Laparoscopic Total Colectomy Combined with NOSES: Turkish Experience

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1 Introduction

Rectal resection, right hemicolectomy, and sigmoid colectomy are the most frequently performed colorectal resections. Left hemicolectomy and transverse colectomy are used less frequently. All these surgeries can be performed with minimally invasive techniques, and specimens can be removed through a natural orifice that is called natural orifice specimen extraction surgery (NOSES). These surgeries involve only a part of the large intestine and related one or two quadrants of the abdomen. Total colectomy or total proctocolectomy involves the four quadrants of the abdomen. These are one of the most extensive surgeries in colorectal surgery with huge specimen sizes, and even they can be performed by laparoscopy. The removal of the large specimen through the natural orifices following laparoscopic resection is not a well-known procedure. In this chapter, we aimed to share our experiences about removing the specimen through the natural orifices in our patients undergoing laparoscopic total colectomy or total proctocolectomy.

2 Material and Method

The laparoscopic colorectal surgery database, performed between January 2013 and January 2020 in the Gastrointestinal Surgery Department, was examined. Patients who underwent ileorectal anastomosis with total colectomy (TC + IRA) or ileoanal pouch with total proctocolectomy (TPC + IPAA) were analyzed. Patients without anastomosis and complementary total colectomy (patients who had previously colon resection) were excluded. In suitable patients, the specimen was taken out from a natural orifice. At first the transanal route was preferred for NOSES; if this was unsuccessful, then the transvaginal route was used. The reason for this was to prevent enlarging the surgical area and to decrease the rate of rectovaginal fistula. Indications are mainly rounded up under two headings. The first was the patient's acceptance and the second was technical suitability. Technically, anal stenosis, wide specimen diameter, vaginal stenosis, virginity, and previous pelvic surgery were considered as the most important limitations. Malignancy and morbid obesity were not considered as a contraindication for NOSES. Previous pelvic surgery was accepted as relative contraindication and NOSES was applied in selected cases. Indications, surgical procedures, and results, as well as the patient demographics, were summarized in results.

3 Surgical Technique

Surgery was performed in the French position. Since positional changes were required during the surgery, patients were securely fixed to the operating table. Socks were dressed for deep vein thrombosis. A urine catheter was routinely applied. The stomach was decompressed with a nasogastric tube. Abdominal skin was widely cleaned with antiseptic solution. The placement of the monitors was changed according to the dial worked during the operation. Pneumoperitoneum was provided with a Veres needle placed from the umbilicus. A total of five trocars of 12 mm were placed in the umbilicus and four quadrants (Fig. 42.1). The procedure was first started from the distal colon or rectum. Total mesocolic resection was performed in patients diagnosed with preoperative cancer. In resections performed for prophylactic purposes, the mesentery was not always removed (Fig. 42.2). First, the sigmoid and descending colons were dissected from the lateral abdominal wall, and the mesocolon was divided by LigaSure 10 mm (Medtronic, USA). The splenic flexure of the colon and its mesentery was

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mobilized and divided. The greater omentum was not removed, and the remaining colon segments (transverse, hepatic flexure, ascendant, and cecum) were all separated from the mesocolon in the same way. The recto-sigmoid junction (or anorectal junction) and distal ileum were transected separately using 60 mm linear endoscopic staplers (Blue cartridge, Ethicon, Johnson & Johnson, USA). The distal rectal stump was opened with scissors, and the free abdominal specimen was taken out of the anus by an oval forceps (Fig. 42.3).

