

## Abstract

**Study question:** What is the prevalence of laparoscopically nonvisualized palpable satellite bowel nodules at or near the planned stapler site in women undergoing segmental bowel resection for endometriosis?

**Summary answer:** Overall, 13 (25.5%) of 51 patients who underwent resection had nonvisualized palpable satellite lesions as small as 2 mm, including seven (14%) who had nonvisualized palpable lesions at or beyond the planned stapler site.

**What is known already:** Both laparoscopy and laparotomy for bowel resection are standard of care in Europe and the USA. Reoperation rates after laparoscopic bowel procedures are 1-16%. Endometriotic lesions at the stapler margin of bowel resections are associated with increased repeat surgery. Nodules of 0.1 mm to 1 cm in size were not recognized during laparoscopic bowel surgery but were recognized on histological examination. Up to 20 nodules not visualized at laparoscopy have been recognized and excised at laparotomy. Tenderness is found at up to 27 mm from a recognized lesion. The size of a lesion does not always predict its symptoms or behavior.

**Study design, size, duration:** This single-arm, observational study focused on the presence of nonvisualized palpable satellite lesions of the bowel. Fifty-one patients scheduled for laparoscopic-assisted bowel resection for deep infiltrating endometriosis with suprapubic incision for placement of the stapler's anvil and removal of the specimen in the course of routine clinical care were included. There were no additional inclusion or exclusion criteria.

**Participants/materials, setting, methods:** Laparoscopic-assisted segmental bowel resection for endometriosis was performed in a private referral center on women aged 24-49 years.

**Main results and the role of chance:** Forty-nine (96.1%) of the 51 patients underwent segmental resection of the sigmoid or rectum, and 14 (27.5%) underwent segmental resection of the ileum for large nodule(s) recognized on MRI. Twelve patients underwent both procedures. Eleven (22.4%) of the 49 patients with recognized sigmoid or rectal lesions and 5 (35.7%) of the 14 patients with recognized ileal lesions had nonvisualized, palpable, satellite lesions. All the large lesions and none of the satellite lesions had been recognized preoperatively on MRI. Five (10%) of 49 patients with lesions of the large bowel and 4 (28.6%) of the 14 patients with lesions of the ileum had nonvisualized palpable satellite lesions at or beyond the planned stapler site. Lesions as small as 2 mm were palpable.

**Limitations, reasons for caution:** This is an observational study. It is not known if the small lesions of this study contributed to the symptoms or were progressive, stable or regressive. This study analyzed lesions in the bowel segment proximal to the primary large bowel lesion, but not in the distal segment as that would have required a change in standard of care surgical technique. This study protocol did not include shaving or disk resection or patients in whom no lesions were visualized. The use of additional techniques for recognition, such as hand-assisted laparoscopy or rectal probes, was not investigated.

**Wider implications of the findings:** This study confirms that some nonvisualized satellite lesions as small as 2 mm are palpable and that an increased length of resection can be used to remove lesions recognized by palpation and to avoid lesions at and beyond the stapler site. This may decrease recurrent surgery in 1-16% of the women undergoing surgery for bowel endometriosis. Knowledge of the occurrence of these small lesions may also be particularly useful in plans for repeat surgery or for women

with clinically significant bowel symptoms and no visible lesions at laparoscopy. Moreover, small lesions are considered to be important as there is no current technique to determine whether a large primary lesion, smaller lesions, an associated adjacent tissue reaction or a combination of those cause symptoms.