Two Years’ Intensive Training in Endoscopic Diagnosis Facilitates Detection of Early Gastric Cancer

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Abstract

Objective Early detection of gastric cancer by screening endoscopy facilitates endoscopic treatment in place of open surgery. The aim of this study was to evaluate whether 2 years intensive training improved the detection rate of gastric cancer by screening endoscopy.

Methods An endoscopist who had trained for 6 years as a general physician, performed screening endoscopy at Imari Arita Kyoritsu Hospital before (group I) and after (group II) intensive training in the diagnosis of early gastric cancer in consecutive patients.

Results Background characteristics, including age (61.6 vs. 62.2 years) and sex, did not differ between the groups. Before training, 10 gastric neoplasms were detected in 937 patients in group I: four early gastric cancers, one gastric adenoma, and five advanced gastric cancer. After training, 36 gastric neoplasms were detected in 937 patients in group II: 18 early gastric cancers, 11 gastric adenoma, five advanced gastric cancer, and one each of gastric carcinoid and malignant lymphoma. The detection rate for early gastric cancer was significantly improved by training [group I: 4/937 (0.4%) vs. group II: 18/937 (1.9%)], although the detection rate for advanced gastric cancer did not differ before and after training. The proportion of early gastric cancer + adenoma to advanced cancer was higher in group II (5/5 vs. 29/5 in group I).

Conclusion Intensive training in upper gastrointestinal endoscopy screening dramatically improved the detection rate for early gastric cancer, although the detection rate for advanced gastric cancer was not affected.

Key words: gastric adenoma, endoscopy, endoscopic mucosal resection, endoscopic submucosal dissection


Introduction

It is widely accepted that prognosis of early gastric cancer is better than that of advanced gastric cancer (1, 2). Endoscopic treatment of gastric cancer, including endoscopic mucosal resection (EMR) and endoscopic submucosal dissection (ESD), has recently been developed in Japan and other countries, contributing improved quality of life for gastric cancer patients after curative treatment (3-6). It is essential for endoscopic treatment to detect gastric cancer in the early stage with screening endoscopy, which facilitates endoscopic treatment alleviating the need for open surgery.

Recent significant progress in endoscopy, including narrow band imaging, Fuji intelligent color enhancement, auto fluorescence imaging and infra-red imaging has improved endoscopic diagnosis but not the overall detection rate of early gastric cancer, because, in Japan, most early gastric cancer is detected by white light endoscopy. One previous study has indicated that the colon adenoma detection rate

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was significantly higher for experienced endoscopists than trainees (7), whereas other studies have shown that colon polyp detection rate was not correlated with the endoscopists’ experience (8, 9). To the best of our knowledge, there have been no studies that have investigated the relationship between the detection rate of early gastric cancer and experience of endoscopists. The aim of the present study was to compare the detection rate of early gastric cancer before and after 2 years intensive training for one endoscopist who was performing screening endoscopy in a single hospital.

### Patients and Methods

#### Patients

Screening endoscopy was performed by a single endoscopist (T.Y.) at Imari Arita Kyouritsu Hospital before (May 2004-April 2006, Group I) and after (April 2008-December 2009, Group II) Intensive Training in Diagnosis of Early Gastric Cancer.

#### Methods

The endoscopist (T.Y.) was intensively trained in endoscopic diagnosis of early gastric cancer at Saku Central Hospital for 1 year. The training at Saku Central Hospital included endoscopic diagnosis of early gastric cancer with white light and indigo carmine spreading, magnifying endoscopy, basic ESD technique, and basic histopathology of the gastrointestinal tract. The process of upper gastrointestinal endoscopy screening was as follows: i) washing the stomach with amount of dimethicone water and removing gastric mucus, being conscious of blind spots (upper third, posterior wall of middle third, lesser curvature of middle third) (11, 12); ii) trying to find places with slight color change on mucosa carefully with adjusting the endoscopic bending angle and volume of air to change from tangential view to direct view; iii) taking pictures with part of a picture overlapped with one or some of other pictures. About 70 pictures were needed for each endoscopic examination. The examination time was approximately 10 minutes. During first year, T.Y. observed around 200 gastric cancers with intensive checking up with 50 cases. In addition, white light screening endoscopy of 1,900 cases was performed during one year. At the Foundation for Detection of Early Gastric Carcinoma, diagnosis of gastric cancer included basic X-ray diagnosis of gastric lesions in addition to endoscopic diagnosis. During the training period, around 100 cases of gastric neoplasms including early gastric cancer, advanced gastric cancer, and malignant lymphoma were observed in detail.

