Emergency Upper Gastrointestinal Endoscopy in the Emergency Room of Tokai University Hospital

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The Tokai University Hospital is the only tertiary emergency hospital in the western region of Kanagawa prefecture and treats many patients; for example, more than 7,000 cases (including 297 helicopter-transfer cases) were transferred to the Emergency Room (ER) of the hospital in 2008. In cases where an emergency endoscopy is necessary, such as suspected upper gastrointestinal (UGI) tract bleeding, the gastroenterologists and the ER staff collaborate on patient care, diagnosis and treatment. The purpose of this study was to summarize such cases in the hospital and to elucidate the possible problems that such collaboration may cause, by means of a questionnaire completed by both the gastroenterology and the ER staff. There were 366 emergency upper GI endoscopies performed in the ER from April 2007 to October 2009, which included 163 hemostasis, 8 foreign body retrievals and 195 observation-only cases. After arrival of the patients, first the ER staff took care of them, then the gastroenterologist was called and both collaborated on the procedures to be implemented. The questionnaires revealed that, generally speaking, the collaboration worked well, but there were several problems that needed to be solved including maintenance, equipment supply and assistance of therapeutic endoscopy.

Key words: emergency endoscopy, upper gastrointestinal bleeding, emergency room

INTRODUCTION

The Tokai University Hospital is located in Isehara city and is the only tertiary emergency hospital in the western region of Kanagawa prefecture. It accepts many emergency patients to its Emergency Room (ER), which is open 24-hours a day. During 2008, more than 7,000 emergency patients were transferred to the ER of this hospital by the public emergency services in the area, including 297 helicopter-ambulance transfers. The emergency patients were taken care of by the staff of the ER, which includes both doctors and nursing staff, who at the same time collaborated with various specialists in the different divisions depending on the nature of the disorder. In cases where an emergency endoscopy was necessary [1], for example because of suspected bleeding of the upper gastrointestinal tract (UGI) bleeding, the gastroenterologists were called and carried out an UGI endoscopy in the ER with the ER staff. For the most part, the system seemed working well, but might have some problems, as some doctors complained from time to time about the ER emergency endoscopy facilities. The purpose of this study were to summarize and evaluate such cases in the hospital, to elucidate possible problems by means of a questionnaire to both the gastroenterology and ER staff, and to publish a sample of the present state of ER emergency endoscopy in a tertiary emergency medical care setting that has adopted an ER system.

PATIENTS AND METHODS

By means of the computing system in the hospital, the medical records of those patients who received emergency UGI endoscopy on the day of arrival at ER, or on the following day, were extracted. The medical records were screened further and only those patients who underwent an emergency endoscopy in the ER immediately after arrival were used for this study. The cases were classified to three subgroups: observation-only, hemostasis performed and foreign body retrieval cases.

Before compiling the questionnaire, the primary author (MM) of this paper interviewed some of the ER and gastroenterology staff on the possible problems in with the ER emergency endoscopy and the information obtained in these pre-interviews was used to prepare the list of questions. An English translation of the questionnaire is shown in fig. 1a–f, and included 5 specific questions and 1 overall evaluation of the current ER endoscopic system. The questionnaires were distributed to both the gastroenterology and ER staff. The results were compared among the three groups by Mann-Whitney's test and p-value under 0.05 was recognized as statistically significant.

This study was approved by the ethics committee of the hospital (No. 09R-178).

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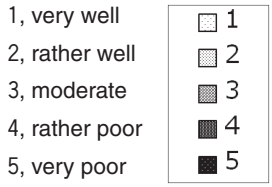
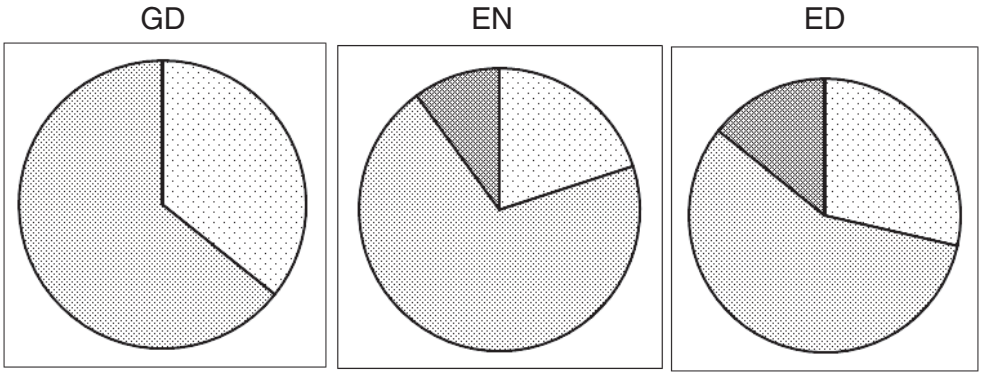
Fig. 1 Summary of the questionnaire
Six questions and a summary of the answers are depicted in the figures. The first column of each question is from the gastroenterology doctors (GD), the second is from the ER nursing staff (EN) and third from ER doctors (ED). Legends to the graphs are given at the top of Figure 1a. The asterisk between the GD and ED in the question 6 indicates $p < 0.05$ in the statistical analysis.

