Robotic Left Colectomy

9

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9.1 Introduction

Although the robotic approach in colorectal surgery has been mainly described for rectal resection and right colectomy [1–5], technical advantages of the robotic platform over standard laparoscopy (high-definition three-dimensional vision of the surgical field, stable camera, ergonomics of the instruments) can also be gained for left colectomy.

Evidence in the literature regarding robotic left colectomy is scarce, and primarily concerns diverticular disease: in 2019 Al-Temini et al. [6] reported on 6776 patients undergoing laparoscopic left colectomy compared to 441 patients undergoing robotic left colectomy. Operative time was higher in the robotic group but conversions to open surgery were significantly lower. Similar results were observed

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by Bastawrous et al. [7]. Beltzer et al. [8] described similar clinical outcomes after robotic or laparoscopic left colectomy for diverticular disease, but reported more cases of complicated diverticulitis, with abscess or recurrent disease, in the robotic group. Together, this evidence may indicate a role for the robotic platform in decreasing the complexity of the minimally invasive approach in a complex surgical scenario such as diverticulitis.

In this chapter, we shall focus of the technical aspects of robotic left colectomy for cancer with the Xi da Vinci platform.

9.2 Patient Position and Robot Docking

The patient is in a supine position with arms alongside the trunk and legs abducted. A slight Trendelenburg position and right tilt are maintained to expose the operative field from the ileal loops (Fig. 9.1).

The procedure starts with induction of pneumoperitoneum through a Veress needle inserted in the Palmer point; once an intra-abdominal pressure of 12 mmHg is reached, the assistant port (a 12-mm optical trocar) is inserted in the right flank.

A preliminary exploration of the abdominal cavity is performed through this port with the robotic camera; if the site and resectability of the tumor are confirmed, the remaining ports are inserted under direct vision.

Four 8-mm robotic trocars are inserted along a line traced from the left subcostal margin to the right greater trochanter; the point where this line crosses the midline represents the insertion point of the camera trocar (R2); the remaining ports are inserted at 6–8 cm between them. Robotic trocar number one (R1) is on the left of R2, and robotic trocars number three (R3) and four (R4) are on the right (Fig. 9.2).

