

Laparoscopic Resection of Tumors of Left Colon, Sigmoid Colon, and Upper Rectum with Transanal Specimen Extraction (NOSES IV and VI): Portuguese Experience

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The technical variations in transanal NOSE colon surgery exist to overcome the restrictions caused by the absence of minilaparotomy and the transanal extraction itself. Without the minilaparotomy there is a need for intra-abdominal anvil delivery and its positioning in the proximal colon by laparoscopy. The way to position the anvil in the proximal colon defines the type of anastomosis created (end-to-end or side-to-end). Because the specimen is extracted through the rectum and anus, the rectum is opened and must be closed before the anastomosis. In low rectal cancer, the rectal stump might be difficult to close, but in tumors of the sigmoid or upper rectum, it is easily achieved.

The aim of this chapter is to explain the steps for NOSES for resection of tumors of the left colon, sigmoid colon, and upper rectum with transanal extraction.



Fig. 46.1 Position of the patient

1 Patient Positioning

The patient is in the modified Lloyd-Davis position with Trendelenburg and right tilt (Fig. 46.1).

2 Trocar Placement

10 mm trocar at the umbilicus for the camera
12 mm trocar at right lower quadrant
5 mm trocar at upper right quadrant
5 mm trocar at the transition of left quadrants (Fig. 46.2)



Fig. 46.2 Trocar positions

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3 Steps of Surgery

3.1 Left Colon Mobilization

In most cases we perform a full mobilization of splenic flexure of colon. This needs three steps:

1. Medial approach to the inferior mesenteric vein with dissection of the mesocolic plane (Fig. 46.3a)
2. Dissection of the mesocolon from the pancreas (Fig. 46.3b)