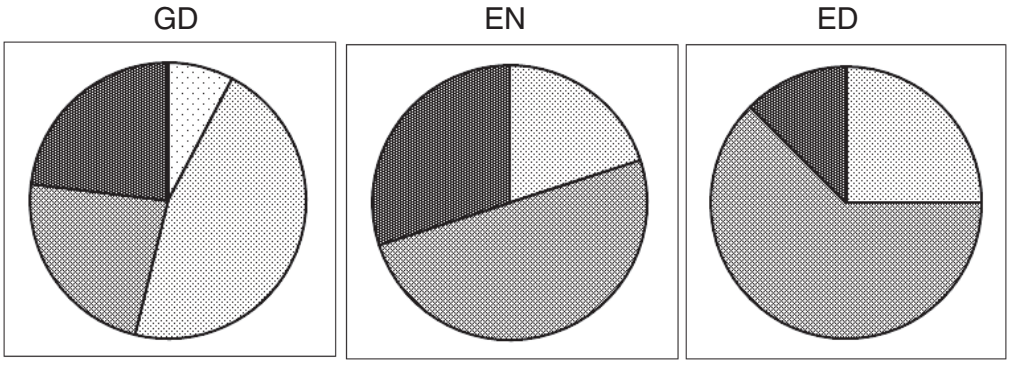
Please evaluate each point using a scale from 1 to 5 as follows:



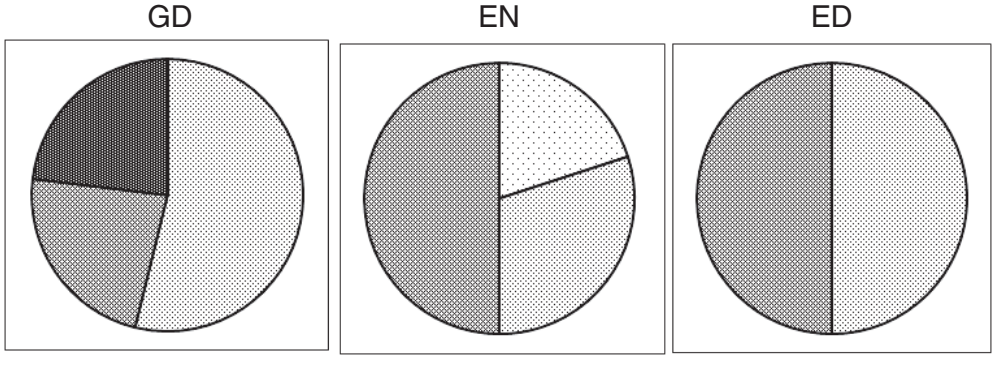
a 1) How do you rate the success of the sharing of roles between first-step care by ER staff and the endoscopy performed afterwards by gastroenterology staff?



