Development of e-learning system for endoscopic diagnosis of gastric cancer: an international multicenter trial:
Global e-Endo Study Team (GEST)

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Kenshi Yao, MD, PhD
Head, Department of Endoscopy
Fukuoka University Chikushi Hospital, Japan

Team Japan

• Endoscopists
  – Kenshi Yao  Dept. of Endoscopy, Fukuoka University Chikushi Hospital, Fukuoka
  – Noriya Uedo  Dept. of Gastrointestinal Oncology, Osaka Medical Center for Cancer and Cardiovascular Diseases, Osaka
  – Manabu Muto  Dept. of Gastroenterology, Kyoto University, Kyoto

• Clinical epidemiologist
  – Hideki Ishikawa  Dept. of Molecular-Targeting Cancer Prevention, Kyoto Prefectural University of Medicine, Osaka

• Pathologists
  – Takashi Yao  Department of Pathology, Juntendo University, Tokyo
  – Akinori Iwashita  Dept. of Pathology, Fukuoka University Chikushi Hospital, Fukuoka
Background

• Gastric cancer is the second cause of cancer death in the world. Diagnosis of gastric cancer in its early stage is imperative in order to reduce the mortality.

• In Japan, the rate of early gastric cancer is more than 70%. On the other hand, in most of the countries with high incidence of gastric cancer, high detection rate of early gastric cancer has not been achieved.

• Many Japanese endoscopists had been invited to such countries to give lectures and hands-on seminars.

• However, quite a lot of time and efforts are needed to teach both standard and advanced endoscopy techniques because of the long distances and because of time differences among each counties.

Geographical distribution
-age-standardized incidence rate- Globoscan, IARC

Male

<table>
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<th>Country</th>
<th>Rate</th>
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<td>Japan</td>
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Female

<table>
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<tr>
<td>China</td>
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<td>Singapore</td>
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<td>Sweden</td>
<td>4.4</td>
</tr>
<tr>
<td>USA</td>
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</table>
Dr. Noriya Uedo, Osaka

Prof. Manabu Muto, Kyoto
IV University Certification in NBI and Advanced Optical Endoscopy, June 10-12, 2010, Bogota, Colombia

VI International Gastrointestinal Therapeutic Endoscopy Course, Santiago, Chile, March 24-25, 2011
Geographical distribution
-age-standardized incidence rate- Globoscan, IARC

Male

Female

To South America, it takes 32 hours from Fukuoka Airport by 3 flights. Time difference is 13 hours.

Background and aims

- I myself developed the most advanced technique for making a correct diagnosis of small and flat gastric cancer which mimics gastritis. I was frequently invited to give lectures and to give hands-on demonstration in other countries. Nevertheless, experiences are quite limited to small number of people who attended the lectures/the demonstration seminars.

- In addition, we realized that in such countries the advanced imaging such as chromoendoscopy or magnifying endoscopy with NBI have not been applied in clinical practice, because the early detection has not been achieved using standard endoscopy white light.
Hypothesis

• For the detection of early gastric cancer, we need to learn (1) technique, (2) knowledge and (3) experience.

• If Endoscopists are short of above subjects, if we give uniform learning system, we may improve their early cancer detection rate.

Background and aims

• Accordingly, we have developed standardized learning system which can be commonly applied to international countries and which is focusing on detection by standard endoscopy.

• The target endoscopist are non-experts who are not familiar with (1) technique, (2) knowledge, and (3) experiences.

• The aim of this study is to test the usefulness of the e-learning system among different countries.
Aims

1. Firstly, to investigate the usefulness of e-learning system for detecting early gastric cancer: E-study

2. Secondary, to investigate the changes in clinical practice after the e-learning and after giving hands-on seminar on site: C-study

Design

• Setting: an international randomized controlled multicenter study

• Intervention: e-learning system on the Internet
Pre-investigation before the study (Background & Historical control)

- Questionnaire sheets: Facility and each participant endoscopists

- Retrospective data of participating facility should be collected.
  - Number of newly detected early gastric cancer/year
  - Number of newly detected advanced gastric cancer/year
  - Number of upper EGD/year
  - Number of endoscopists who performed endoscopy
  - Whether or not the endoscopist are employing the uniform systematic screening protocol for the stomach.

