Miniprobe Endoscopic Ultrasonography Has Limitations in Determining the T Stage in Early Colorectal Cancer

Pei Chuan Tsung*, Jong Hyeok Park*, You Sun Kim*, Sun Young Kim*, Won Wo Park*, Hyun Tae Kim*, Jin Nam Kim*, Yun Kyung Kang†, and Jeong Seop Moon*

Departments of *Internal Medicine and †Pathology, Inje University Seoul Paik Hospital, Inje University College of Medicine, Seoul, Korea

Background/Aims: Miniprobe endoscopic ultrasonography (mEUS) is a useful diagnostic tool for accurate assessment of tumor invasion. The aim of this study was to estimate the accuracy of mEUS in patients with early colorectal cancer (ECC). Methods: Ninety lesions of ECC underwent mEUS for pre-treatment staging. We divided the lesions into either the mucosal group or the submucosal group according to the mEUS findings. The histological results of the specimens were compared with the mEUS findings. Results: The overall accuracy for assessing the depth of tumor invasion (T stage) was 84.4% (76/90). The accuracy of mEUS was significantly lower for submucosal lesions compared to mucosal lesions (p=0.003) and it was lower for large tumors (≥2 cm) (p=0.034). The odds ratios of large tumors and submucosal tumors affecting the accuracy of T staging were 3.46 (95% confidence interval [CI], 1.05 to 11.39) and 6.25 (95% CI, 1.85 to 25.14), respectively. When submucosal tumors were combined with large size, the odds ratio was 14.67 (95% CI, 1.46 to 146.96). Conclusions: The overall accuracy of T stage determination with mEUS was considerably high in patients with ECC; however, the accuracy decreased when tumor size was >2 cm or the tumor had invaded the submucosal layer. (Gut Liver 2013;7:163-168)

Key Words: Colorectal neoplasms; Endosonography

INTRODUCTION

Colorectal cancer is one of the most common malignancies worldwide. Current studies have shown that colorectal cancer is on the rise, especially in Africa and Asia, including Korea.1-3 One possible explanation for this current trend may be the increased use of colonoscopy. The early diagnosis of colorectal cancer is feasible and various treatment methods have been developed. Multiple treatment options are available to patients with early colorectal cancer (ECC), including radical or laparoscopic surgery, transanal endoscopic microsurgery, endoscopic mucosal resection (EMR), and endoscopic submucosal dissection (ESD).4 Endoscopic treatment for ECC is considered appropriate only when the invasion of the submucosal layer is <1,000 μm.5 Therefore, accurate assessment of tumor invasion (T stage) is essential when making therapeutic decisions regarding patients with ECC.

Endoscopic ultrasonography (EUS) is one of the most reliable assessment techniques in the preoperative assessment of T stage of gastrointestinal tract cancer. EUS is better than magnifying colonoscopy and is comparable to narrow-band imaging with magnification in determining tumor invasion of ECC.6-10 The pooled sensitivity and specificity in a meta-analysis of the use of EUS in determining T1 stage rectal cancer were 87.8% and 98.3%, respectively, and the accuracy of EUS for the T1 stage was lower than that for the advanced T stages (T3 or T4).11 However, maneuvering in the proximal part of the colon is difficult in conventional EUS.

The mini-probe EUS (mEUS) can be easily introduced through the biopsy channel of the endoscope and this technique has many benefits compared to conventional EUS.2 However, the accuracy of mEUS in identifying the T1 stage of colorectal cancer is variable, ranging from 67% to 100%.9,10,12 In addition, studies which focus solely on the accuracy of diagnosis of submucosal lesions are limited. Therefore, we investigated the performance of mEUS in T1 staging of mucosal and submucosal lesions. In addition, we estimated the factors that influence the accuracy in diagnosing the T1 stage of ECC.
MATERIALS AND METHODS

1. Materials

A mEUS was performed on 90 lesions in 86 patients with suspected T1 stage colorectal cancer at the Inje University Seoul Paik Hospital between March 2003 and June 2010. Among 86 patients, 82 had a single lesion and four patients had two lesions, making up a total of 90 lesions. The patients consisted of 62 men (72.1%) and 24 women (27.9%) with a mean age of 62.7 years (range, 35 to 85 years). The tumors were primarily located in the rectum (39/90, 43.3%) and sigmoid colon (30/90, 33.3%). Patients who were diagnosed with adenocarcinoma on histology were included in the study. The usefulness of mEUS in ECC treatment plans was investigated through a retrospective review of patients’ medical records. The Institutional Review Board of Inje University Seoul Paik Hospital approved this study.

2. Methods

1) mEUS technique

All examinations were conducted using a 20 MHz mini-probe with a diameter of 6F (Olympus UM-3R-3; Olympus, Tokyo, Japan). Two specialists performed the procedures and one specialist reviewed all the mEUS findings retrospectively. All patients underwent examinations in a conventional manner. Colonic preparation was performed with 2 to 4 L of hypertonic polyethylene glycol before the examination. A sedative agent was used (midazolam; 3 to 5 mg intravenously) when requested by the patient. After a lesion was diagnosed via colonoscopy

Fig. 1. Mini-probe endoscopic ultrasonography (EUS) and corresponding histopathologic findings. Mini-probe EUS (uT1m) (A) and histopathologic image (pT1m) (B) demonstrated that the tumor was confined to the mucosal layer (H&E stain, ×200). In contrast, mini-probe EUS (uT1sm) (C) and histopathologic image (pT1sm) (D) demonstrated that the tumor penetrated into the submucosal layer (H&E stain, ×200). m, mucosa; sm, submucosa.