Laparoscopic Sigmoid Resection

12

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Preference Card

- Number 10-blade scalpel with handle
- Tonsil and hemostat clamps, Kocher clamps
- Toothed and non-toothed forceps (Adson-Brown, DeBakey, rat tooth, Bonney)
- 5–10 mm ports (3)
- Hasson blunt 12 mm port or a Veress needle
- Laparoscopic camera 30°, 10 mm
- Atraumatic laparoscopic graspers (Babcock or Joanne), scissors, anvil grasper
- Laparoscopic hook electrocautery
- Laparoscopic suction/irrigation device
- Energy vessel sealing device
- Laparoscopic reticulating linear stapling devices (60 mm)
- Wound protector (size depending on size of incision – small is preferable)
- Purse string clamp
- Carter-Thomason suture passer
- Circular cutting stapler (33 mm)
- Flexible or rigid sigmoidoscope
- Standard laparotomy tray (∗∗ in case of conversion)
- Sutures
  - 0 polyglactin
  - 0 polypropylene on a straight needle
  - 3.0 polydioxanone
  - 1 polyglyconate
  - 4.0 polyglecaprone

Patient Positioning/Operating Room Setup

- Modified lithotomy position (Fig. 12.1) with legs in stirrups to provide easy access to perineal region, thighs are flexed. Patient's buttock slightly off the lower edge of the bed to allow access to the rectum.
- Both arms tucked, patient secured on a beanbag and taped to the operating room table.
- Position the equipment such that the surgeon, pathology, and monitor all are in line; adequate monitor position for assistants.
- Rectal irrigation, mushroom catheter in rectum, 1 Lt NS until clear, 1 small bottle of Betadine.
- Surgeon is positioned on patient's right (to access the left side of the abdomen) (Fig. 12.2).
- Camera assistant to surgeon's left for the pelvic dissection and to the right for transverse colon mobilization and splenic flexure takedown.
- Assistant between the legs.
- Scrub nurse to surgeon's right, at the patient's feet.
- Monitor positioned on patient's left side, feet level.

Nodal Points

Type of Incision/Port Placement (Fig. 12.3)

- Insert Veress needle in the left upper quadrant or an supraumbilical Hasson trocar
- Create pneumoperitoneum.
- Place the working ports under direct visualization, paying attention to triangulation, anterior superior iliac spines (to avoid restriction on instrument mobility), and possible potential ostomy site.
- 5 or 10 mm trocar in right lower quadrant.
- 5 or 10 mm trocar in right upper quadrant.
- Additional ports if needed.
  - 5 mm suprapubic/left lower quadrant

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R. J. Rosenthal et al. (eds.), *Mental Conditioning to Perform Common Operations in General Surgery Training*,
https://doi.org/10.1007/978-3-319-91164-9_12