Screening the participant endoscopists

- For application by candidate, approval is made depending upon how the candidate reply to questionnaires precisely and quickly.
Outline of the study

Pre-learning period

Historical control (Questionnaire sheets) → Pre-test → Randomize endoscopists → E-learning (+) / E-learning (-) → Post-test → E-learning (+)

Post-learning period

Option

Follow-up: One year after

E-study:
Primary endpoint = change in scores after e-learning

C-Study:
Primary endpoint = changes in number of newly detected EGCs after e-learning
E-study

We would like to invite all the endoscopists who is keen on this e-learning from all over the world because the purpose of the study is to test the usefulness of e-learning system.

Outline of the study: E-study

E-study:
Primary endpoint = change in scores after e-learning.
Primary endpoint

1. Changes in scores of pre-test and post-test after e-learning

C-study

The participants may be limited to the endoscopists who are working in the area where the gastric cancers are common.
Outline of the study: E-study

E-study:
Primary endpoint = change in scores after e-learning

Outline of the study

Historical control (Questionnaire sheets)

Pre-learning period

E-study
Primary endpoint = change in scores after e-learning

Post-learning period

C-Study
Primary endpoint = changes in number of newly detected EGCs after e-learning

Follow-up: One year after
Primary endpoint

1. Number of newly detected early gastric cancers (EGC)* per number of EGD by each endoscopist in pre vs. post periods (1 year) of e-learning

*The pathological diagnosis focusing on early gastric cancer will be made by central review of a single Japanese gastrointestinal pathologist. Therefore, participants should send the histological photos or slides of the resected specimens of early gastric cancer.

Outline of the study

Historical control (Questionnaire sheets)

Pre-learning period

Pre-test

Randomize endoscopists

E-learning (+)  E-learning (-)

Post-test  Post-test

E-learning (+)

Option

Follow-up: One year after

E-study
Primary endpoint = change in scores after e-learning

Post-learning period

C-Study
Primary endpoint = changes in number of newly detected EGCs after e-learning
E-study

- We will begin with e-study.

- And then, we will invite endoscopists to c-study after completing e-study.

Sample test

- Before the pre-test, we will send ID, password to each participant and we will check whether the test will work on each computer using the sample test.
Pre-/post-test

- A series of approximately 20 photos of a case with or without EGC, which had been recorded and stored in Japan, will be shown consecutively on the web browser (Internet Explorer, etc).
  - Participant endoscopists will click the button whether each photo shows a localized lesion.
  - If a localized lesion is present, click the right part on the endoscopic image.
  - When the part is pointed out, click the button whether the diagnosis is cancer or not.

- The test contains approximately 40 cases.

An example

https://gest.medicalstream.net/uegw4/
Fukuoka University Advanced Endoscopy E-learning system:
Step 1, Detection

ID ........
Password ........

https://gest.medicalstream.net/uegw3/

Welcome to "an international multicenter trial: global endo study team (GEST)".

Brief instructions for e-test of detecting early gastric cancer
1. A series of endoscopic images of one patient were shown one after the other. You can change the size of images using the button on the right side of the image according to the resolution of your monitor.
   i. First, please click the button whether or not a localized lesion is present.
   ii. Second, when you click the button of "present", please click the center of the lesion on the endoscopic image.
   iii. Third, please click whether or not the lesion is cancer.
2. You have only 5 minutes for one patient.
3. During 5 minutes, you can go backward or forward as you like.
4. At the last slide of each case, you can review the summary of your answers.
5. After completing one case, you may take a break by clicking the break button.

If you are ready, please click the button "OK".
AI: A localized lesion is

- Present
- Absent

Please click 'Forward'.
Time left: Time over  Case: 1/40  Image: 5/19

Q1: A localized lesion is

Present  Absent

Please click "Forward".
Q1: A localized lesion is

Choose "Present" or "Absent".

Time left: Time over Case: 1/40 Image: 7/19

Please click "Forward".
A1: A localized lesion is
Present  Absent

A2: Lesion on this image is

Q3: The diagnosis is
Cancer  Noncancer

A4: Another lesion is...
Present  Absent

Please click 'Forward'.
Q1: A localized lesion is

Present  Absent

Q2: Please click the center of the lesion on this image.
A1: A localized lesion is
| Present | Absent |
---|---|

A2: Lesion on this image is
| Present | Absent |

A3: The diagnosis is
| Cancer | Nocancer |

A4: Another lesion is...
| Present | Absent |

Please click "Forward".
Q1: A localized lesion is
Present  Absent

Q2: Please click the center of the lesion on this image.
Time left: Time over  Case: 1/40  Image: 12/19

A1: A localized lesion is
Present  Absent

A2: Lesion on this image is

A3: The diagnosis is
Cancer  Noncancer

A4: Another lesion is...
Present  Absent

Please click "Forward".