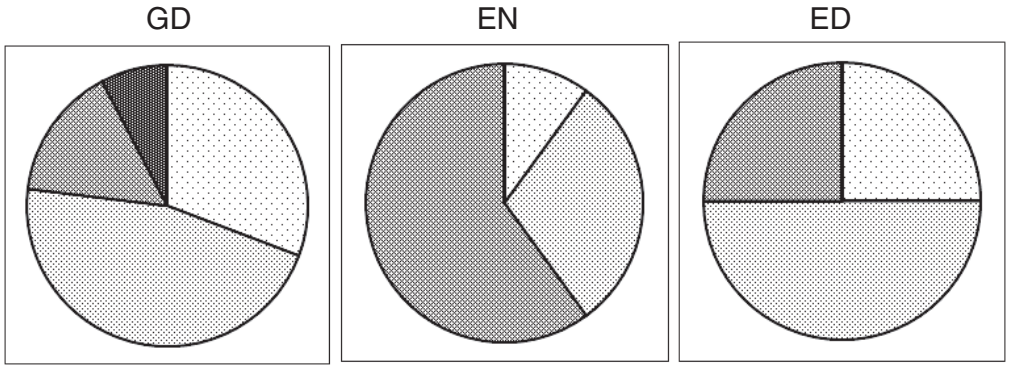
b 2) Is there enough hardware and equipment in the ER and what are your views on its maintenance and the ordering of supplies?



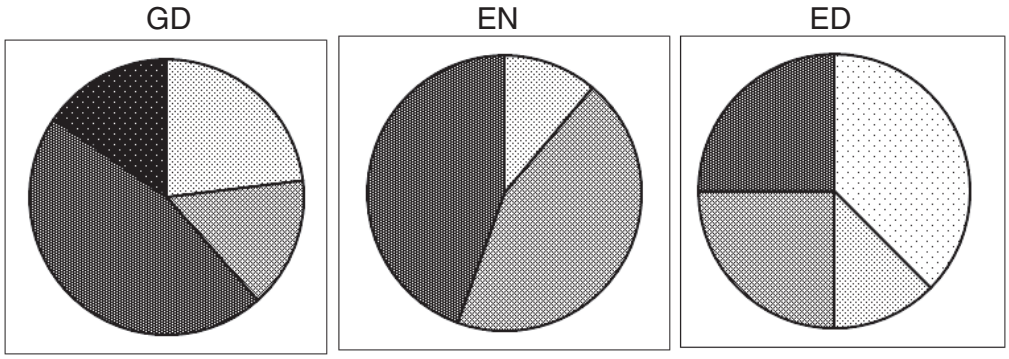
c 3) What are your views on the operator and assistant? If the operator is a resident, a senior doctor does the back-up; in case of a therapeutic endoscopy by a single member of the gastroenterology staff, the ER staff are asked to help.



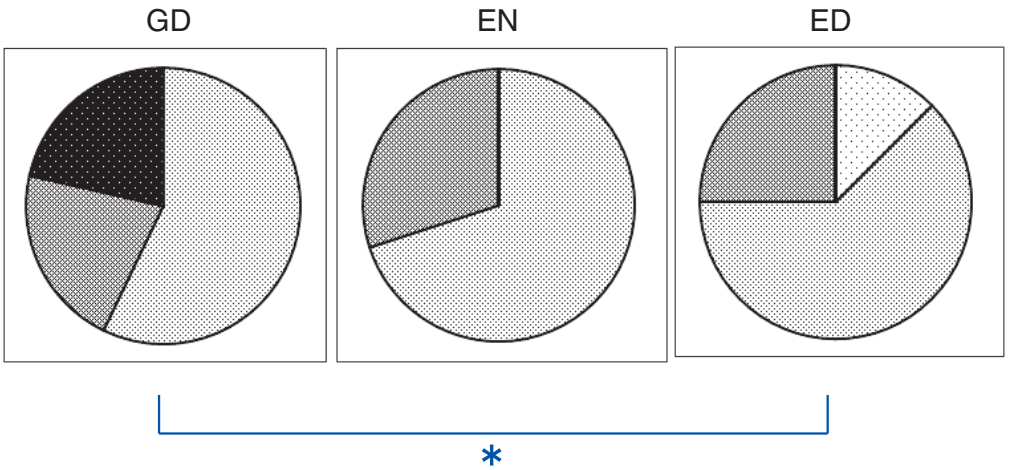
d 4) What are your views on the general control of the patient's condition during the procedure? At present, this is carried out by the ER staff.



e 5) What are your views on the washing of the scope after the procedure and its subsequent return to the storage cabinet? At present, the gastroenterology staff wash the scope and the ER nursing staff return it to the cabinet.



f 6) What is your overall assessment of the present ER emergency endoscopy system?