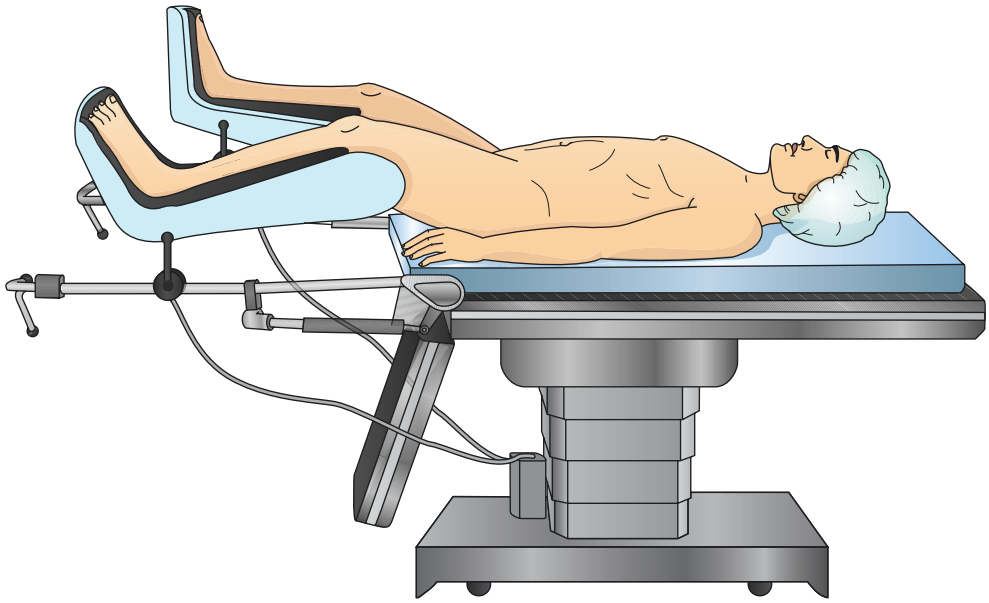

Fig. 12.1 Modified lithotomy position

Approach

- Place patient in the "left side up" and Trendelenburg position. This is key to dislodge the small intestine out of the pelvis and to expose the correct dissection planes.
- *Lateral-to-medial approach:* begins with lateral mobilization of the descending colon, dissecting along the left paracolic gutter on the white line of Toldt.
- *Medial-to-lateral approach:* begins with identification and ligation of vascular pedicle and ends with lateral dissection of the descending colon.

Dissection Step

Lateral-to-Medial Approach (Fig. 12.4)

- Dissect the left and sigmoid colon along the white line of Toldt, moving proximally toward the splenic flexure, along the left paracolic gutter.
- Mobilize the splenic flexure by transecting the splenocolic ligaments using a vessel sealing device.
- Take care not to injure the spleen or the tail of the pancreas.
- Place patient in the reverse Trendelenburg position.
- Camera assistant now to the surgeon's right side.
- Enter the lesser sac by dividing the gastrocolic ligament until the area of the lateral mobilization is reached.
- Colonic mobilization is complete when the splenic flexure is completely free.
- Identify and protect the left gonadal vessels and the left ureter within the retroperitoneum.
- Identify and ligate the inferior mesenteric vessels at their origin (the inferior mesenteric artery 1–2 cm from the takeoff of the aorta and the vein at the distal edge of the duodenum and inferior border of the pancreas) if oncological procedure; if benign disease, high ligation is not necessary.

Medial-to-Lateral Approach (Fig. 12.5)

- Score the mesentery at the level of the sacral promontory, moving toward to the inferior mesenteric artery (IMA).
- Identify and protect the left gonadal vessels and left ureter.
- Identify and ligate the IMA (if necessary) and continue dissection in the avascular plane, elevating the mesentery off of the retroperitoneum.
- Complete the mobilization with the lateral dissection
- Splenic flexure mobilization as described above.

Resection Step

- Create a window in the mesosigmoid at the rectosigmoid junction, remaining close to the colon wall at the designated point of resection to allow insertion of the stapler.
- Transect the large bowel distally, at the top of the rectum (identified by the merging of the tenia coli) using a laparoscopic linear cutting stapler.
- Complete the mesosigmoid transection proximally using energy device.
- Exteriorize the descending and sigmoid colon through a minilaparotomy incision (Pfannenstiel, midline or left lower quadrant, 5–7 cm in length) using a wound protector.
- Clamp the proximal point of transection with a purse string clamp.

