



# Monopolar hook electrode assisted laparoscopic resection of descending colon cancer

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**Abstract:** Colorectal cancer accounts for about 25% of all malignant tumors in China. Efficacy and safety of laparoscopic assisted descending colon cancer radical resection have been recognized, and that complete mesocolic excision (CME) plays an important role. For this surgery, most surgeons choose scalpel as the primary instrument, and monopolar hook electrode minimal. A 72-year-old female patient with an adenocarcinoma of the left colon, with pre-operative clinical stage CT3N1M0, was chosen for the study. We use the monopolar hook electrode to finish the laparoscopic assisted descending colon cancer radical resection. The tumor with the surrounding tissue and 4/15 lymph nodes was resected by laparoscopy and colon side to side anastomosis performed. The procedure lasted about 120 minutes with minimal bleeding. Postoperative tumor biopsy revealed a tumor staging of T3N2M0 (IIIB). The patient recovered well following the procedure and was discharged after 4 days. The use of monopolar hook electrode in laparoscopy assisted descending colon cancer radical removal is safe, feasible and effective. The procedure is accurate, safe, provides ease of operating in a narrow space and is relatively inexpensive.

**Keywords:** Laparoscopy; descending colon cancer; adenocarcinoma; complete mesocolic excision (CME); monopolar hook electrode

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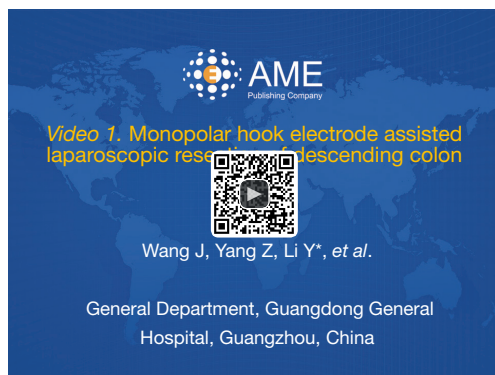
Colorectal cancer accounts for a fourth of the malignant tumors in China. In 1991, Jacobs *et al.* (1) used laparoscopy to treat colorectal cancer, for the first time. In the following 20 years, minimally invasive treatment concept has been widely adopted and it has the advantages of rapid recovery, less trauma, and the long-term efficacy (2,3). Especially in 2009, Hohenberger *et al.* (4) put forward the concept of complete mesocolic excision (CME), it was found to improve the treatment of colorectal cancer and promoted the extensive adoption of laparoscopic surgery. Due to the complexity of the anatomy (5,6), attention must be paid to the correct clearance, and the relationship between the spleen, pancreas, stomach and their blood supply must be recognized, throughout the surgical procedure. For this surgery, most surgeons choose scalpel as the primary

instrument, and monopolar hook electrode minimal. In addition to this, monopolar hook electrode has unique advantages: (I) accurate surgery with good separation of the vasculature; (II) fast and safe cutting, on the premise of ensuring safety shortening the procedure time; (III) the unique design of the monopolar hook electrode aids in adapting to the angle the bleeding, thus helping to preserve hemostasis; (IV) can be used repeatedly, is low cost and suitable for primary hospitals.

## Materials and methods

### Case selection

A 72-year-old female who underwent a preoperative colonoscopy: revealed a visible mass 48 cm from the



**Figure 1** Monopolar hook electrode assisted laparoscopic resection of descending colon cancer (7).

Available online: <http://www.asvide.com/articles/1085>

anus. The surface had a crisp texture, bled easily and the colonoscope could barely pass through. Biopsy of the mass revealed that it was an adenocarcinoma. The result of the CT scan showed that the middle of the descending colon was thickened, and the size of the film is violated. The preoperative clinical stage of the tumor was CT3N1M0.

### ***Surgical position (Figure 1)***

Patient was placed in a foot high position (10–30 degrees), on a recumbent straddle, towards the right (10–20 degrees). The splenic flexure was maintained as the body position changed. The surgeon was on the patient's right side and the assistant on the left side. The endoscope handles should change the position between the side legs and locate on the head side with postural.

### ***Surgical procedure***

#### **Disconnection of the inferior mesenteric artery, descending colon branch and sigmoid colon branch**

Following the traditional intermediate approach, the sigmoid mesocolon was cut apart on the sacral promontory level until the inferior mesenteric artery root was reached. To reach the correct level we used nerve guidance, along the gap into the left posterior lobe of the mesocolon, named Todt's fascia. Isolating the gap towards the descending colon side ditch, attention was paid to expose and protect the left ureter and reproductive blood vessels. The lymph nodes of the inferior mesenteric artery were dissected and the distal portion was exposed. Then the descending colon branch was exposed and the sigmoid colon branch

was closed off at the root of the two branches, thereby preserving the rectal artery. Continued on to free the inferior mesenteric vein up to the pancreatic edge, sweeping the corresponding regional lymph adipose tissue close to the lower edge of the pancreas to cut off the mesenteric vein.

