

## Endoscopic submucosal dissection of multiple flat adenomas in the radiated rectum

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### Abstract

We report a case of multiple flat adenomas and cancer of the rectum that occurred 15 years after pelvic irradiation following surgery for uterine cancer. Adenoma borders were diagnosed accurately by magnifying chromoendoscopy, leading to their adequate excision using endoscopic submucosal dissection. This enabled minimal dissection of the irradiated pelvis that would have otherwise been difficult. Furthermore, our approach probably helped minimize loss of bowel function, thereby preserving the patient's quality of life as much as possible. Pathology of the resected specimens revealed thickened walls of the submucosal layer vessels, indicating chronic radiation proctitis. Pelvic irradiation of the bowel carries a high risk of causing flat adenomas and cancer. Close and long-term surveillance may be useful in such cases, using not only conventional colonoscopy but also chromoendoscopy with indigo carmine dye spray and magnifying endoscopy.

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**Key words:** Flat adenoma; Endoscopic submucosal dissection; Magnifying chromoendoscopy; Radiation proctitis; Pelvic irradiation

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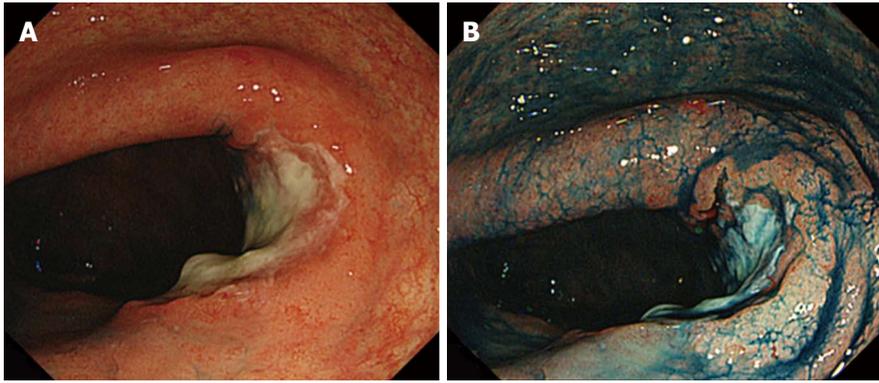
### INTRODUCTION

Pelvic irradiation is frequently used as a definitive or adjunctive treatment for pelvic malignancy, and development of cancer in this region is considered a late complication<sup>[1-4]</sup>. We recently experienced a case of multiple flat adenomas and cancer in the rectum that occurred 15 years after pelvic irradiation following surgery for uterine cancer. The borders of these adenomas could be accurately diagnosed by magnifying chromoendoscopy, leading to their adequate excision using endoscopic submucosal dissection (ESD). This enabled us to minimize the extent of surgical dissection in the irradiated pelvis when removing the remaining neoplasm.

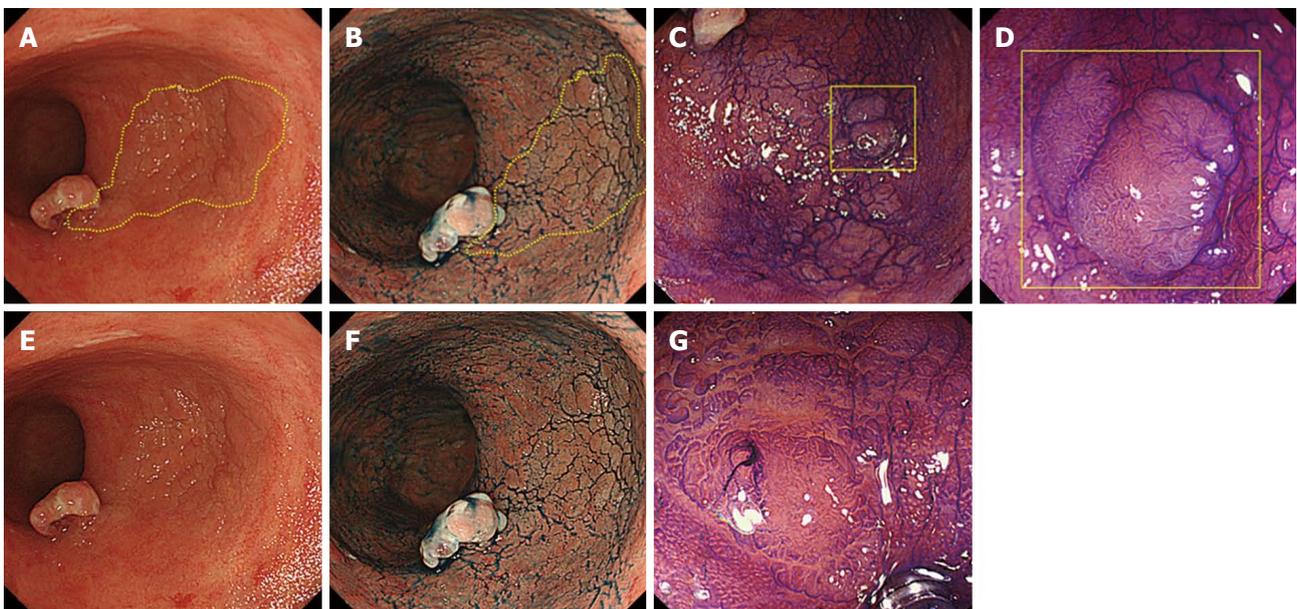
To our knowledge, there have been no similar reports of endoscopic resection of multiple flat adenomas in the irradiated rectum. The superficial neoplastic lesions were described according to the Paris endoscopic classification of superficial neoplastic lesions<sup>[5]</sup>.

