Single Incision Laparoscopic Appendectomy with Two Port: A Case of Appendiceal Mucocele

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Abstract Laparoscopic appendectomy for the neoplasm of the appendix remains a controversial subject in the literature. The main concern regarding laparoscopic treatment for the neoplasm of the appendix is incomplete resection and rupture of the tumor into the peritoneal cavity. There is a slight increase in the rate of invasion of the surgical margins in laparoscopic interventions. However, the prognosis of the neoplasm of the appendix treated with laparoscopic appendectomy is not different from an open surgical technique. A series of cases have been reported in the literature concerning the success rate of single-incision laparoscopic appendectomy used in the treatment of acute appendicitis. In our clinic, two-port laparoscopic appendectomy through a single incision was successfully performed on a 45-year-old male patient diagnosed with an appendiceal mucocele. Despite some concerns in the literature about laparoscopic treatment of neoplasms of the appendix, we suggest that single-incision laparoscopic appendectomy can be successfully performed in patients diagnosed with neoplasms of the appendix.

Keywords Single incision · Laparoscopic appendectomy · Appendiceal mucocele

Introduction

Single-incision laparoscopic surgery (SILS) is an important area of interest in general surgery and successful results have been reported for several intra-abdominal surgical interventions, particularly cholecystectomy and appendectomy [1]. The most important advantages of SILS are better cosmesis and less incisional pain. On the other hand, the primary disadvantages of this surgical technique are restriction of movement and technical challenges due to the decreased number of ports [1]. An appendiceal mucocele is a rare clinical entity which is characterized by the accumulation of mucus inside the lumen of the appendix [2]. The prevalence of appendiceal mucocèles among appendectomies is in the range of 0.2–0.3 % [3]. Mucocèles of the appendix may be of benign or malignant origin. Rupture of an appendiceal mucocele leads to pseudomyxoma peritonei, which is characterized by intra-abdominal accumulation of acid mucin. The prognosis of pseudomyxoma peritonei associated with appendiceal mucocèles of malignant origin is very poor [4]. Another rare complication of appendiceal mucocèles is the torsion of the appendiceal mucocele characterized by a cystic mass in the right lower quadrant of the abdomen, observed on computed tomography (CT) [2].

Case

A 45-year-old male patient presented to the general surgery clinic with complaints of pain in the right lower quadrant of the abdomen of 3 months' duration and a feeling of fullness. No other systemic disease was reported in his medical

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history. The physical examination revealed no abnormalities apart from sensitivity in the right lower quadrant of the abdomen. The routine hematologic and biochemical analyses were normal. An abdominal ultrasonography demonstrated a cystic appearance of the appendix. An abdominal CT demonstrated a cystic mass lesion in the right lower quadrant at the location of the appendix; however, no appendix was identified. A colonography with barium enema revealed a filling defect. No lesion was detected in the cecum. A decision to perform two-port laparoscopic appendectomy through a single incision was made following the diagnosis of the appendiceal mucocele.

Surgical Technique

The patient was prepared for surgery under general anesthesia with intratracheal intubation. A 2 cm vertical incision was performed inside the umbilicus, which was drawn out via a gear clamp. The first 10 mm trocar was inserted, and following the insufflation of the abdomen to a pressure of 12 mmHg via CO₂, the patient was placed in partial Trendelenburg position. The second 5 mm trocar was inserted through the same incision, but from a different fascial defect (Fig. 1). Intra-abdominal organs and the appendix were examined using a standard 30° camera, which was inserted through the inferior trocar. There was a 3 cm×7 cm mass of appendix. Subsequently, a 0 number Prolene material of suture on a straight needle was inserted from 2 cm above McBurney's point, placed into the abdomen and the Prolene was wrapped through the mesentery including the appendix, and the Prolene was removed from the abdomen 2 cm below the entry point to perform the traction of the appendix. The mesenteric vessels were sealed and excised using a ligature after dissecting the mesentery of the appendix with a laparoscopic dissector. The completely dissected radix of the

appendix was seen to prolapse into the cecum due to the tumor. The appendix was resected together with a part of the cecum using two laparoscopic linear cutter staplers. The appendix, which was suspended from the abdominal wall by a traction suture, was placed into endobag by cutting the sutures inserted into the abdomen and was removed from the abdomen together with the 10 mm trocar (Fig. 2).

Results

The surgery lasted for 60 min. There was no bleeding or organ injury during the operation. The tumor was completely removed without rupture. A liquid diet was initiated the morning after surgery. In the morning of the second postoperative day, the patient was placed on a semisolid diet, and in the evening of the same day, a solid diet was initiated. After defecation he was discharged on the third postoperative day. The pathologic report of the excised tumor was consistent with an appendiceal mucocele. No malignant cells were observed, and no recurrence was reported at the 18-month follow-up period.

Discussion

One of the main reasons for the frequent use of laparoscopic interventions in intra-abdominal surgical procedures of luminal organs is widespread use of the newly developed vessel-sealing instruments and the laparoscopic cutting staplers. In our case, we reduced the number of ports with the use of vessel-sealing procedure and the suture method for suspension and traction of the appendix to the abdominal wall. In the literature review, we did not encounter any case of single-incision two-port laparoscopic appendectomy, or laparoscopic appendectomy for the mucocele of the

Fig. 1 Trocar placement

Fig. 2 Appendiceal mucocele

appendix. Therefore, the original aspect of this study was the mucocoele resection by two ports through a single incision.

Laparoscopic appendectomy has gained popularity against conventional appendectomy over the past 10 years with the advantages of laparoscopic appendectomy including less incisional pain, earlier mobilization, shorter period of hospitalization, and an early return to work [5]. Laparoscopic excision of a nonruptured mucocoele of the appendix has provided better cosmesis, significant decrease in postoperative pain, and a shorter period of hospitalization [6]. In the present case, a liquid diet was initiated in the morning of the day after surgery. The patient was discharged on the third postoperative day.

SILS was first described during the last half of 1990. Appendectomy using this method was first performed in 1998. The most important advantages of SILS are better cosmesis and less incisional pain [1]. Three trochars are used during classic laparoscopic appendectomy (one 10–12 mm trochar and two 5 mm trochars). In our case, a 20 mm single incision was made in the umbilicus and one 10 mm and one 5 mm trochars were inserted by the elimination of one trochar with the use of the suspension-traction suture technique which passed through the mesentery by involving the appendix. Limitations in maneuvering due to the limited visual field and the reduced number of trochars and leakage of CO₂ due to insertion of trochars through the same skin incision are the main technical problems encountered with surgical procedures using the SILS technique. We inserted the trochars into the abdomen through two separate openings of the fascia and created an adequate visual area by reducing leakage of CO₂.

During multiport laparoscopic or single-incision laparoscopic resections of appendiceal mucocoeles, the most

important indication for conversion to laparotomy is the presentation of pseudomyxoma peritonei or operative rupture of the tumor. Contamination of the peritoneal cavity by mucin during surgery may lead to a clinical picture of pseudomyxoma peritonei. This is an important risk factor, particularly in malignant cases. As a consequence, we applied the wrapping sutures passing through the mesentery by involving the appendix to perform traction, and we avoided mucin contamination from the lumen of the appendix.

In conclusion, despite some concerns in the literature about incomplete resection during laparoscopic treatment of neoplasms of the appendix and mucin contamination, we suggest that two-port laparoscopic appendectomy through single incision can be successfully performed in cases with neoplasms of the appendix, particularly in mucocoeles of the appendix.

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