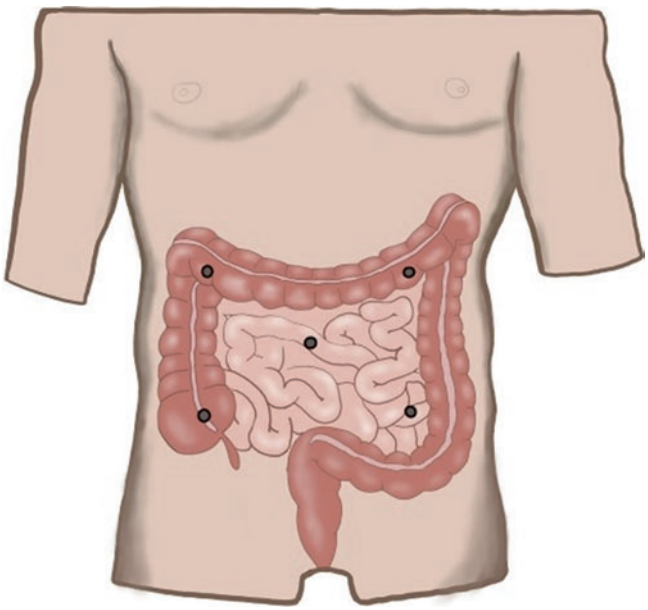

Fig. 42.1 Trocar placements

4 Results

Of the 305 cases performed by laparoscopy, 162 (53%) were planned to be removed by NOSES. A total of 16 (10%) cases failed with NOSES and were removed with an abdominal incision. Of all laparoscopic surgeries, a total of 35 (11.5%) patients underwent TC + IRA or TPC + IPAA. In 19 patients, the specimen was removed from the abdominal incision. In the remaining 16 (46%) patients, the specimen was removed with NOSES (14 transanal, 2 transvaginal). The transanal route was used for benign tumors and small-sized malignant tumors; the transvaginal route was used for larger tumors or large-sized specimens.

The median age was 41.5 (16–70) and there were eight patients in both genders. The median body mass index was 23.5 kg/m^2 (16–35.5). The etiology was familial adenomatous polyposis (FAP) (n:12), attenuated FAP (n:2), multifocal colon cancer (n:1), and colonic inertia (n:1). Thirteen patients underwent TC + IRA, while 3 patients underwent TPC + IPAA. The conversion was required in one patient (6%). In this case, following TPC, the specimen was removed transanally, and the distal stump was closed. After the J pouch was formed, when it was not possible to deliver the pouch to the anus, the intestine was released with a vertical lower abdominal incision, and anastomosis was performed. A diverting loop ileostomy was created to this patient, and this stoma was reversed several months later. Apart from this case, no protective ileostomy was used in any patient. Median operation time was 300 (150–720) minutes. Median blood loss was 30 ml (0–300 ml). The first bowel movement is on Day 2 (1–4). The duration of hospital stay was a median 9 days (3–18). Excised intestinal lengths were median 108 cm (77–185).