### CASE REPORT

A 46-year-old woman presented with bloody stools in November 2010. She had undergone radical hysterectomy followed by pelvic irradiation (total 54 Gy) for uterine cancer 15 years earlier. There was no family history of colorectal cancer. On physical examination, her lower abdomen was slightly hard because of the surgical scar,



**Figure 1** An advanced neoplasm, 35 mm in size, in the rectum. A: Colonoscopy shows an ulcerative lesion in the rectum, the biopsy of which proved to be well differentiated adenocarcinoma; B: Chromoendoscopy with indigo carmine dye spray shows the lesion clearly.



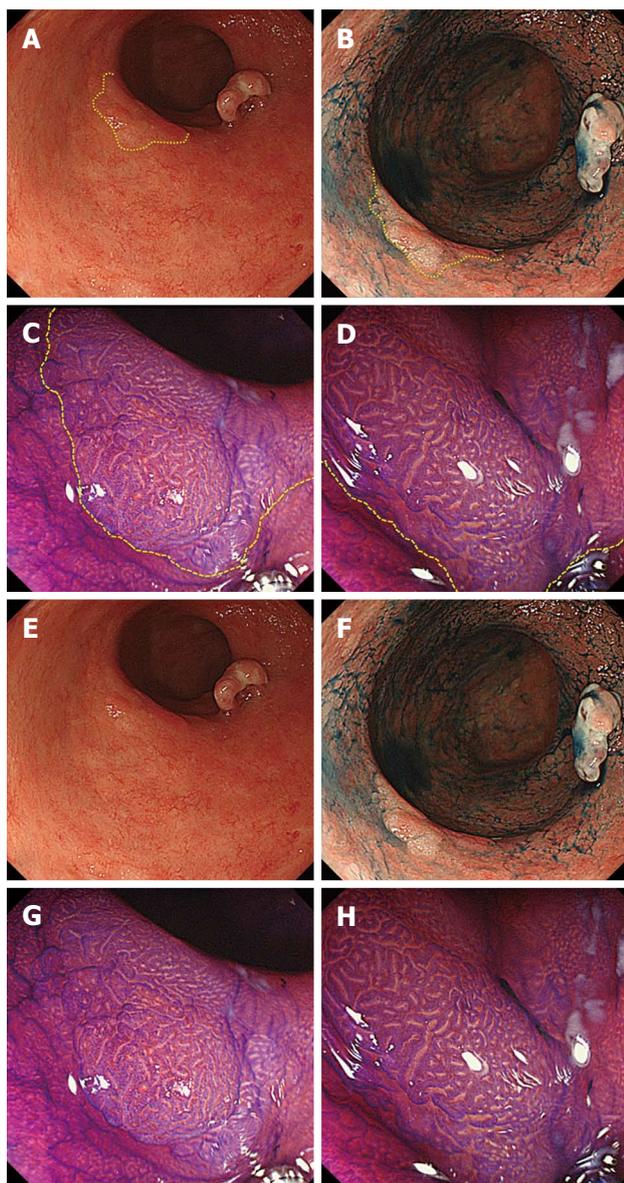
**Figure 2** A flat adenoma, 35 mm in size, in the anterior wall of the low rectum. A: The lesion was detected as a slight decline in vascular permeability on routine observation; B: Although we could highlight the irregular surface by spraying indigo carmine solution, it was difficult to trace the margin of the lesion; C, D: The surface structure of the lesion is composed mainly of IIIIL pits with partially mixed IV pits on magnifying endoscopy with crystal violet staining; E: Figure A showing lesion borders without the aid of yellow lines; F: Figure B showing lesion borders without the aid of yellow lines; G: Magnifying endoscopy with crystal violet staining effectively delineates the margin of the lesion.

