Natural orifice specimen extraction (NOSE) is widely used for early-stage and small cases of colorectal cancer (CRC) [1]. The long-term outcomes are not compromised when using the NOSE technique. Moreover, faster recovery and fewer postoperative complications make this technique preferable to mini-laparotomy [2]. According to the International Consensus on Natural Orifice Specimen Extraction Surgery (NOSES) for Colorectal Cancer [1], there are three methods for extracting the specimen through the rectum. The first method is the transanal specimen eversion and extraperitoneal resection technique, which is usually used for rectal cancer. The second method is the intra-abdominal specimen resection and transluminal extraction technique. This approach is universal for all locations of CRC, but it is technically difficult. The third method is the transluminal specimen extraction and extra-abdominal resection technique. All manipulations with specimen transection and anvil insertion are performed extracorporeally, making this method the easiest for sigmoid colon cancer from a technical standpoint. The main limitation of the method is the adequate length of the left colon for pull-through into the perineum. High ligation of the inferior mesenteric artery is one of the main tricks to achieve an adequate length of the left colon. At the same time, ischemia of the sigmoid colon is a common problem for this technique. Therefore, resection of the left colon should be extended until the level of adequate blood supply, necessitating splenic flexure mobilization for pull-through into the perineum. The video presents a step-by-step technique to achieve
sufficient length and prevent anastomotic leakage in the transluminal specimen extraction and extra-abdominal resection technique (Supplementary Video 1).

A lateral-to-medial approach is used for wide mobilization of the left colon. Skeletonization of the inferior mesenteric artery (IMA) starts from the origin for clear identification of the left colic artery (LCA). A high risk of sigmoid artery preservation instead of the LCA exists if skeletonization is performed without visualizing the IMA origin, which leads to a limited length of the left colon. The LCA should be preserved to achieve adequate blood supply to the sigmoid colon for anastomosis. The IMA is divided distally and close to the origin of the LCA. The inferior mesenteric vein is transected at the level of the LCA. High ligation of the inferior mesenteric vein does not elongate the left colon; this maneuver is mandatory only in cases when the splenic flexure is mobilized. The mesocolon is transected parallel to the LCA for additional length of the left colon. The distal resection margin is ligated, and a washout of the distal stump is performed to avoid intra-abdominal contamination and cancer cell spillage from the lumen. The wall of the bowel is transected using an energy device to avoid bleeding. A polyethylene sleeve is inserted to prevent contamination of the sigmoid colon, which will be used for anastomosis and to slide the colon during pull-through into the perineum. The clamp can be fixed on the thread, as well as the distal resection margin. During the extracorporeal step, the demarcation line or pulsation of the vasa recta of the colon may be visualized. If the blood supply is uncertain, cutting the vasa recta is helpful to clarify the adequacy of the blood supply. The anvil is inserted extracorporeally, and it is one of the easiest ways to install it. The distal stump of the bowel is closed using a purse-string suture, and crossing of the linear and circular staples lines is excluded. Anastomosis tightness is checked using a bubble test.

Preservation of the LCA with low ligation of inferior mesenteric vein enables achieving adequate length of the left colon for transluminal specimen extraction and extra-abdominal resection.

Ethics statement
The study was approved by the Institutional Review Board of Sechenov University (No. 12-21) and the national research committee. The procedure was performed in accordance with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards. The patient provided written informed consent for publication of her clinical information and video.

ARTICLE INFORMATION

Conflict of interest
No potential conflict of interest relevant to this article was reported.

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Supplementary materials
Supplementary Video 1. Tips and tricks for transluminal specimen extraction and extra-abdominal sigmoid colon resection. Supplementary materials are available from https://doi.org/10.3393/ac.2023.00689.0098.

REFERENCES