#### **Separation of the upper part of the rectum**

We followed through by separating the upper rectum and the lateral ligament to protect the abdomen and the pelvic nerve floor. At this point, the left half of the colon, the splenic flexure, descending colon, sigmoid colon, rectum and mesentery had been completely cut off.

#### **Transverse colon lymph node dissection**

We cut apart the right transverse mesocolon along the surface of the pancreas until the edge of the pancreatic neck, leaving the left branch. Then we followed along the pancreatic body to the tail of the pancreas and then cut off the left transverse mesocolon.

#### **Splenic flexure dissociation**

The patient was placed in a head high position that provided enough tension, along the outside of the vascular arch of the stomach. The gastrocolic ligament was severed and the gastrosplenic ligament was completely released up to the splenic flexure.

#### **Left lateral dissociation**

For complete left lateral dissociation, we cut along the Todt's line and towards the cephalad, then we cut the left paracolic sulci as far as the phrenicocolic ligament. Once this was accomplished the medial free plane gets through.

#### **Tumor removal and anastomosis**

A 4-cm vertical incision was made on the left side of the abdominal wall. Using plastic protective sleeve as protection, the free intestinal segment was pulled out and the tissue was cut on both sides of the tumor for a distance of 10 cm and Ethicon TCR 75 mm suture was used for side to side anastomosis of the colon. No bleeding was observed in the abdominal cavity and the abdomen was closed.

### **Results**

The surgical procedure lasted 120 minutes, and the bleeding was about 20 mL. Postoperative biopsy revealed

an adenocarcinoma stage T3N2M0 (IIIB) and total lymph node 4/15 (+). The patient recovered well, without serious complications and 6 hours after the procedure the patient was able to consume liquid diet. The patient had anus exhaust on the second day and was started on semisolid diet on the third day. The patient was discharged on the fourth day.

## Discussion

Surgical treatment of colon cancer which radical lymph node clearance has different requirements depending on the location of the tumor in the descending colon (8). For patients with tumors located in the distal colon, depending on the lymph node clearance, the inferior mesenteric artery and rectal artery need to be avoided. The monopolar hook electrode allows for the removal of lymph nodes while avoiding the inferior mesenteric arterial root and guarantees that the distal sigmoid colon and rectum have a good blood supply. In addition, proper planning of the surgical can ensure the continuity of the procedure, considerably reduce the time needed and the patients need to assume only one position throughout the procedure.

Ultrasound scalpel in laparoscopic surgery is in the early stages of development. It allows for laparoscopic surgery and ensures for proper blood coagulation (9). However, it also has a few disadvantages: (I) surgical cutting of two different levels together leads to anatomical level loss; (II) less blood vessels, especially for some fascial connective tissue may reduce the speed of cutting (10). However, with the promotion of laparoscopic technology and the improvement of surgical skills as the surgeons learn more about the procedure and the monopolar hook electrode allowing better separation from blood vessels in the local areas, it's possible to improve the effectiveness of the procedure. Monopolar hook electrode allows for a 360° operating angle and better mobility in the operating space. Its operational advantages in blood vessels become more prominent in the nude. In this case the monopolar hook electrode allowed for multi-angle cutting around the blood vessels in the process of clearing the lymph nodes. Video can also be observed in the separation of monopolar hook electrode in different angles, cutting and blood coagulation has certain advantages.

To sum up, monopolar hook electrode in the application of laparoscopy assisted descending colon cancer radical removal is safe, feasible and effective. It is clear in separating blood vessels and looking for developmental gaps to identify the anatomical level. Cutting membranous structures has

the obvious advantages, blood coagulation being one of them. The procedure is accurate, safe, makes it easy to perform in a narrow space, and reduces the frequency of use of expensive surgical instruments and results in reduction in the patient's treatment cost. However, the procedure will cause more smoke and the lack of the grasping function of the ultrasonic knife will, to some extent, influence the observation and grasp functionality in the surgical field, and thus impact the clinical experience. The skill of the assistant in positioning the mirror will be key to the effectiveness of the procedure.

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## Footnote

*Conflicts of Interest:* All authors have completed the ICMJE uniform disclosure form (available at <http://dx.doi.org/10.21037/tcr.2016.07.03>). The authors have no conflicts of interest to declare.

*Ethical Statement:* The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patient for publication of this manuscript and any accompanying images.

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