3. Transection of the gastrocolic ligament to enter the lesser sac (Fig. 46.3c)

3.2 Medial Approach and Ligation of the Inferior Mesenteric Artery at Its Origin

3.3 Section of the Mesentery of Upper Rectum to Define the Transection Zone of the Rectum

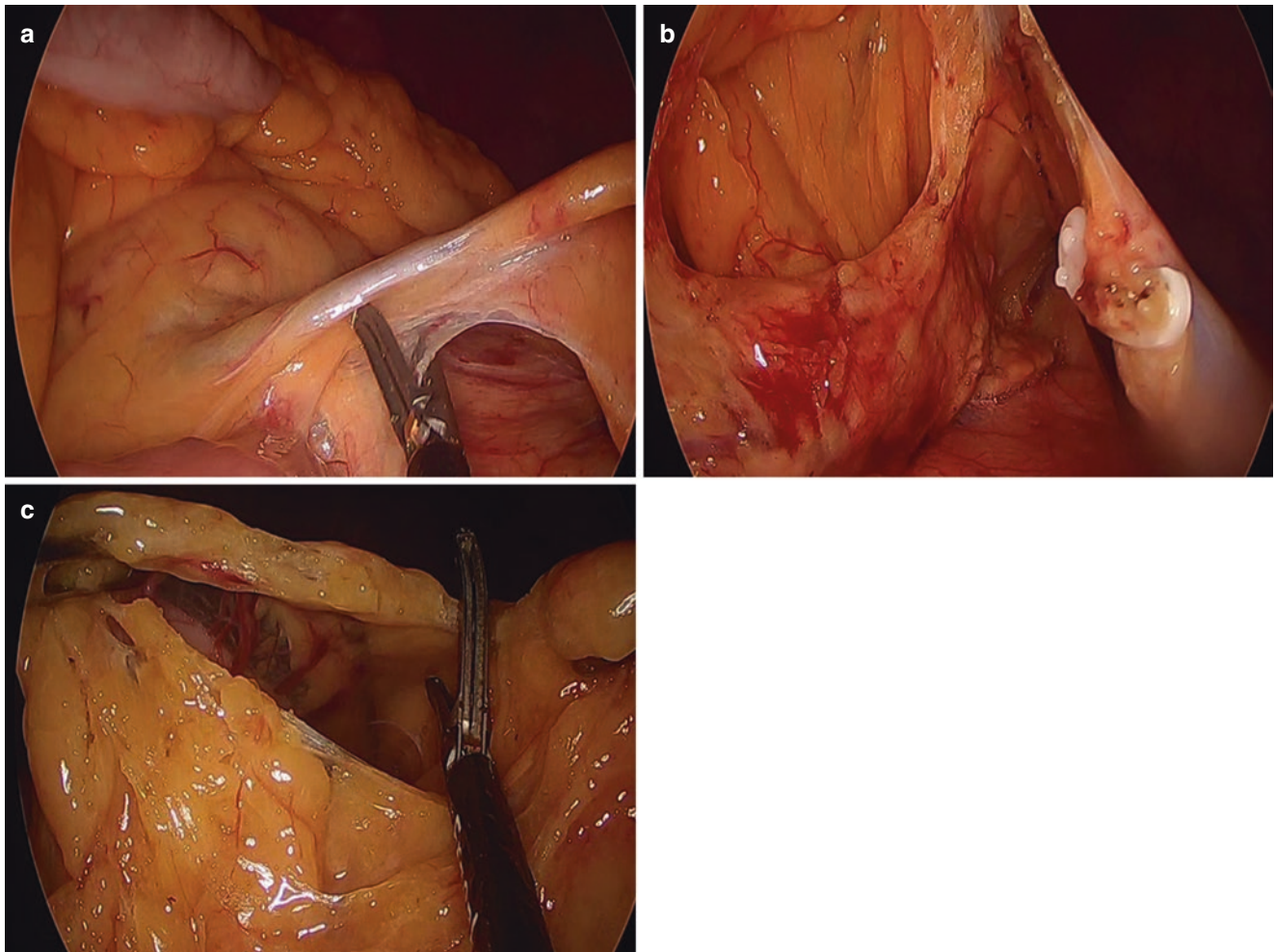


Fig. 46.3 (a) Medial approach to the inferior mesenteric vein next to the pancreatic border; the mesocolic plane is developed and the inferior mesenteric vein is ligated at this position. (b) The mesocolon is separated from the pancreas in medial to lateral approach; the lesser sac is

entered from below. (c) To complete the full mobilization of the splenic flexure, the gastrocolic ligament is transected next to the gastroepiploic vessels. The lesser sac is entered from above. And care must be taken in the final steps of dissection not to injure the left gastroepiploic vessels

3.4 Section of the Mesentery of the Left Colon to Define the Proximal Transection Area

The section of left colon mesentery starts at the mesenteric border immediately proximal to the ligation of the inferior mesenteric vein toward the mesenteric border of the splenic flexure, allowing an anastomosis to the distal transverse colon.

3.5 Occlusion of the Distal Colon

This is done to prevent intra-abdominal soiling and to allow for washing of the rectum. The rectum is occluded just above the level of desired distal transection with a silk suture, a cotton tape, or even a linear stapler (Figure 46.4).

3.6 Transanal Washing of the Rectum with Saline

3.7 Transection of the Colorectal Transition

The rectum is transected completely in the level previously defined (Fig. 46.5). A protective plastic sleeve is inserted through the rectum, usually a small Alexis® device (Fig. 46.6).

3.8 Anvil Delivery

The anvil of the circular stapler is introduced into abdominal cavity transanally. The spike must be attached to the anvil.