### Data analysis

The clinical records, endoscopic images, endoscopic records, and biopsy reports were reviewed retrospectively for all subjects who underwent screening endoscopy at Imari Arita Kyouritsu Hospital. Statistical analysis was carried out using Student’s t test or χ² test. Differences were considered significant at p<0.05.

### Results

As indicated in Table 1, background characteristics of patients did not differ between groups I and II; age: 61.6±14.4 vs. 62.2±14.4 years; sex ratio (males/females): 507/430 vs. 485/452; upper gastrointestinal clinical symptoms (+/-): 331/606 vs. 328/609; history of endoscopic examination within 3 years (+/-): 449/488 vs. 437/500. Before intensive training in endoscopic diagnosis of early gastric cancer, 10 gastric neoplasms in 937 screening subjects in group I were detected: four early gastric cancers; one gastric adenoma; and five advanced gastric cancers (Table 2). The final diagnosis was confirmed in resected lesions after endoscopic or surgical resection. The number of neoplasms detected increased significantly after 2 years training to 36 (p<0.01): 18 early gastric cancers; 11 gastric adenomas; five advanced gastric cancers; one gastric carcinoid; and one gastric malignant lymphoma.

The detection rate in groups I and II is compared in Table 3. The detection rate of early gastric cancer in group II was 1.9% (18/937), which was significantly higher than that in group I (0.4%, 4/937, p<0.01). The detection rate for gastric adenoma was significantly different between the groups (group I: 0.1%, 1/937; group II: 1.2%, 11/937; p<0.01), indicating that training in endoscopic diagnosis of early gastric cancer improved the detection rate for gastric adenoma. In contrast to early gastric cancer and adenoma, the detec-
Table 2. Number of Neoplasms Detected before (May 2004-April 2006, Group I) and after (April 2008-December 2009, Group II) Intensive Training in Diagnosis of Early Gastric Cancer.

<table>
<thead>
<tr>
<th>Neoplasm</th>
<th>Group I (n=937)</th>
<th>Group II (n=937)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early gastric cancer</td>
<td>4</td>
<td>18</td>
</tr>
<tr>
<td>0-I</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>0-IIa</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>0-IIb</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0-IIc</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>0-III</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Gastric adenoma</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>Advanced gastric cancer</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Gastric carcinoid</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Gastric malignant lymphoma</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Total number of neoplasms</td>
<td>10</td>
<td>36</td>
</tr>
</tbody>
</table>

*a = P<0.01 compared to group I.

Table 3. Detection Rate for Early Gastric Cancer, Adenoma, and Advanced Gastric Cancer before (May 2004-April 2006, Group I) and after (April 2008-December 2009, Group II) Intensive Training in Diagnosis of Early Gastric Cancer.

<table>
<thead>
<tr>
<th>Neoplasm</th>
<th>Group I (%)</th>
<th>Group II (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early gastric cancers</td>
<td>0.4% (4/937)</td>
<td>1.9% (18/937)*</td>
</tr>
<tr>
<td>Adenomas</td>
<td>0.1% (1/937)</td>
<td>1.2% (11/937)*</td>
</tr>
<tr>
<td>Advanced gastric cancers</td>
<td>0.5% (5/937)</td>
<td>0.5% (5/937)</td>
</tr>
</tbody>
</table>

*a = P<0.01 compared to group I.

