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Digestive Endoscopy (2009) 21(S1):S28–S30.

Endoscopic piecemeal resection is a practical option to cure colorectal tumors

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**EPMR is a practical option to cure colorectal tumors.**

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Running title: Significance of EPMR to cure colorectal tumors

Key words: EMR, EPMR, 2-channel method, circumferential mucosal incision

Footnote

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## **Abstract**

EMR and EPMR are therapeutic options widely accepted to cure colon adenoma, intramucosal cancer and minimally invasive submucosal cancer. Our retrospective investigation revealed that single EMR or EPMR with 2-channel procedure cured 913 (96.6%) of 945 flat & depressed tumors, verifying the significant role of certain procedures in the therapeutic strategy for colorectal neoplasm. Predicting the invasion depth and fibrotic change before resection are proposed to be necessary for improving complete resection rate of first EMR or EPMR. Hood, 2-channel method and the combination of EMR and circumferential mucosal incision are regarded to be practical procedures on EPMR.

## **Introduction**

Endoscopic mucosal resection (EMR) is a therapeutic procedure developed for curable removal of adenomas, intramucosal cancers, and minimally invasive submucosal cancer (less than 1000 micrometer of invasion depth, well and moderately differentiated type, no lymphovascular invasion). Furthermore, endoscopic piecemeal resection (EPMR) has been established to remove large tumor which was impossibility resected with en-bloc EMR. These endoscopic procedures widely accepted as therapeutic options for treating colorectal tumors. Whereas EPMR is relatively easy procedure with less complication, histological assessment with segmented specimens removed by EPMR possesses a potential risk for miss-diagnosis of lateral and horizontal margin.

Endoscopic submucosal dissection (ESD) has been developed to remove early gastric cancer in en-bloc and recently tried to be applied for colon tumor treatment. However, ESD is still special therapy for colorectal tumors because of the technical difficulty and high complication rate, particularly high perforation risk.

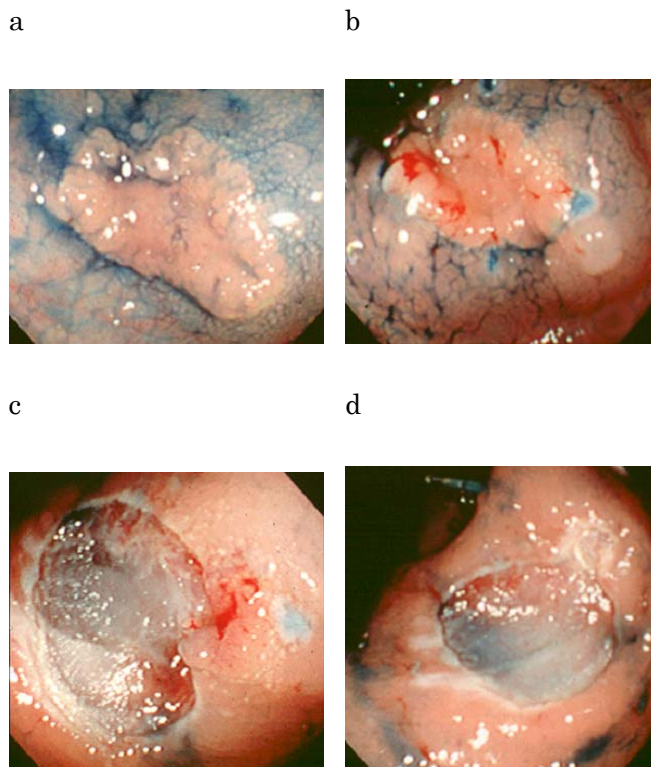
We here review the clinical course of colon tumors treated with EPMR in our institute and probably utilitarian procedures on EPMR.

### **1. Cases of colorectal tumors treated with EMR or EPMR**

### 1) A case of completely removed colon tumor with EPMR

This is a case of slightly elevated tumors of 2.5 cm in size and removed by EPMR with 2-channel method. After marking at the edge of the tumor, 2ml of saline containing less than 1% indigo carmine was injected under the lesions (Figure 1a, b). First piece including the center of the lesion was removed with first resection (Figure 1c), and then removed second piece and remained marking with 2-channel method (Figure 1d). No remnant tumor was detected with magnifying colonoscopy right after EPMR and follow-up examination for 5 years.

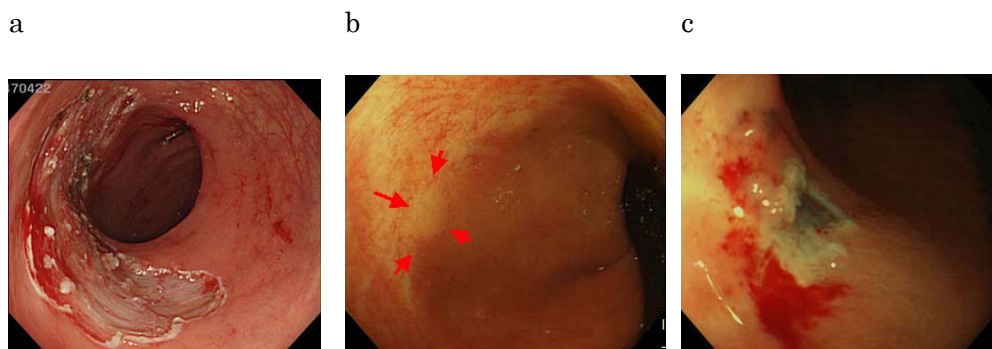
Figure 1



## 2) A case of rectal tumor incompletely removed by first EPMR

This is a case of rectal tumor of 3.5 cm in size, which was treated with EPMR (Figure 2a). Right after the first EPMR, no remnant tumors were seen around or inside of the ulceration. Seven months after the first EPMR, endoscopic examination revealed remnant tumor on the scar at the site of the first EPMR (Figure 2b). Second EMR completely removed the remnant tumor (Figure 2c). No remnant tumor has been identified by follow-up examination for 2 years after the second EMR in this case.