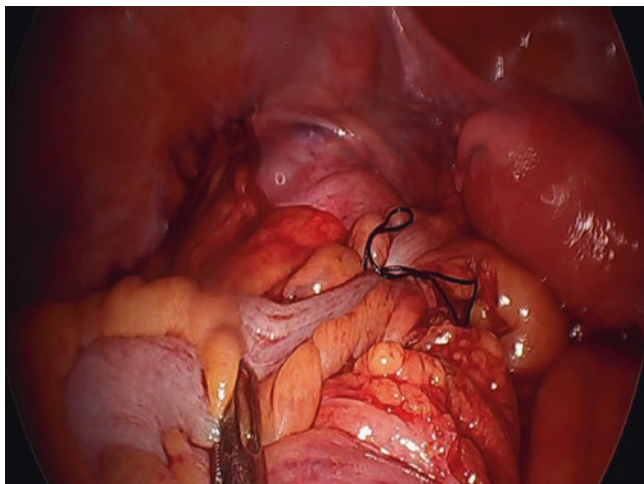


Fig. 46.4 A silk suture is used to occlude the colon lumen proximal to the desired distal transection location

3.9 Start the Extraction of the Specimen Through the Anus

The goal is a partial extraction placing the proximal part of the specimen at the left lower quadrant of the abdomen. At this time the surgeon has a good perception of the ischemic line marking the border between the proximal colon for anastomosis and the distal colon of specimen to be extracted.

3.10 Anvil Placement in the Proximal Colon

A colotomy is performed 1 cm distal to the ischemic line (Fig. 46.7), at the antimesenteric border of the specimen, and the anvil is inserted in the colonic lumen (Fig. 46.8a and b).

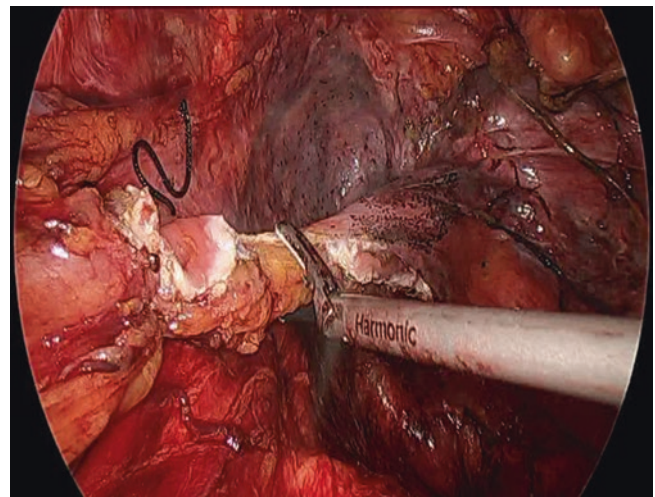


Fig. 46.5 A complete transection of the distal bowel is done

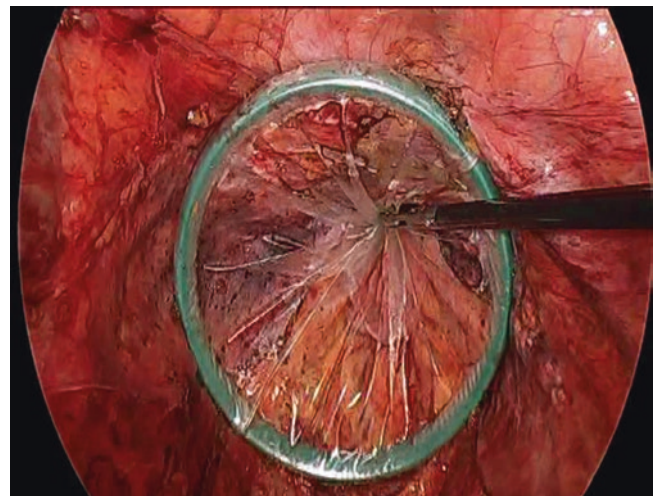


Fig. 46.6 A plastic wound protector is used to protect the rectum, allow for anvil delivery, and facilitate extraction of the specimen by reducing the length of the rectum

The spike of the anvil extrudes at the antimesenteric border of the proximal colon, about 5 cm proximal to the ischemic line, allowing the performance of a side-to-end colorectal anastomosis (Fig. 46.9).

3.11 Colon Transection

The colon is transected proximal to the previous colotomy (Fig. 46.10) with an endoscopic linear stapler, closing the proximal colon and freeing the specimen that can now be extracted transanally.