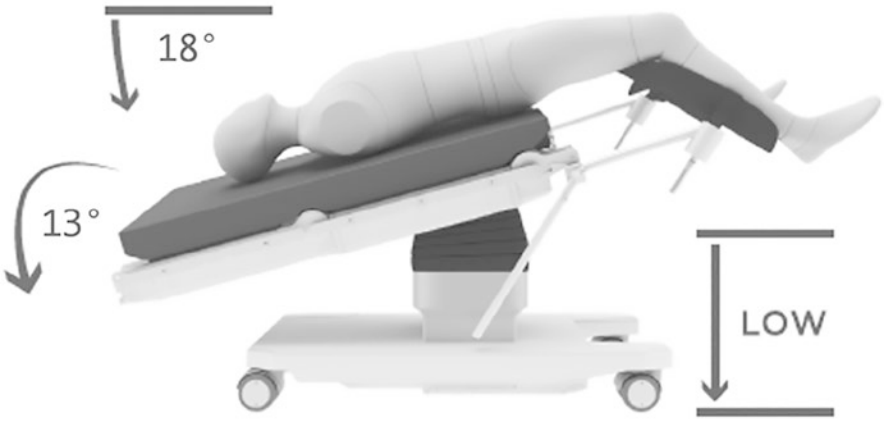

Fig. 9.1 Patient position

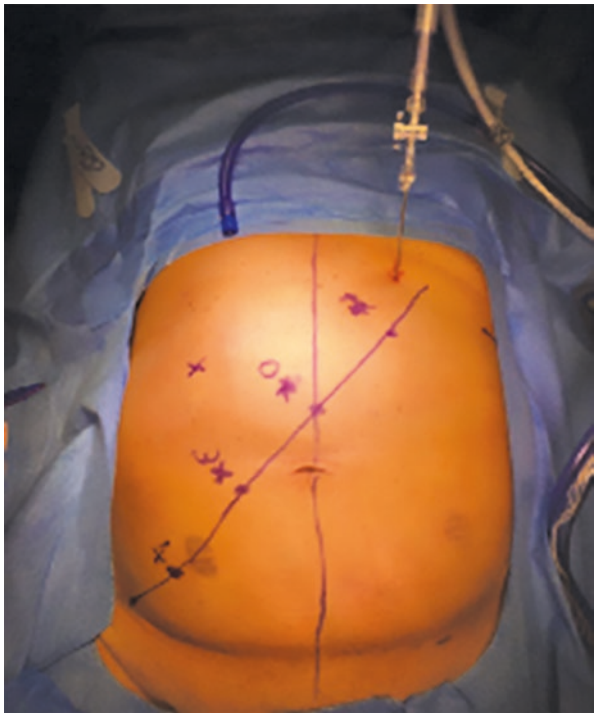

Fig. 9.2 Trocar positions

The robotic cart comes from the left side of the patient. R2 is connected to the arm, the camera is inserted and targeting is performed pointing on the sigmoid colon. After completing the targeting, arms one, three and four are connected to the trocars; a bipolar forceps is inserted in R1, a monopolar hook (or monopolar forceps) in R3, and a Cadiere grasper (or a tip-up grasper) in R4.

9.3 Dissection of the Left Mesocolon

The first step of the procedure is separation of the left mesocolon from the retroperitoneum: the bipolar forceps in R1 and the Cadiere forceps in R4 lift the mesocolon at the level of the inferior mesenteric vein (IMV), and the peritoneum is incised just below IMV, exposing the retrocolic plane.

The assistant forceps exerts countertraction on the retroperitoneum exposing the dissection plane (Fig. 9.3); the dissection is performed with the monopolar hook or scissors and proceeds from medial to lateral until reaching the colon.

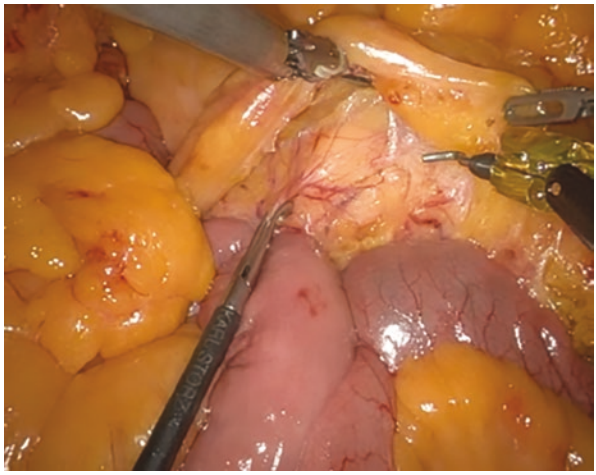

Fig. 9.3 Medial-to-lateral dissection. The bipolar forceps in R1 and the Cadiere forceps in R4 lift the descending mesocolon and the assistant grasper tractions the retroperitoneal reflection to expose the dissection plane

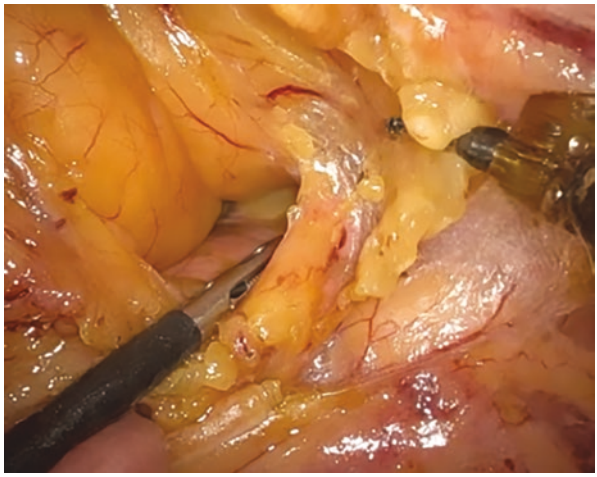

Fig. 9.4 Incision of the root of the transverse mesocolon. With the robotic graspers in R1 lifting the transverse mesocolon and the grasper in R4 lifting the descending mesocolon, the assistant forceps lowers the body of the pancreas and the root of the transverse mesocolon is completely detached from pancreas, to enter the lesser sac from below

9.4 Splenic Flexure Mobilization

The root of the transverse mesocolon is incised just anteriorly to the pancreas: the bipolar forceps lifts the transverse mesocolon cranially and the Cadiere forceps lifts the descending mesocolon; the assistant helps with a suction device or a grasper lowering the pancreatic body (Fig. 9.4). The root is incised two inches superiorly and two inches to the left of IMV, and the lesser sac in entered from below. Complete detachment of the root of transverse mesocolon from the pancreas is essential to fully mobilize the splenic flexure. IMV is isolated and sectioned between clips. The left coloparietal detachment is completed by reaching the previous medial-to-lateral dissection. Finally, a coloepiploic detachment is performed, and the splenic flexure is completely lowered.