Figure 2



## 2. Result of EMR and EPMR for flat & depressed colon tumors

Clinical course of 945 colorectal tumors treated by simple EMR or EPMR with 2-channel method was retrospectively investigated<sup>1)</sup>. The data were collected referring to the medical records in Asahikawa Medical College and Asahikawa Kosei Hospital. As

the result of this investigation, 913 lesions (96.6%) were cured with first EMR or EPMR, illustrating the usefulness of EMR and EPMR on the therapeutic strategy for colon tumors. However, remnant tumors were found by follow-up examinations in 19 (20.0%) tumors. As additional treatment, repeated EMR or EPMR was required to cure for 11 lesions, ablation therapy for 6 lesions and surgical operation for 2 lesions. This implies many remnant tumors are supposed to be cured with additional endoscopic therapy. In the 2 cases which were required to undergo surgical operation, ESD might be a proper way for the complete resection and accurate histological assessment. Massive invasion and/or vessel permeation were found in 13 (1.4%) tumors due to the under diagnosis of invasion depth before EMR or EPMR. Surgical resection was required to cure these lesions and no remnant and metastatic lesions were detected with follow-up endoscopic and CT examinations. Consequently, 930 (98.4%) tumors which were diagnosed as intramucosal tumors or minimally invasive cancers before resection possibly cured with EMR or EPMR, suggesting the significance of EMR and EPMR on therapeutic strategy for early colorectal tumors.

### **3. Proposed indication and limitation of EPMR**

Our investigation of the cases treated with EMR or EPMR provided that certain

endoscopic therapies were extremely effective on colorectal tumor treatment when the indication of EMR or EPMR was appropriately determined. According to the guideline of Japanese Society for Cancer of the Colon and Rectum, intramucosal and minimally invasive cancer (less than 1000 micrometer of invasion depth) is potential lesion curable for endoscopic resection. Thus, invasion depth should be predicted before the decision of therapeutic strategy. We have proposed endoscopic and radiologic features of massively invasive cancer and highly diagnostic accuracy using these features<sup>2)3)</sup>. High-frequency ultrasound probe (HFUP) also contributes to improve the diagnostic accuracy for invasion depth of colorectal cancers<sup>4)</sup>. Lesions hardly predicted their invasion depth must be removed in en-bloc in order to obtain correct diagnosis of invasion depth on histological specimen. Accordingly, EPMR is not an adequate procedure for the treatment of such tumors.

Another restriction of EMR or EPMR is fibrotic change under the tumors. Whereas EPMR possibly remove large tumors, remnant lesions are occasionally detected by follow-up endoscopy in the cases of lateral spreading tumor (LST) with submucosal fibrosis which causes the incomplete resection by EMR or EPMR. ESD or surgical operation should be an adequate procedure for treating large LSTs in which sufficient elevation cannot be obtained by submucosal injection due to fibrotic change. Taken



together, curative EPMR is practically indicative for the lesions with no features of submucosal invasion and fibrotic change.

#### **4. Practical procedures on EPMR**

Transplant hoods attached on the tip of scope enable to keep the suitable view during EPMR, particularly when the lesions present behind the folds. This procedure improves the technique of endoscopic treatment as well as cecal intubation and polyp detection rate<sup>5)</sup>. However, excess length of hood sometimes disturbs endoscopic view due to the stagnation of the remnant stool or intestinal juice, leading to fail EPMR. It is important to select appropriate length of hood in each case.

2-channel method with various types of forceps is useful to remove flat & depression tumors on EPMR<sup>6)</sup>. Particularly, mini forceps enables to capture the remnant small piece of tumors with less damage by electric coagulation. Second channel can also be utilized for the washing and collection of small pieces of tumors.

The combination of EMR and circumferential mucosal incision is an option to remove large tumors in en-bloc. This might be an intermediate procedure between EMR and ESD. Whereas the complication rate of EMR with circumferential mucosal incision might be higher than that of EPMR, the advantages of en-bloc resection is potentially

significant. Further prospective studies should be needed to demonstrate the advantages of this procedure.

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## Figure legends

### Figure 1

(a) Slightly elevated tumors of 2.5 cm in size were shown on conventional colonoscopy with dye-spraying. (b) Marking technique was performed with snare electrocautery. (C) Almost all parts of lesion was removed by first resection. (d) Small remaining piece was resected by second resection.

### Figure 2

(a) No remaining tumors were detected inside or around the ulceration right after EPMR for rectal tumor of 3.5 cm in size. (b) Remnant tumor on the scar at the site of the first EPMR was revealed with endoscopic examination 7 months after EPMR. (c) Remnant tumor was completely removed with second EMR.