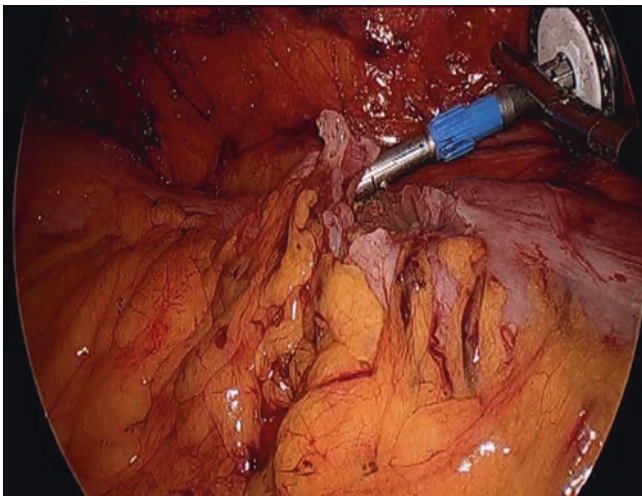


Fig. 46.7 The anvil is introduced through the colotomy of the proximal colon

3.12 Complete the Extraction of the Specimen and Removal of the Alexis® Device

3.13 The Rectal Stump Is Closed with an Endoscopic Linear Stapler (Fig. 46.11)

At this step extra care must be taken to ensure complete closure of the rectal stump. We suspend both borders of the rectum with graspers and make sure the entire border of the rectum is above the stapler line.

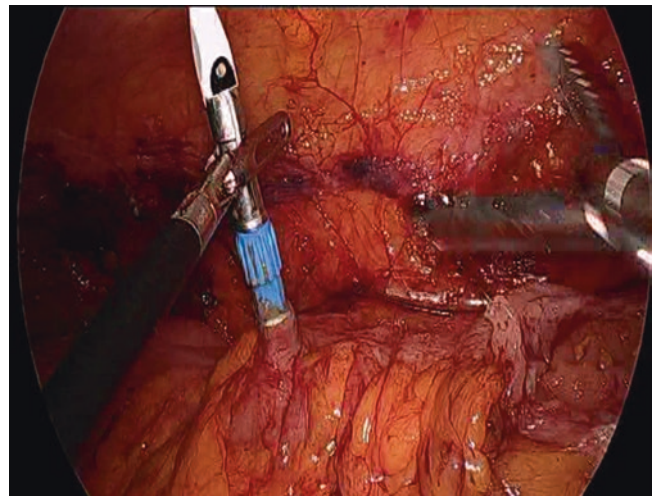


Fig. 46.9 Final position of the anvil in the proximal colon

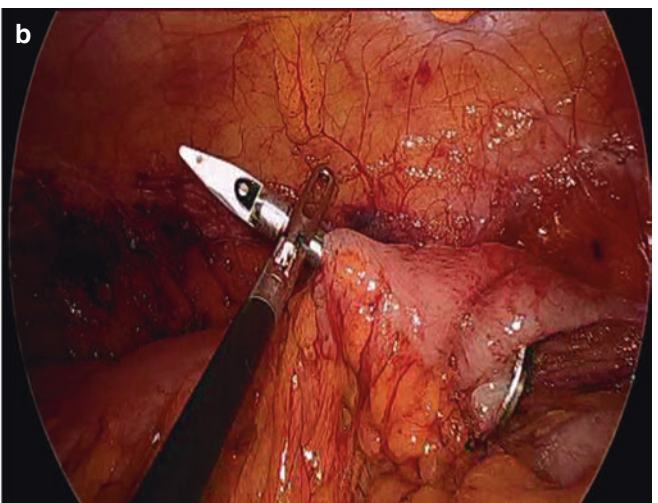
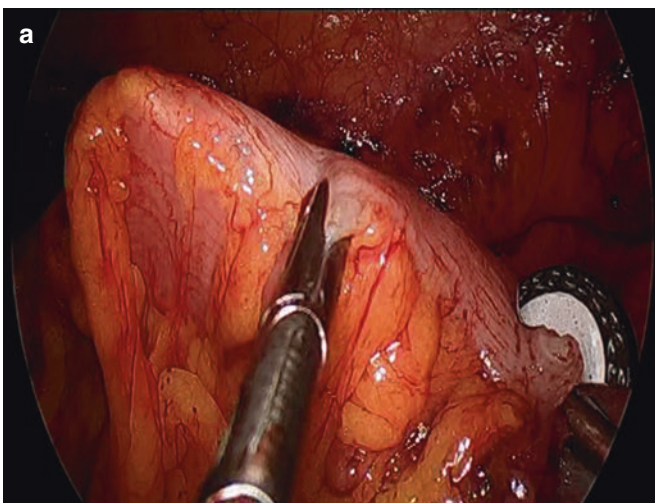