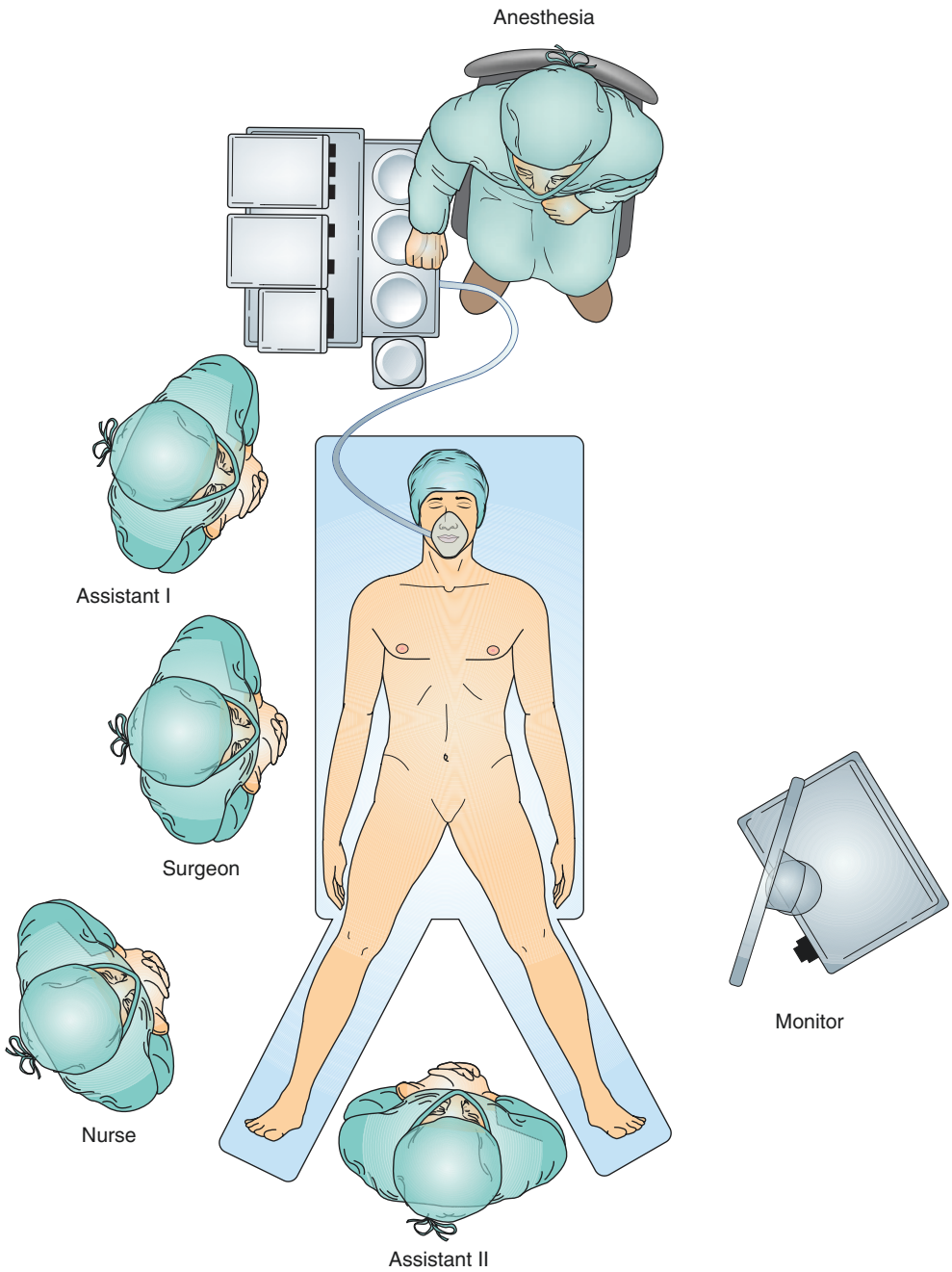

Fig. 12.2 Operating room setup. *ANS* anesthesiologist, *S* surgeon, *AI* camera assistant, *AII* second assistant, *N* scrub nurse, *M* monitor

- Thread a 0 polypropylene on a straight cutting needle through the clamp to create purse string.
- Transect colon with scalpel along the purse string clamp.
- Send specimen to pathology

Reconstruction Stage

- Insert the anvil of the circular stapler.
- Tie purse string snuggly around the shaft of the anvil.
- Return bowel to abdomen and re-establish pneumoperitoneum.
- Insert the circular stapler into the rectum and advance it to the top of the rectum.
- With the patient in Trendelenburg position and the pelvis free of any small bowel, grasp the anvil with the anvil grasper.
- Open the spike of the stapler and join it to the anvil shaft.
- Inspect the colonic mesentery to ensure that it is not twisted and is in the correct orientation.
- Close the stapler under direct vision, and perform the end-to-end anastomosis (Fig. 12.6); ensure that no intra-abdominal or pelvic structures are incorporated into the closure.
- Remove the stapler from the rectum.