bowel sound was normal, and superficial lymph nodes were not palpable. All other physical examinations were unremarkable. Laboratory studies, including complete blood cell counts, serum electrolytes, blood biochemistry, carcinoembryonic antigen, and CA19-9 were within normal limits.

Colonoscopy using a magnifying videoscope (CF H260-AZI high vision scope, Olympus, Tokyo, Japan) revealed five lesions: a 35-mm flat adenoma in the sigmoid colon, an advanced cancer, a 30-mm flat adenoma in the rectum (Figure 1), and two flat adenomas (35 mm and 10 mm) in the lower rectum. Although we could highlight the irregular surface by spraying indigo carmine solution, it was difficult to trace the lesion margin. On magnifying endoscopy with crystal violet staining, the surface structure

of the four lesions was found to be composed mainly of IIIIL and IV pits, which suggested adenomas. Magnifying chromoendoscopy helped to delineate the borders of these lesions distinctly (Figures 2, 3). ESD was performed for two rectal flat lesions, which minimized the extent of dissection in the subsequent anterior resection of the rectal cancer (pT3 N0 M0) in January 2011.

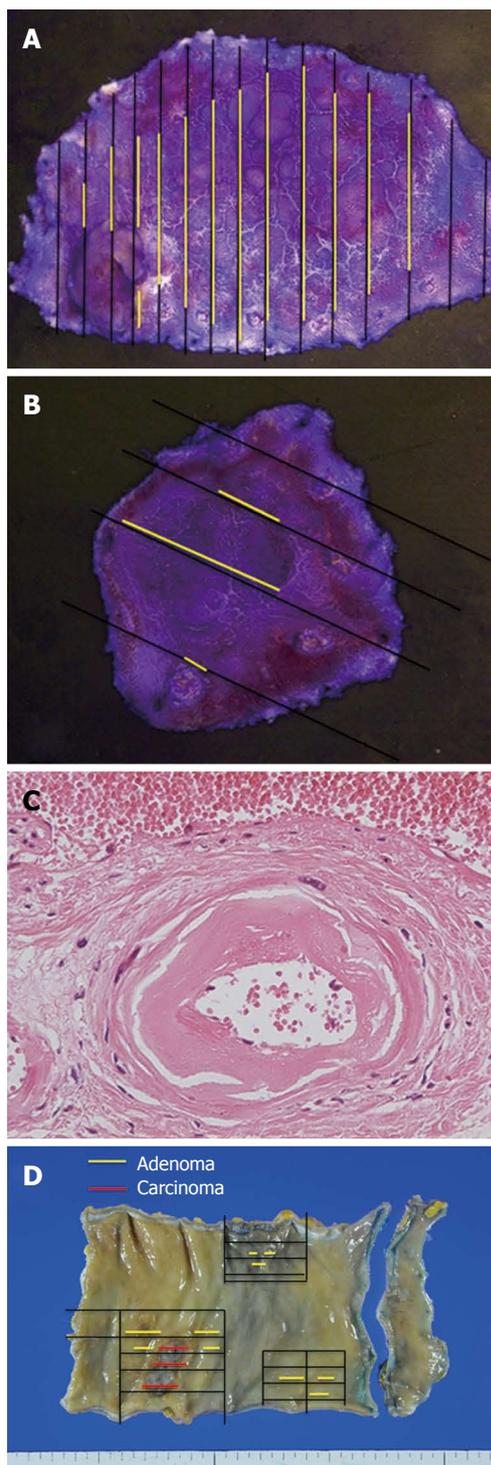
Pathological examination revealed the two flat lesions in the lower rectum to be tubular adenomas. The resected specimens measured 52 mm × 30 mm and 18 mm × 18 mm with sufficient margins (Figure 4A, B). In the resected rectum specimen, wall-thickening of the vessels in the submucosal and subserosal layers was evident (Figure 4C), indicating chronic radiation proctitis<sup>[6]</sup>. No recurrence was observed during follow-up.