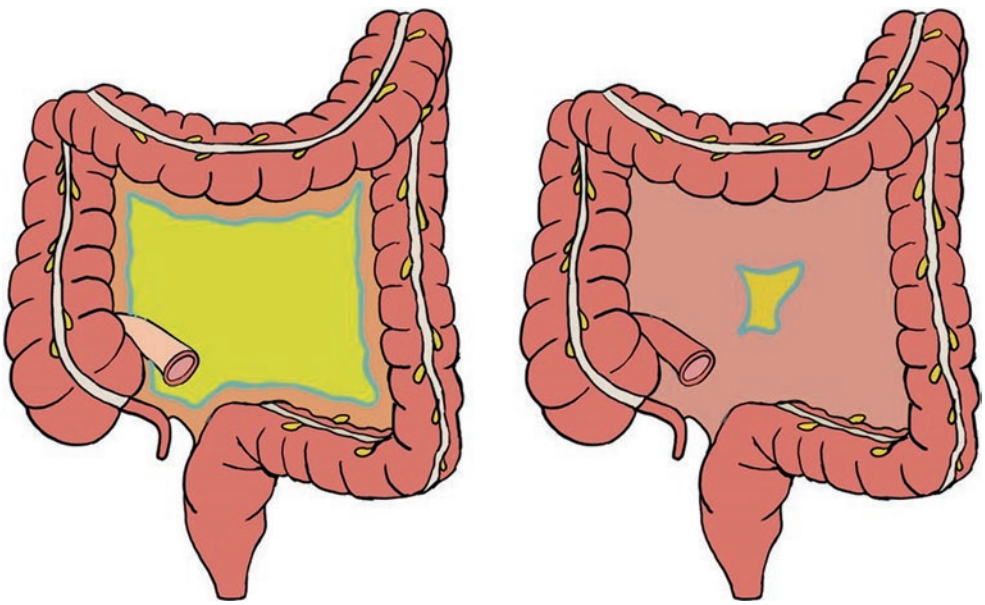

Fig. 42.2 Preserving or removing the mesocolon

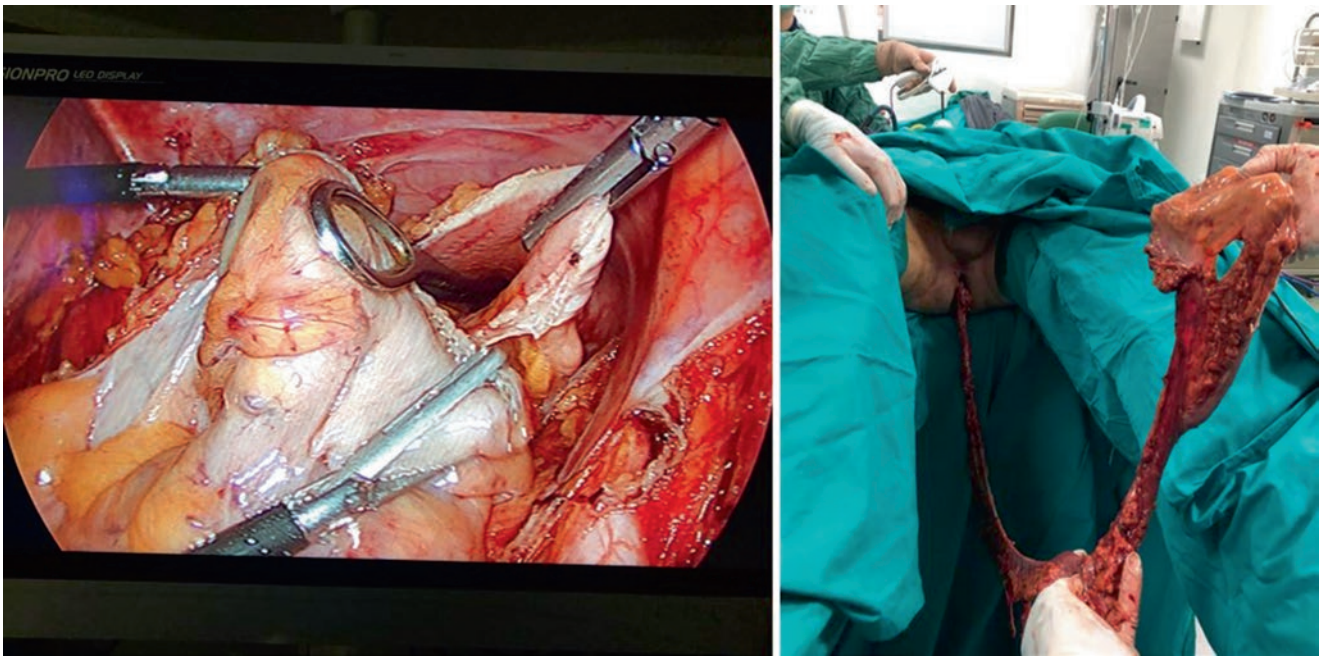

Fig. 42.3 Total colectomy specimen extraction through the anus (Servet Karagul archive)

Early postoperative complications were defined as those within the first 90 days. Complications were given according to the Dindo-Clavien classification. In the early period, a total of 8 (50%) patients had complications. There were one grade 1 (self-limiting hematuria), one grade 2 (hematochezia, improved with medical therapy and blood transfusion), two grade 3a (two intra-abdominal abscesses, both treated by percutaneous drainage and antibiotics), and two grade 3b complications (on the second postoperative day, laparotomy and hemostasis were performed due to intra-abdominal bleeding; another patient required reoperation due to intra-abdominal abscess and intestinal perforation on postoperative 75th day).

Late complications (>90 days) were seen in four patients. Two patients had an intra-abdominal abscess and required surgical treatment (one with intestinal fistula and ileus). One of them developed pouchitis in the late period and improved with medical treatment. In one FAP patient, a desmoid tumor developed in the small intestine mesentery and abdominal wall. In this patient, intestinal resection and bladder repair were performed. This is the only patient who has to live with a stoma. One patient had advanced obstructed gastric cancer with extensive colon cancer. TC + IRA and subtotal gastrectomy were performed in the same session, and both specimens were removed by transanal way. This patient died later due to advanced disease and cachexia in the postoperative third month. All patients, except this patient, are still alive.