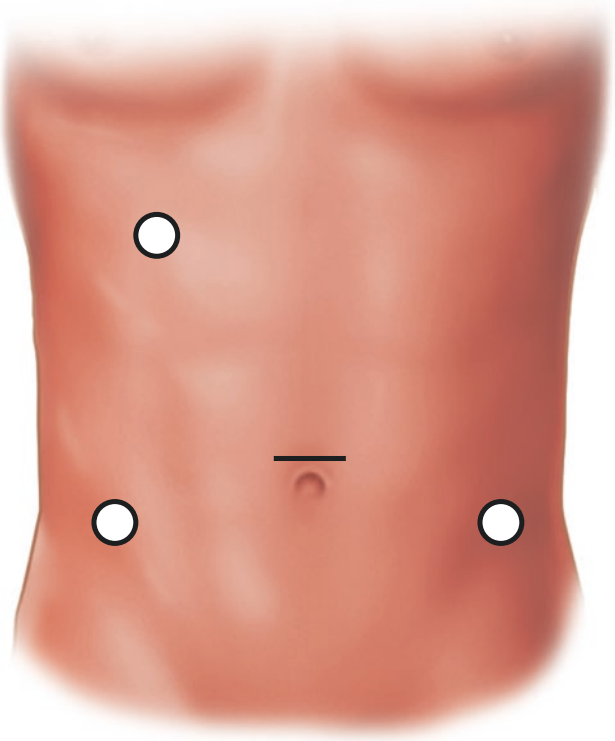

Fig. 12.3 Trocar placement

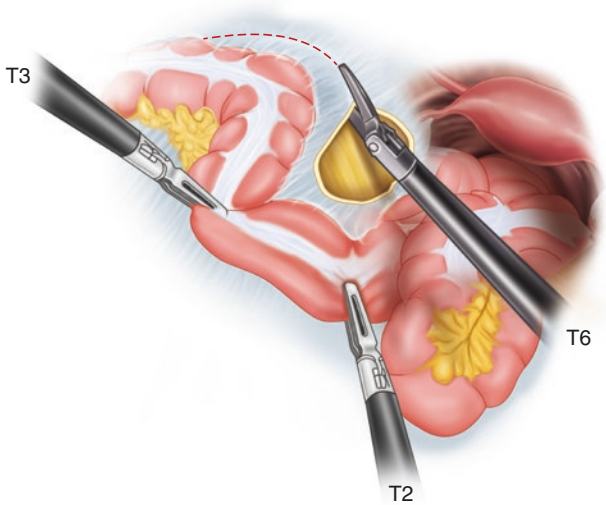

Fig. 12.4 Lateral-to-medial descending colon mobilization

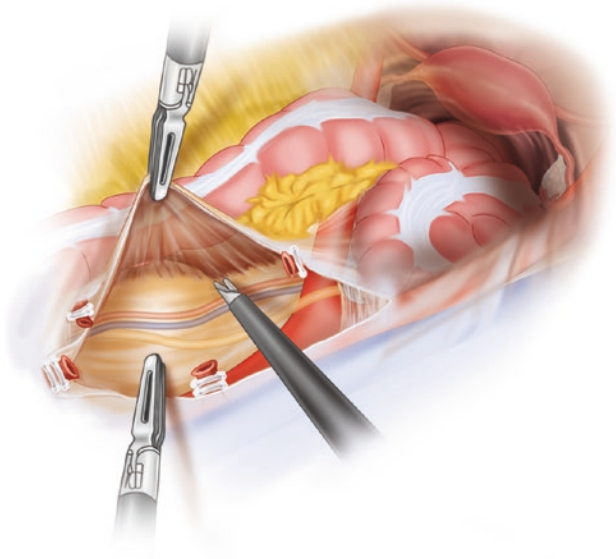

Fig. 12.5 Medial-to-lateral descending colon mobilization

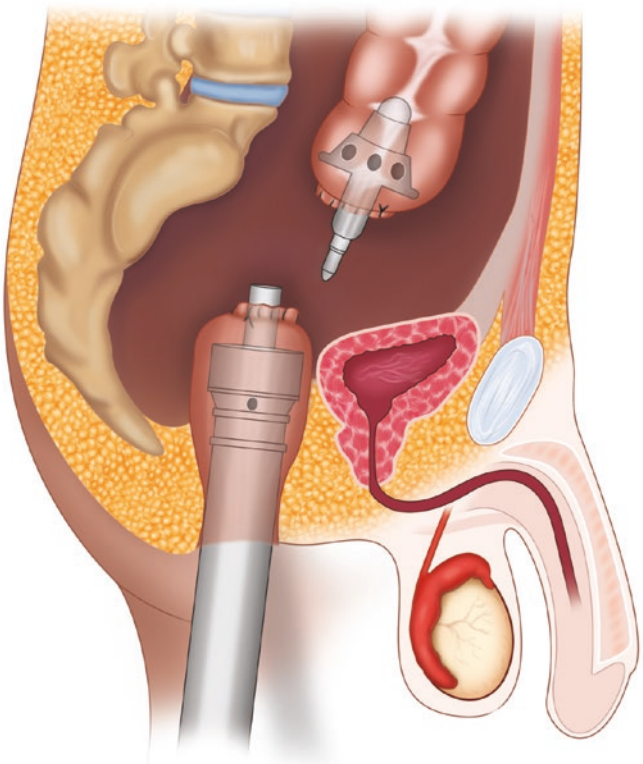

Fig. 12.6 Transanal end-to-end anastomosis

- Inspect the proximal and distal anastomotic "donuts" for completeness.
- Perform an air leak test using a flexible or rigid sigmoidoscope after the proximal colon has been clamped with an atraumatic grasper (Fig. 12.7).
- Visualize the anastomosis and check for hemostasis at the same time.
- Close the 10 mm port sites either using the Carter-Thomason suture passer or in an open fashion, under direct vision.
- Close Pfannenstiel incision with slow absorbable sutures.
- Close the skin and apply Steri-Strips and dressings.

Pearls and Pitfalls

- Performing an air leak test is crucial as this will help identify any defects in the anastomosis.