Fig. 46.8 (a) Tension is used to perforate the colon with the spike at the antimesenteric border. (b) The anvil is gently positioned inside the colon

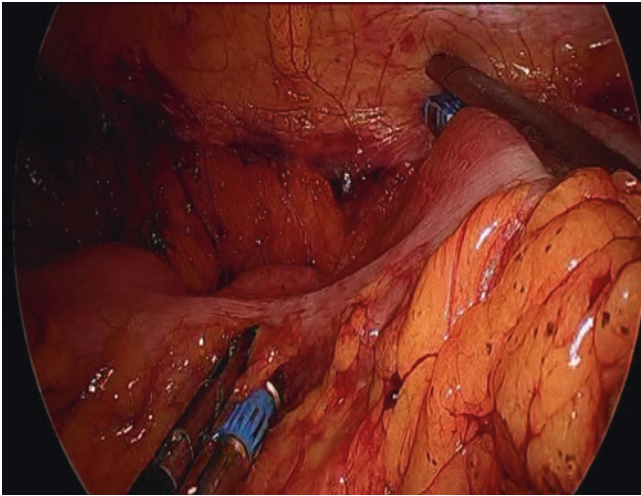


Fig. 46.10 Endostapler is used to cut the colon; the colotomy used for anvil insertion is distal to the transection line

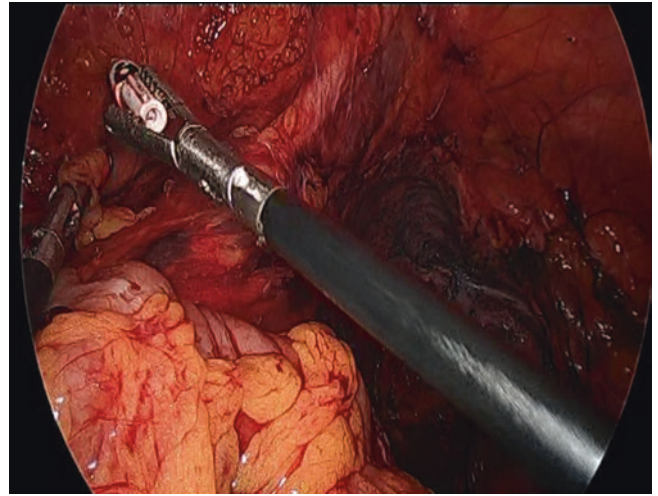


Fig. 46.12 The spike is removed from the anvil and extracted from the abdominal cavity