RESULTS

The procedures whereby the patients are taken care of and the emergency endoscopy is performed in the ER are as follows. After the priority call from the domestic emergency services, information is transmitted from the service to the ER staff as well as to the gastroenterology department in situations where an emergency endoscopy might be needed, such as suspected UGI bleeding and foreign body ingestion. After the patient's arrival at the ER, they are taken care of firstly by ER staff, which includes taking down the patient's history, checking vital signs, carrying out blood tests, starting intravenous drip infusion, and preparing for blood transfusion and tracheal intubation if necessary. After these first-steps in the patient's care, the gastro-

Table 1 Hardware and equipment for emergency endoscopy in the ER

1) A video endoscope system (EVIS-LUCERA series B set, Olympus, Tokyo, Japan)

2) 3 Video endoscopes (2 of GIF-XQ260 and GIF-Q260J, Olympus, Tokyo, Japan)

3) An endoscope washing machine (OED-2, Olympus, Tokyo, Japan)

4) Hemoclip tools EZ-clip system and 3 different types of clips (long, short and super- short), (HX-110LR, HX-110LR, HX-610-090L and HX-610-135XS, Olympus, Tokyo, Japan)

5) Disposable injection needles (NM-201L-0423, Olympus, Tokyo, Japan)

6) Endoscopic ligation devices and overtubes (MD-48709 and MD-48518, Sumitomo Bakelite, Tokyo, Japan)

7) Attachments to an endoscope tip (D-201-10704 and -11804, D-206-03 and -05, and MH-462 and 463, Olympus, Tokyo, Japan)

8) Forceps, normal and grasping types (FG-42L-1, FG-47L-1 and FB-25K-1, Olympus, Tokyo, Japan)

9) Drugs for hemostasis injection
10% NaCl, epinephrine, ethanol, polydocanol, ethanolamine oleate, 40% glucose, cyanoacrylate

Table 2 Emergency UGI endoscopy during the study period

Hemostasis	163	(44.5%)
Peptic ulcer	121	
Malignancies	16	
Mallory-Weiss syndrome	11	
Varices	5	
Others	10	
Foreign body retrieval	8	(2.2%)
Observation only	195	(53.3%)
Total	366	(100%)

enterology staff is called and the emergency GI endoscopy is performed by gastroenterology staff, while the ER staff continuously monitor the patient's condition and intervene when needed. When the endoscopy assistant is needed, for example due to a need for haemostatic control and foreign body retrieval, then ER doctors will assist, although occasionally this role will be fulfilled by the ER nursing staff. Preparation of the emergency endoscopy including the scope and machine set-up, drugs and equipment is mostly done by the gastroenterology staff. However, while washing the scopes is a task performed by the gastroenterology staff, alcohol flush and returning the scopes to the storage cabinet are the task of ER nursing staff. Other than the scope, both staffs cooperate in the clearing away. After the procedures, the patients are admitted to the appropriate hospital department, which is gastroenterology in most cases.

With regard to the hardware and equipment needed for emergency UGI endoscopy, most are kept in the ER, including an endoscopy system, scopes with or without a jet washing system, a scope washing machine, injection needles, endoscopic hemostasis clips, drugs for hemostasis injection, *etc.* as listed in Table 1. Young staff in gastroenterology (TN, YA, YT, MF and TU in the authors) are responsible for the maintenance of the equipment needed for the procedures and are charged with requesting the ER nursing staff to reorder when shortages of the various pieces of equipment become apparent. In the case of the malfunction of any hardware, it is the responsibility of the ER nursing staff to organize the repairs.

During the 18 month investigation period, 366 cases of emergency UGI endoscopy were performed in the ER, consisting of 163 hemostasis, 8 foreign body retrievals and 195 observation-only cases. The 163 hemostasis cases were subdivided to 5 groups: peptic ulcer, malignancy, Mallory-Weiss syndrome, varices in UGI and others as shown in Table 2. During the period, all but one of the patients were either admitted to the hospital or discharged from hospital to home after the procedures. The exception was the death of one patient in the ER because of the penetration of the thoracic aorta and the esophagus by an invasive malignant lymphoma.