- Ureteric stents are advised for patients with predicted difficult anatomy or with significant intra-abdominal inflammation or locally advanced colonic malignancy.
- Diverting stoma is considered for anastomoses in patients taking steroids, malnourished patients, patients with a history of pelvic irradiation, or patients following suture repair of a positive air leak test.

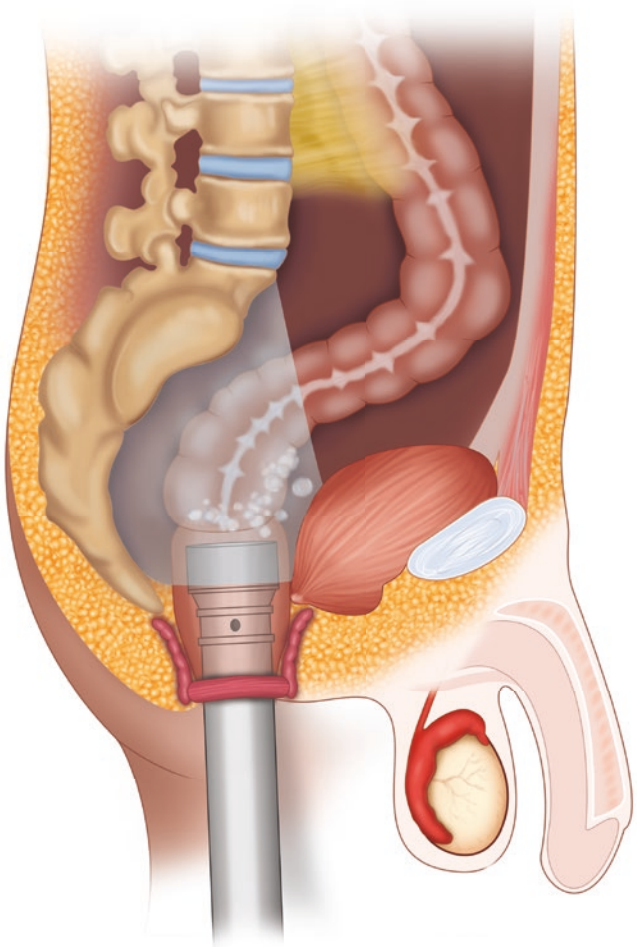

Fig. 12.7 Air leak test

Access Reader Checklist Appendix

☑ READER CHECKLIST
Laparoscopic Sigmoid Resection

✓ PREFERENCE CARD

►**Instruments**
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__Wound protector (size depending on size of incision- small is preferable)
__Purse string clamp
__Carter-Thomason suture passer
__Circular cutting stapler (33mm)
__Flexible or rigid sigmoidoscope
__Standard laparotomy tray (** in case of conversion)

►Sutures
__ 0 polyglactin
__0 polypropylene on a straight needle
__3.0 polydioxanone
__1 polyglyconate
__4.0 polyglecaprone

