient. The patients underwent an initial assessment in the outpatient department and were subsequently admitted for surgery. Upon admission, a comprehensive medical history was elicited from each patient and standard investigations were conducted. Patients with a history of upper abdominal laparotomy were excluded.

Operative technique

Our technique involves placing the ports in a fashion that adds comfort for the surgeon and suits the requirements of the patient. The surgeon measures the distance from the gallbladder fossa, using the 9th costal level at the intersection of the lateral border of the right rectus abdominis and the costal margin as a clinical landmark [3]. The trocar is placed at a distance of 16 to 18 cm (the distance of the average surgeon’s hand, fingers spread apart, from the tip of
the little finger to the tip of the thumb) (Fig. 1.). In patients with a small abdomen, this location may be farther away from the umbilicus (Fig. 2.), while in obese patients, the location of the port may be closer than the umbilicus (Fig. 3.).

Pneumoperitoneum is established via the upper-left quadrant approach (Palmer’s point). A Veress needle is inserted 3 cm below the left subcostal border in the midclavicular line [4]. Correct placement of the Veress needle is determined via an aspiration test [5]. Upon achieving sufficient pneumoperitoneum, the primary 5-mm optical trocar is directly inserted at the predetermined site, as described earlier. A non-serrated 5-mm metal optical port is used. The insertion is performed using slow, alternating rotational movements until a loss of resistance is felt, indicating entry into the peritoneal cavity. The gas inlet is left open during the optical port insertion (Fig. 3.), allowing the hissing sound of CO$_2$ escaping from the gas inlet to confirm successful entry into the peritoneal cavity. The subsequent intraoperative steps follow the conventional laparoscopic cholecystectomy procedure. It is worth noting that the fascial defect of the 5-mm port is left unclosed, with only the skin being sutured, as the routine closure of 5-mm trocar incisions is not recommended [6]. The patients are made ambulatory on the evening of the same day and liquid orals are given.

Only difficult cholecystectomies required drains, which were removed postoperatively when the output was less than 20 ml over 24 hours.

RESULTS AND ANALYSIS

Sixty patients underwent modified four-port laparoscopic cholecystectomy. The median age of the patients was 38 years and the range was 20–55 years. There were 39 women and 21 men in the study. The mean body mass index was 30 (range: 25–37). None of our patients had a history of previous upper abdominal surgical intervention. Operative time, estimated blood loss, the need for transfusions, intraoperative complications, and the use of suction/tube drainage were recorded. There were complications in 2 cases (3%). Both complications were minor, consisting of diffuse hemorrhagic oozing from the liver bed. Both complications were minor and involved diffuse hemorrhagic oozing originating specifically from the area of the liver bed, which was associated with the gallbladder bed. The complications were managed intraoperatively by securing the proper hemostasis.

There was no major bile duct injury in our study and no patients required conversion to open cholecystectomy. Three of our patients developed postoperative complications. Two of them developed an infection at the epigastric port site. This was managed by opening up the skin suture and antiseptic dressing twice daily with a short course of antibiotics against *Staphylococcus*. Another patient developed fever due to thrombophlebitis, which was treated with change of intravenous access site and locally administered heparin cream. The mean operative time was 78 min (range: 70–90). The mean hospital stay was 3 days (range: 2–4). Most of the patients were discharged home on the morning of second postoperative day. The hospital stay was prolonged to up to 4 days in patients who developed the above-mentioned postoperative complications. Most of the patients returned to their normal routine work within 1 week of surgery. All patients were followed-up strictly after the surgery, with a mean follow-up period of 12 months (range: 10–14). None were found to have incisional hernia.
DISCUSSION

In our study, we modified the optical port position and size so as to achieve a consistent and optimal position every time. We felt that the conventional laparoscopic cholecystectomy has some flaws as regards completing the procedure uneventfully, as the umbilicus is an unreliable landmark. Furthermore, there is a higher risk of trocar site incisional hernia at the umbilicus [7], as it is a naturally weak spot in the anterior abdominal wall. Studies have shown that there is a higher risk of trocar site hernia at a midline versus off-midline trocar site [8].

A trocar size of ≥10 mm is associated with an increased risk of developing a hernia [6]. Using a 5-mm optical trocar instead of the conventional 10-mm one reduces the risk of trocar site hernia and allows for a better recovery. Because no dissection is done locally, there is minimal tissue edema and postoperative pain at the trocar site.

CONCLUSION

We strongly feel, given the various innovations in laparoscopic cholecystectomy, that our procedure with a modified approach can prove to be a better alternative in developing countries vis-à-vis patient satisfaction and surgeon comfort.

REFERENCES