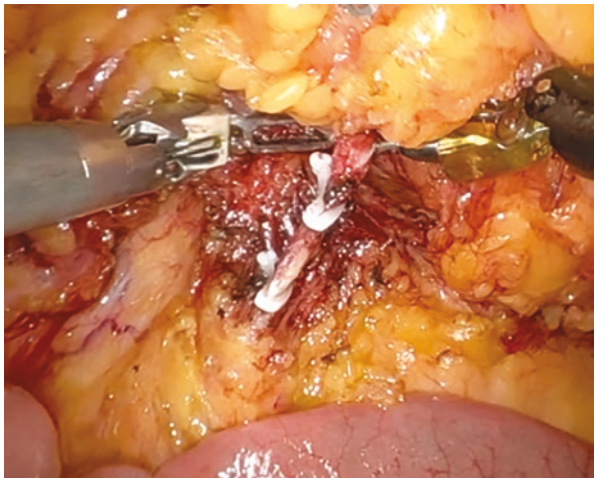

Fig. 9.5 Section of the inferior mesenteric artery

9.5 Inferior Mesenteric Artery Isolation and Lymphadenectomy

The peritoneum is incised at the level of sacral promontory and the mesorectal space is entered; the Cadiere forceps in R4 lifts the proximal rectum cranially to expose the root of inferior mesenteric artery (IMA), while the assistant forceps tractions the descending colon. The bipolar forceps in R2 lifts the left mesocolon and IMA is dissected at its origin, performing a central lymphadenectomy [9]; then, IMA is sectioned between clips (Fig. 9.5).

9.6 Section and Anastomosis

The upper mesorectum in dissected and the upper rectum is sectioned with a robotic linear stapler introduced in R3 after having removed the 8-mm trocar and having replaced it with a 12-mm robotic trocar able to harbor the stapler. Usually, a blue 45- or 60-mm cartridge is used for the transection; before extracting the colon, the mesocolon between the IMV and the IMA stumps is incised intracorporeally.

A suprapubic transverse incision is performed, and the colon is extracted; before the proximal transection, 3 mL of a reconstituted solution of indocyanine green with sodium chloride is injected intravenously, and the correct perfusion of the proximal colonic stump is assessed by switching the vision modality of the robotic camera from normal to infrared light (Fig. 9.6). This vision modality can be used extracorporeally, provided that all the operating room lights are switched off and a sterile drape is positioned over the robotic camera to lower the ambient light as much as possible.

After colon transection, the anvil of a circular stapler is introduced in the proximal colonic stump and fixed by a purse-string suture. During the extracorporeal phase of

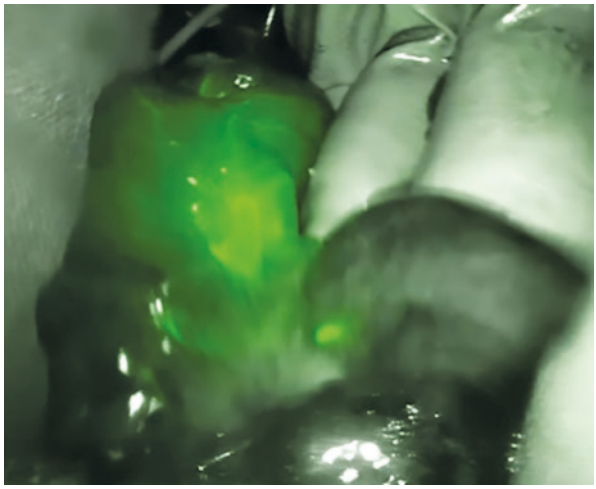

Fig. 9.6 Indocyanine green injection and assessment of colon perfusion. Extracorporeal assessment of proximal colon perfusion before section

the surgery, the robot remains docked. The colon is then reinserted in the abdominal cavity and the minilaparotomy is closed; the pneumoperitoneum is reinduced and a Knight-Griffen mechanical terminoterminal anastomosis is performed under robotic guidance.

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