✓ PATIENT POSITIONING/ OPERATING ROOM SETUP

►Patient Positioning
__Modified lithotomy position (Figure 12-1) with legs in stirrups to provide easy access to perineal region, thighs are flexed. Patient's buttock slightly off the lower edge of the bed to allow access to rectum
__Both arms tucked, patient secured on a beanbag and taped to operating room table
__Position the equipment such that surgeon, pathology, and monitor all are in line; adequate monitor position for assistants
__Rectal irrigation, mushroom catheter in rectum, 1 Lt NS until clear, 1 small bottle betadine

►Operating Room Setup
__Surgeon is positioned on patient's right (to access the left side of abdomen)
__Camera assistant to surgeon's left for the pelvic dissection and to right for transverse colon mobilization and splenic flexure takedown)
__Assistant between the legs
__Scrub nurse to surgeon's right, at the patient's feet
__Monitor positioned on patient's left side, feet level

✓ NODAL POINTS

►**Type of Incision/Port Placement**
__Insert Veress needle in the left upper quadrant or an supra-umbilical Hasson trocar
__Create pneumoperitoneum
__Place the working ports under direct visualization, paying attention to triangulation, anterior superior iliac spines (to avoid restriction on instrument mobility) and possible potential ostomy site
__5 or 10mm trocar in right lower quadrant
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__Additional ports, if needed
__5mm suprapubic/left lower quadrant

►**Approach**
__Place patient in "left side up" and Trendelenburg position. This is key to dislodge small intestine out of pelvis and expose correct dissection planes
__Lateral-to-medial approach begins with lateral mobilization of descending colon, dissecting along left paracolic gutter on White line of Toldt
__Medial-to-lateral approach begins with identification and ligation of vascular pedicle and ends with lateral dissection of descending colon.

►**Dissection Step**
Lateral-to-medial Approach
__Dissect left and sigmoid colon along White line of Toldt, moving proximally towards splenic flexure, along left paracolic gutter
__Mobilize splenic flexure by transecting splenocolic ligaments using vessel sealing device
__Take care to avoid spleen or tail of pancreas injury
__Place patient in reverse Trendelenburg position
__Camera assistant now repositioned to surgeon's right side
__Enter lesser sac by dividing gastro-colic ligament until area of lateral mobilization reached
__Colonic mobilization complete when splenic flexure completely free
__Identify and protect left gonadal vessels and left ureter within retroperitoneum
__Identify and ligate inferior mesenteric vessels at origin (inferior mesenteric artery 1-2cm from take-off of aorta and vein at distal edge of duodenum and inferior border of pancreas) if oncological procedure; if benign disease, high ligation not necessary

►**Resection Step**
Medial-to-lateral Approach
__Score mesentery at level of sacral promontory, moving towards inferior mesenteric artery (IMA)
__Identify and protect left gonadal vessels and left ureter
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__Complete mobilization with lateral dissection
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__Create a window in the mesosigmoid at the rectosigmoid junction, remaining close to the colon wall at designated point of resection to allow insertion of stapler
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__Clamp proximal point of transection with purse string clamp
__Thread 0-polypropylene on straight cutting needle through clamp to create pursestring
__Transect colon with scalpel along pursestring clamp
__Send specimen to pathology

►**Reconstruction Stage**
__Insert anvil of circular stapler
__Tie purse string snuggly around shaft of anvil
__Return bowel returned to abdomen and insert wound protector and cover to prepare for insufflation and pneumoperitoneum.
__Insert circular stapler into rectum and advance to top of rectum
__With patient in Trendelenburg position and pelvis free of any small bowel, grasp anvil with anvil grasper
__Open spike of stapler and join to anvil shaft
__Inspect colonic mesentery to ensure it is not twisted and is in correct orientation
__Close stapler under direct vision and perform end-to-end anastomosis
__Ensure no intra-abdominal or pelvic structures incorporated into closure
__Remove stapler from rectum
__Inspect proximal and distal anastomotic "donuts" for completeness
__Perform air leak test using flexible or rigid sigmoidoscope after proximal colon clamped with atraumatic grasper
__Visualize anastomosis and check for hemostasis
__Close 10 mm port sites using the Carter-Thomason suture passer or in open fashion, under direct vision
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__Close skin and apply steri-strips and dressings