**Figure 3** A slightly elevated adenoma, 10 mm in size, in the posterior wall of the low rectum. A: The lesion was detected with a slight decline in vascular permeability on routine observation; B: Although we could highlight the irregular surface by spraying indigo carmine solution, it was not possible to determine the area of the lesion; C: Regarding surface structure, the lesion is composed mainly of III L pits with partially mixed IV pits on magnifying endoscopy with crystal violet staining; D: Magnifying endoscopy with crystal violet staining effectively delineates the margin of the lesion; E: Figure A showing lesion borders without the aid of yellow lines; F: Figure B showing lesion borders without the aid of yellow lines; G: Figure C showing lesion borders without the aid of yellow lines; H: Figure D showing lesion borders without the aid of yellow lines.

## DISCUSSION

To our knowledge, no cases of endoscopic removal of flat adenomas arising in the radiated rectum have been reported. The current case is particularly interesting not only because the patient developed advanced rectal cancer 15 years after pelvic irradiation therapy, but also because she simultaneously developed multiple sizeable flat adenomas that would have been extremely difficult to diagnose on routine colonoscopy alone. In fact, magnifying



**Figure 4** Resected specimens. A: A complete one-piece resection of 52 mm × 30 mm in size with tumor-free margins was achieved; B: Complete one-piece resection with tumor-free margins 18 mm × 18 mm; C: Microscopy of the resected specimens revealed increased vessel wall thickness in the submucosal layer and the serous coat of the large intestine around the tumors, indicating chronic radiation proctitis; D: A well-differentiated adenocarcinoma, 35 mm × 18 mm, invading beyond the muscularis propriae (pT3). None of the 10 lymph nodes retrieved were involved (pN0). Moreover, adenomatous change, which endoscopic observation failed to detect, was found.

chromoendoscopy proved useful for accurate diagnosis, and led to adequate resection using ESD. Chromoendos-

copy with crystal violet is indeed time-consuming. However, magnifying chromoendoscopy enabled accurate diagnosis of the surface structure of the lesions. Narrow-band imaging (NBI) is a recent development designed to enhance standard endoscopy with superior delineation of mucosal surface capillaries. In the present case, we did not estimate these lesions by using NBI. However, the features of NBI suggest that it is more useful than conventional colonoscopy for evaluating flat adenomas. Pathology of the resected specimens revealed thickened vessel walls in the submucosal layer, indicating chronic radiation proctitis<sup>[6]</sup>.

We predicted that using endoscopic mucosal resection it would be difficult to achieve complete one-piece resection with tumor-free margins because adequate lifting of the lesions after submucosal injection was not obtained due to severe submucosal fibrosis after the previous radiation therapy. Therefore, we performed ESD for two flat adenomas in the lower rectum. By adequately removing the adenomas in the low rectum by ESD, we were able to minimize the extent of dissection of the irradiated pelvis which would have otherwise been difficult. Furthermore, it is likely that this approach helped minimize the loss of bowel function, thereby minimizing the impact on quality of life.

Flat adenomas are generally hard to detect on routine colonoscopy. Moreover, background radiation proctocolitis, resulting in flat lesions, makes accurate diagnosis more difficult. In fact, the pathology of the surgically resected specimen revealed a cancer-associated adeno-

matous component which endoscopic observation had failed to detect (Figure 4D). It is important to bear in mind that patients who have undergone pelvic irradiation may be at high risk of developing flat adenomas or neoplasms in the irradiated bowel<sup>[1-4]</sup>. Close and long-term surveillance using not only conventional colonoscopy but also chromoendoscopy with indigo carmine dye spray and magnifying endoscopy may therefore prove useful in such patients.

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