Time left: Time over  Case: 1/40  Image: 19/19

A1: A localized lesion is

Present  Absent

Please click "Forward".
### Summary of your answers

If you are sure, please click the OK. If not, please click the Backward. And try it again.

Once you click this button, you can't go back to the previous images.

- **Number of image**: Localized lesion is.
- **The center of the lesion**
- **Diagnosis**

<table>
<thead>
<tr>
<th>Number of image</th>
<th>Localized lesion is</th>
<th>The center of the lesion</th>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Absent</td>
<td></td>
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<tr>
<td>2</td>
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<td>Absent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Present</td>
<td>Clicked (2)</td>
<td>Cancer</td>
</tr>
<tr>
<td>11</td>
<td>Present</td>
<td>Clicked (23)</td>
<td>Cancer</td>
</tr>
<tr>
<td>12</td>
<td>Present</td>
<td>Clicked (65)</td>
<td>Cancer</td>
</tr>
<tr>
<td>13</td>
<td>Absent</td>
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</tr>
<tr>
<td>19</td>
<td>Absent</td>
<td></td>
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</tr>
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### Time left : Time over

**Case: 1/40**

If you are ready to move on to the next case, please click

**OK**

If you would like to take a break, please click

**Break**

When you click this "Break" button, you would log out automatically. Then, you should log in again and you will be able to start the test from the next case.

There is 4 day(s) 20:16:02 left before the deadline.
Have a good break.

If you are ready to move on to the next case, please click Next.
We are going to show about 20 images for one case

Announcement

• I would like to ask to organize the Taiwanese team.

• Please send an e-mail to yao@fukuoka-u.ac.jp if you would like to organize a team
Load map

Outline of the study

Pre-learning period:
- Historical control (Questionnaire sheets)
- E-learning (+)
- E-learning (-)
- E-learning (+)
- Post-test
- Randomize endoscopists

E-study
Primary endpoint = change in scores after e-learning

Post-learning period:
- C-Study
  Primary endpoint = changes in number of newly detected EGCs after e-learning
- Follow-up: One year after
**Load map**

- **2012**
  - October-November: engineering
  - October: the 4th international meeting during UEGW Amsterdam, the Netherlands, kick off!
  - November: test the system for Japanese endoscopists
  - December: improve the system according to the result of the above test. Fix the participants and deliver ID & password

- **2013**
  - January: pre-test 1 week,
  - January: randomize endoscopists
  - February: e-learning period
  - February: post-test 1 week
  - March: e-learning period for the other group of the endoscopists

**Authorship (E-study)**

- Japanese faculty members have the top 4 authorship

- One representative person (a team leader) from each team has a right authorship.

- The order of the authors depends upon the number of endoscopists in well-organized team, who have completed the trial intensively and accurately.
Current situation

International team

• Europe
  – Bulgaria
  – England
  – Germany
  – Greece
  – Holland
  – Italy
  – Poland
  – Portugal
  – Serbia
• Russia
• Australia

• Asia
  – Burnei
  – China
  – India
  – Turkey
  – Pakistan
  – Singapore
  – Thai
  – Malaysia
  – Korea
  – Taiwan
  – Philippines

• Central & South America
  – Argentina
  – Bolivia
  – Brazil
  – Chile
  – Colombia
  – Costa Rica
  – Mexico
  – Peru
  – Uruguay
International team

- Number of countries: 32
- Number of teams: 39
- Registered endoscopists: 91

Announcement

- If you are keen on participating this study, please send an e-mail to
  - Ms. Aska Mizushima (mizushima-asu@medicalrs.com)
  - Dr. Kenshi Yao (yao@fukuoka-u.ac.jp)
In conclusion,  

Geographical distribution  
-age-standardized incidence rate- Globoscan, IARC  

Let’s scope the world!  

mizushima-asu@medical-rs.com  
yao@fukuoka-u.ac.jp