5 Discussion

Following TC + IRA and TPC + IPAA combined with NOSES, we observed intra-abdominal abscess in five patients (31%) in our series. This was a higher rate than other colorectal surgeries combined with NOSES. In one patient, the abscess was secondary to omental ischemia in the splenic flexure and drained by laparoscopy. While the other two collections improved with percutaneous treatments, two cases of intra-abdominal abscesses that appeared in the late period (after 3 months) were treated by laparotomy. Intestinal obstruction after TC + IRA is not an uncommon complication. The compression of small intestines under the mesenterium of the terminal ileum or intra-abdominal abscesses are the main causes of postoperative ileus. In our patients, only partial ileus findings were encountered in the presence of intra-abdominal collections.

Diverting ileostomy was required in only one case in our series. Anastomosis leakage was not observed in any patient. Transanal rectal tube placement is a known technique to decrease the pressure in the anorectal region following the anastomosis. We performed decompression with a transanal rectal tube in five of our cases.

There is not enough information on whether it is necessary to remove the mesocolon when performing prophylactic TC *or* TPC. The common practice is to remove the mesentery in accordance with the principles in oncological surgery. However, preserving the mesentery can help NOSES, as its

specimen size is reduced. The increased risk of postoperative ileus related to the left colonic mesentery has been discussed but has not been proved. Desmoid is a rare but serious complication of FAP, and leaving the mesocolon may raise a concern about increasing the risk of desmoid. However, desmoids generally do not originate from the remaining mesocolon but from the small intestine mesentery. More information is needed on the risk of incidental colorectal cancer in prophylactic colectomy in FAP patients who have no preoperative cancer diagnosis.

Additional surgical procedures can be performed with total colectomy and may be a part of NOSES. Additional surgery was performed in our three cases: one subtotal gastrectomy and two cholecystectomies. In all three cases, specimens were removed from the natural orifices without any problem.

Open or laparoscopic TPC + IPAA is a well-known procedure; however, TPC + IPAA combined with NOSES was performed only in three cases, and all are reported here. Laparoscopic pouch creation intracorporeally showed some difficulties in our experiences. After the first stapler firing (60 mm laparoscopic linear stapler), the ongoing staplers continued firing, but this was not easy, and in the first case, we had to use a total of six cartridges. As far as we know, NOSES combined with laparoscopy is not available in the literature except for our cases. Recently, transanal TPC + IPAA (with or without laparoscopy) has been reported, and this new technique may have more widespread acceptance than NOSES combined with laparoscopic TPC + IPAA.

It is well-known that laparoscopic surgery reduces both general complications and wound-related complications compared to open surgery. One of the most important causes of this trend is to minimize incision length. NOSE-assisted laparoscopic techniques are considered to provide less and less incision-related risks. NOSE-assisted surgical techniques are predicted to extend the operation time, but in our comparison, the operation time did not show a significant difference between the two groups, but a bit longer in the transabdominal group. This was attributed to the higher rate of malignant patients in the transabdominal group and to two complicated cases (distal anastomotic tension) in the transabdominal group. The amount of bleeding did not show significant differences between the two groups. Postoperative pain closely affects patient comfort and recovery process. The pain score increases with the increasing length of the incision. In our study, it was found that the VAS scores on postoperative days 1 to 3 were significantly lower in the NOSE group. Laparoscopic TC is an extensive laparoscopic colorectal surgery involving the four quadrants of the abdomen, and postoperative pain was significantly reduced by NOSE in laparoscopic TC. One of the major advantages of minimally invasive surgery is reduced incision-related complications. The incidence of incisional hernia and wound infection is known to be significantly lower in laparoscopic colon surgery. These rates are expected to decrease further with NOSE-assisted laparoscopic surgery. When the complication rates in our study were examined, no wound complications were observed in the NOSE group as expected. In the transabdominal group, two patients had wound infections, and one patient had a late incisional hernia. The greatest concern for NOSE-assisted laparoscopic surgery consists of anal sphincter damage, sexual dysfunction, and pelvic organ damage. However, the incidence of these complications is very low and it was zero in our series.

As a conclusion, NOSES combined with TC + IRA or TPC + IPAA are feasible procedures. TC + IRA is a more suitable procedure for NOSES because TPC + IPAA with NOSES is more challenging. Postoperative intestinal obstruction related to an intra-abdominal abscess in the early or late period is the most common concern. When compared to conventional laparoscopic TC + IRA, NOSES provided less postoperative pain and better late cosmetic satisfaction.