The present study suggested that experience, together with intensive training in upper gastrointestinal endoscopy, enhanced the detection rate for early gastric cancer, but not advanced gastric cancer, which might explain why early gastric cancer is frequently detected in countries, including Japan and Korea, with a high prevalence of gastric cancer and many experienced endoscopists (13-16). Intensive training in upper gastrointestinal endoscopy is more important than experience in screening endoscopy. The early gastric cancers generally reveal slight color changes, and the early gastric cancers are often present in the blind spots including the upper third, posterior wall of middle-third, and the lesser curvature of middle-third of the stomach (11, 12). The detection rate for gastric cancer in the present study was im-

Discussion

The detection rate for colon adenoma has been evaluated in several studies, with differing results. Some have indicated that detection was significantly higher for experienced endoscopists than trainees (7), and others have reported that colon polyp detection rate was not correlated with experience (8, 9). In contrast to the colon, a detection rate of the gastric neoplasm was not clearly compared in previous studies. Most experienced endoscopists agree that detection of gastric neoplasms, especially early gastric cancer, by screening endoscopy is more difficult than detection of colon polyps. The present study indicated that intensive training in the diagnosis of early gastric cancer improved the detection rate for gastric cancer by screening endoscopy with normal white light. As indicated in the Table 1, the detected early gastric cancer lesions in the group I were easy to be detected, because all of them had marked depression or bleeding. As indicated in the Table 2, lesions of cases 2a,b,i,j,l had marked elevation or depression, bleeding, so these 5 lesions of early gastric cancer were considered as being easy to detect. But the other 13 cases in Table 2 were referred as being not easy to detect, because the lesions of these 13 cases had only slight color changes or existed on the blind spot in upper third, posterior wall of middle third, and lesser curvature of middle third of the stomach (11, 12). Before the intensive training, lesions like those of the 13 lesions in Table 2 might be missed during upper gastrointestinal endoscopy screening. The present study indicated that intensive training in the diagnosis of early gastric cancer could improve the ability to detect early gastric cancer, especially finding lesions with only slight color changes and decreasing the blind spots during examinations. In addition, the endoscopic differential diagnosis between adenomas and 0-IIa gastric cancers is difficult as demonstrated in this study. An accurate differential diagnosis might require more endoscopic experience.

Endoscopic differential diagnosis between adenoma and 0-IIa gastric cancer was not easy. A case of gastric adenoma in group I was endoscopic diagnosed as non-neoplasm and was finally diagnosed adenoma with histological examination. In group 2, 11 gastric adenomas and 4 0-IIa gastric cancers were finally diagnosed with histological examination, and these cases were endoscopically diagnosed as 5 gastric adenomas, 8 0-IIa gastric cancer, and 2 non-neoplasms.

The adenomas in groups I and II were superficial elevated type, and these lesions were treated by EMR or ESD. As indicated in Table 2, the four early gastric cancers in group I were type 0-IIc, and the 18 early gastric cancers in group II were: 0-I, 2; 0-IIa, 4; and 0-IIc, 12. The endoscopic pictures of all the early gastric cancers detected are shown in Fig. 1a-d (group I) and Fig. 2a-r (group II). The cancer types were as follows: Fig. 1a-d, 0-IIc; Fig. 2a and b, 0-I; Fig. 2c-f, 0-IIa; Fig. 2g-r, 0-IIc. All four early gastric cancers in group I were curatively treated by surgery, and eight of those in group II were treated by ESD.
Figure 1. White light endoscopic features of four patients in group I with types 0-IIc tumors (May 2004-April 2006).

Figure 2. White light endoscopic features of 18 patients in group II (April 2008-December 2009). a and b: type 0-I; c-f: type 0-IIa; g-r: type 0-IIc.
proved for 0-IIc and elevated type neoplasms, including ade-
noma and 0-IIa gastric cancer, indicating that flat elevated
neoplasms are easily passed over in upper gastrointestinal
endoscopy screening with white light.

The present study had several limitations, including a his-
torical control group, a relatively small number of patients, a
2-year interval in the same cohort, tested one trainee, the
suitable period for intensive training, and the appropriate
method of intensive training.

In conclusion, our study suggested that detection of early
gastric cancer by screening endoscopy required intensive
training in endoscopic diagnosis, indicating that early gastric
cancer might be missed during upper gastrointestinal endo-
scopy screening by inexperienced endoscopists in Japan.

The authors state that they have no Conflict of Interest (COI).

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