The questionnaires were completed by 14 of 16 gastroenterology staff, 10 of about 50 ER nursing staff and 8 of 15 ER doctors. The low completion rate

of ER nursing staff seems to be due to the rotation system of the staff, in which most of the staff are arranged in intensive and high care units, while only a few staff at a time works in the ER in rotation. The results are summarized in Figures 1a–f. For the most part all 3 groups responded positively to questions 1 and 4, which means that role sharing between ER and gastroenterology staff worked well with respect to both patient primary care after arrival at the ER and the emergency endoscopy performance itself. The answers to question 3, however, suggested that while some gastroenterology staff, the operator side, thought there were procedural-related problems, the ER staff, the assistant side, did not have any concerns in this area. As for maintenance and equipment supply, some of the staff in all 3 groups thought there were some problems (question 2). Finally, the responses to question 5, returning the washed scopes to the original storage place, were quite different in the three groups; ER doctors thought it worked well, while gastroenterology staff did not and the views of the ER nursing staff fell between the other two. The same tendency was observed in the overall evaluation (question 6). As for the statistic analysis, only the difference between the gastroenterology and ER doctors in question 6 was statistically significant.

DISCUSSION

According to the emergency endoscopy guidelines [1] published by Japanese Society of Gastroenterological Endoscopy, there are 5 indications for UGI emergency endoscopy: hematoemesis and/or tarry stools, foreign body ingestion, gastric anisakiasis, perforation by peptic ulcer with potential need for emergency surgery and acute onset of abdominal pain. There has been no national survey of emergency endoscopy performed in Japan, but there is only one report on it written in English; Fujishiro *et al*. reported that there were 325 hemostasis cases of peptic and artificial ulcer bleeding in a year, 2008, in 9 high-volume hospitals [2]. According to the guideline, the first of these indications usually accounts for 80 to 90% of the UGI emergency endoscopy [1]. In our case, there were 366 cases of emergency endoscopy including 163 hemostasis cases in 1.5 years only in the ER, which is obviously higher numbers than the 2 reports, and 322 cases (88%) were henatoemesis or tarry stools, which agrees closely with the description in the guideline.

In cases where UGI bleeding is suspected, prompt endoscopy is thought to be useful both for diagnosis and treatment. Although there have been several negative reports for early endoscopy [3, 4], nevertheless, the majority [5, 6] including the guidelines [1, 7] recommend performing an early endoscopy. Our hospital also adopts this approach and aggressively promotes emergency endoscopy even in the ER. Of the 326 cases of suspected UGI bleeding, however, endoscopic hemostasis was performed in only 164 (50.4%). That is, around half of the cases did not need hemostasis procedures, for the following reasons: ulcer without blood vessels, which is not indicated for endoscopic hemostasis [1, 7], hemoptysis, nasal bleeding, red colored food, *etc*. Of course, while most cases needed the emergency endoscopy, we could not eliminate the possibility that mixed in with these cases might be some where an ER endoscopy was not actually necessary. However, as emergency endoscopy is not without certain risks, any decision to perform an endoscopy should always be made carefully and with adequate informed consent. Foreign body retrieval is another important intervention in emergency UGI endoscopy. The guidelines suggest urgent endoscopic intervention is required when a sharp object or disk battery is lodged in the esophagus [8]. Among our 366 ER endoscopy cases, foreign body retrieval was performed in 8 cases (2.2%). Seven concerned the ingestion of a sharp object and 1 was the impaction of a rice cake; this incidence reflects the guidelines.

The questionnaire revealed that although the ER endoscopy system in the hospital generally worked well, several problems existed. Concerns over washing and maintaining the scope, equipment supply, and assistance in therapeutic endoscopy seemed to stem from the fact that in the ER there were no staff designated for these tasks. In the endoscopy room in the hospital, such tasks are performed very well by the gastroenterological endoscopy technicians. The ideal solution would be to employ such technicians in the ER. The alternative would be for these technicians to carry out periodic checks in the ER endoscopy room, and we have already requested that this be implemented. The problems seemed to be more severely felt by gastroenterology staff than the ER staff as described. Although only the difference between ER and gastroenterology doctors in the question on the overall evaluation was statistically significant, the same tendency was observed in procedure assistance, maintenance and equipment supply, and returning the scopes to the cabinet. The reason of no significant differences in these questions may be due to insufficient sample numbers. Such tendency may be not unexpected in view of the fact that the gastroenterology staff are specialists in the field and desire higher levels of examination, assistance, maintenance, *etc*. One way to solve the discrepancy would be for the gastroenterology staff to run educational seminars for the ER staff. This possibility as well as other possible solutions should be discussed by both groups of staff.

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