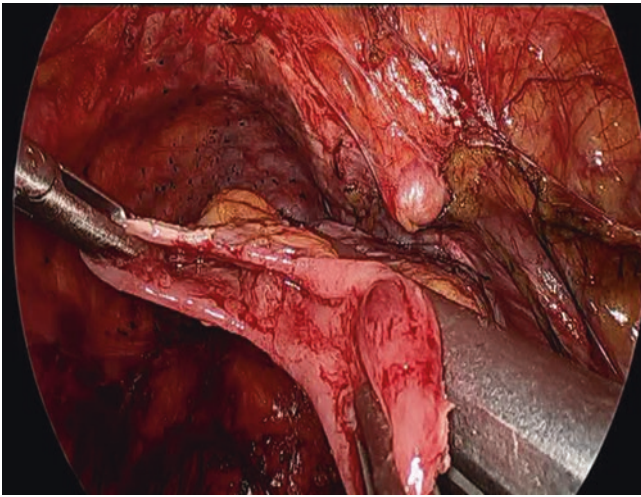


Fig. 46.11 After extraction of the specimen and removal of the plastic wound protection device, the rectum is closed with a linear endoscopic stapler

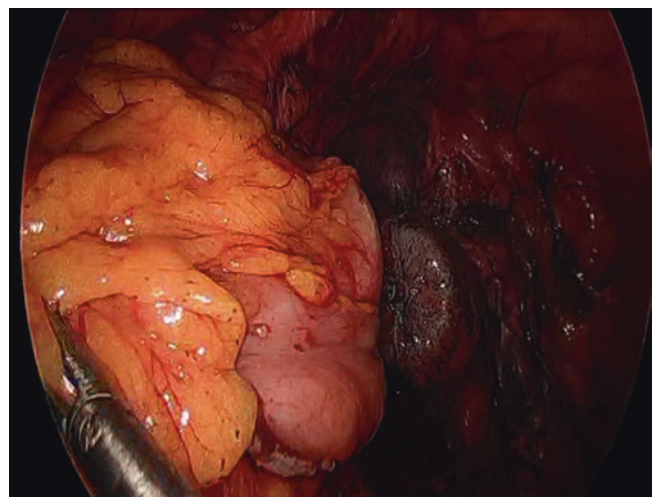


Fig. 46.13 A side-to-end anastomosis is performed

3.14 Removal of the Spike of the Anvil Through the 12 mm Port (Fig. 46.12)

3.15 Wash the Pelvis with Saline and Perform a Side-to-End Colorectal Anastomosis (Fig. 46.13)

3.16 Test the Anastomosis for Leaks (Fig. 46.14) and Placement of a Transanal Tube

4 Postoperative Care

In the first 18 to 24 hours of surgery, the patient is given intravenous analgesia, intravenous glucose, and saline and can drink clear liquids.

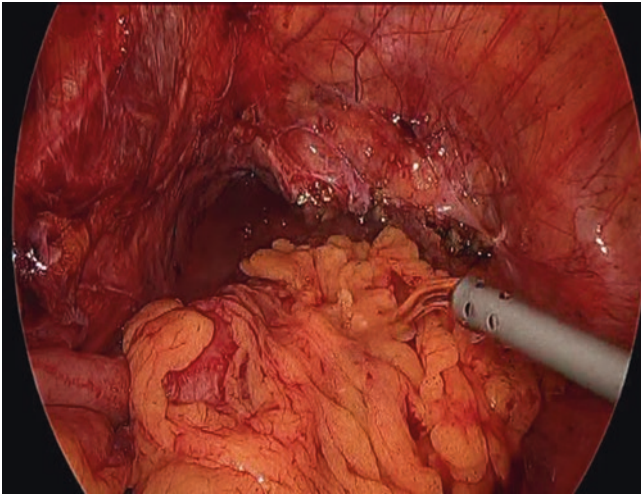


Fig. 46.14 Air leak test

On the first postoperative day, the patient starts liquid diet and oral analgesics, intravenous medication is suspended, and Foley catheter is removed.

On the second postoperative day, regular diet is introduced; the transanal tube is removed after the first bowel movement.

Between the third and fifth postoperative days, the patient is discharged.

The criteria used for safe discharge are the following: 1. patient is ambulatory and tolerates diet; 2. patient has bowel movements; 3. the pain is controlled with oral analgesics; and 4. blood tests are normalizing.