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ORIGINAL ARTICLE – COLORECTAL CANCER – MULTIMEDIA ARTICLE

Nerve-Guided Laparoscopic Total Mesorectal Excision for Distal Rectal Cancer

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ABSTRACT

Background. Urogenital dysfunctions are well-recognized problems after rectal cancer surgery and are often due to autonomic nerve damage. Although following holy planes during total mesorectal excision (TME) reduces the possibility of damage to the autonomic nerve fibers, these could still be affected in some critical areas.[1,2] To improve the quality of surgery and prevent nerve damage, accurate intraoperative anatomical orientation of autonomic nerve is essential.[3] Thanks to advancement of the high-definition laparoscopic technology, even the finest nerve fibers deep in the pelvic cavity can be identified through illumination and magnification.[4] We aim to present a surgical technique of using the autonomic nerves as landmarks to guide laparoscopic TME for distal rectal cancer, with the purpose of preventing autonomic nerve damage to the largest extent.

Methods. The video describes the technique of performing nerve-guided laparoscopic TME in a 50-year-old man with a rectal cancer (7 cm from anal verge). Preoperative staging by endorectal ultrasound and pelvic magnetic resonance imaging is stage I rectal cancer (cT2N0M0). Five trocars (two 12 mm and three 5 mm) are used. All procedures are performed with conventional laparoscopic instruments. The sigmoid colon is mobilized using a medial approach. The superior hypogastric plexus lies just posterior to the inferior mesenteric artery (IMA) are clearly identified and protected. Then the root of the IMA is ligated and cut. The left Toldt space is dissected, followed by complete mobilization of the sigmoid colon. The superior hypogastric plexus nerve fibers combine to a strong pair of hypogastric nerves as they enter the pelvic cavity, and can be clearly identified when the mesorectum is lifted. Then the mesorectum is separated from the hypogastric nerves by sliding down along the nerves. Dissection of the mesorectum is continued in the loose areolar plane along the midline down to the sacrococcygeal junction. Then the mesorectum is dissected laterally from posterior midline up to 9 o'clock on the left and to 3 o'clock on the right side. The splanchnic nerves can be identified as they swing from the sacrum and straight into the pelvic plexus. The peritoneum is dissected in an arc line about 0.5 cm above the line of rectovesical pouch. After the anterior side of the rectum is mobilized, the mesorectum is dissected along the seminal vesicles downward and sideward to the lateral margin. The neurovascular bundle of Walsh at the anterolateral side of the rectum is clearly identified and protected. The mobilization of the mesorectum ceases at the tendinous arch of levator ani. Then the rectum is only fixed to the pelvic side wall by its lateral ligaments, which are consisted by rectal branch of the inferior pelvic plexus and vessels. Thus care should be taken to cut only those rectal nerve fibers, leaving the inferior pelvic plexus intact. The mesorectum is divided 5 cm distal to the lesion with one firing of an endoscopic stapler. The specimen is extracted through a 3 cm transumbilical laparotomy. End-to-end anastomosis using a circular stapler is performed intra-abdominally.

Results. There were no intraoperative complications. The operating time was 160 min. Blood loss was 20 mL. The

The first two authors contributed equally to this article, and both should be considered first author.

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patient underwent an uneventful recovery and was discharged home on postoperative day 6. Final pathology was pT2N0M0. At 6-month follow-up, the patient had no urogenital dysfunctions.

Conclusions. Nerve-guided laparoscopic total mesorectal excision for distal rectal cancer is safe and feasible. This technique should be considered whenever possible as a means to prevent autonomic nerve damage and subsequent loss of urogenital function.

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