

# Appropriate Utilisation of Emergency Upper Gastrointestinal Endoscopy in a Tertiary Referral Centre

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## Summary

A retrospective cross-sectional study was carried out in a tertiary referral centre to determine the appropriateness of usage of emergency upper gastrointestinal endoscopy (EUGIE) with reference to the guidelines set by the American Society of Gastrointestinal Endoscopy (ASGE). EUGIE was defined as early, non-elective endoscopy performed for in-patients within 48 hours of acute hospital admission. The median age of the 668 patients was 55 years (age range 12- 90), 31% of whom had a previous upper gastrointestinal endoscopy. Bleeding in the form of haematemesis, melaena or anaemia was the most common indication (40.7%) for EUGIE. Eighty one percent of the procedures were judged appropriate by the ASGE guidelines. There was a statistically significant relationship between appropriateness and significant diagnostic yield ( $P<0.05$ ). Procedures performed for melaena, symptomatic anaemia and haemetemesis led to greater significant diagnostic yield ( $P<0.05$ ) and there was no difference in the yield between working-hours and after-hours EUGIE.

**Key Words:** Emergency, Upper gastrointestinal endoscopy, Appropriate, Guidelines

## Introduction

Upper gastrointestinal (UGI) endoscopy is one of the most commonly performed medical procedures globally. To put it in perspective, it is estimated that approximately 70 000 outpatient UGI endoscopies are performed each year in Switzerland which has a population of 7.2 million<sup>1</sup>. In terms of health resources, endoscopic services are expensive, requiring the use of sophisticated hardware as well as dedicated and trained service personnel. Gastrointestinal endoscopy carries a risk, albeit small, of potentially harmful complications such as visceral perforation and death. For an endoscopy service to be effective, it is important that the service is not overloaded with inappropriately referred patients in order to maintain the quality and effectiveness of this procedure<sup>2</sup>. Proper patient

selection based on appropriate indications would be ideal to maintain cost-effectiveness as well as minimising risks.

Consensus-based endoscopic guidelines are not new and several have been formulated worldwide. During the past 25 years, the American Society of Gastrointestinal Endoscopy (ASGE) with the assistance and support of several related associations has established guidelines on safe endoscopy technique, certification of endoscopist and indications for endoscopy. These are set as standards for more appropriate use of gastrointestinal endoscopy aimed at improving patient care<sup>3</sup>.

We studied the appropriateness of usage of emergency upper gastrointestinal endoscopy (EUGIE) in our

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institution by using the American Society of Gastrointestinal Endoscopy (ASGE) guidelines.

## Materials and Methods

A retrospective cross-sectional study was carried out for all EUGIE performed at Hospital Kuala Lumpur from 1st January to 31st December 2000. Patients were identified from the endoscopy records and their case notes then accessed to retrieve the necessary information comprising of the demographic profile, co-morbid factors, indications for endoscopy, pre-endoscopic diagnosis, pre-endoscopic clinical status, endoscopic findings and diagnosis, therapeutic intervention and patient outcome.

For the purpose of this study, EUGIE was defined as non-elective upper gastrointestinal endoscopy performed for inpatients within 48 hours of hospital admission. The guidelines developed by the American Society of Gastrointestinal Endoscopy (ASGE) were applied to determine the appropriateness of the indication for performing EUGIE. Clinical indications for which EUGIE were considered "generally indicated" or "may be indicated" according to the ASGE guidelines, were considered appropriate (Table I), while conditions in which EUGIE is "generally not indicated" were considered inappropriate. Inappropriate indications included symptoms considered functional in origin, metastatic adenocarcinoma of unknown primary site, radiographic findings of asymptomatic or uncomplicated sliding hiatal hernia, uncomplicated duodenal ulcer which has responded to therapy, deformed duodenal bulb when symptoms are absent, surveillance for malignancy in patients with gastric atrophy, pernicious anaemia, or prior gastric operations for benign disease, healed benign disease and surveillance during repeated dilations of benign strictures unless there is change in status.

The non-parametric *chi-square test* was used to analyse differences in proportions.  $P < 0.05$  was considered statistically significant. The statistical program SPSS Ver.10.1 (SPSS, Chicago, USA) was used for data computation.

## Results

Of 1138 patients recorded to have had EUGIE in our tertiary referral centre, 668 patients records were retrieved giving a retrieval rate of 58.8%. The median

age was 55 years (range from 12 to 90 years old). There were 443 (66.3%) male patients and 225 (33.7%) females. The mean age for the male patients was 53.4 years as compared to 54.9 years for female patients. Emergency UGIE was commonest amongst the Malays (34.4%), and the Chinese (34.3%).

Abdominal pain was amongst the most common clinical indication (16.4%) for which EUGIE was performed (Table II). Clinical presentation indicating recent upper gastrointestinal bleeding (haematemesis, melaena and symptomatic anaemia) had a significant relationship with endoscopic diagnostic yield ( $P < 0.05$ ). (Table III).

Based on indications given in ASGE guidelines, the majority (60.7%) of indicated or appropriate upper gastrointestinal endoscopies were classified under the category of gastrointestinal bleeding. No cases were classified under indication 1f, 1g, 1o, 1p, 1r, and 1t (Table I).

Amongst the endoscopic diagnosis during EUGIE, normal findings were discovered in 6.4% of the patients. Clinically nonsignificant diagnosis (hiatal hernia, non-erosive gastritis, non-erosive duodenitis and others) was found in 38.3% of the cases, while clinically significant diagnosis was found in 55.3% of the patients (Table IV).

From 17 emergency upper gastrointestinal endoscopic procedures that were performed for patients over 81 years old, 94% were classified as being appropriate. Conversely, only 57% of the procedures were considered appropriate in patients below 21 years old. In patients below 50 years of age, only 38.1% resulted in a significant diagnostic finding in comparison to older patients.

Five hundred and forty four (81%) of the endoscopies were judged appropriate according to the guidelines. Meanwhile, 124 (19%) of the procedures were performed for indications not provided in the guidelines and were thus considered inappropriate.

Significant diagnostic yield were found in 70% of the patients when EUGIE was judged appropriate compared with 36.3% when the procedures were considered inappropriate. There was a significant relationship between appropriateness and significant diagnostic yield. ( $\chi^2 = 49.777$ ,  $df = 1$ ,  $P < 0.05$ ). In patients undergoing several UGI endoscopies, the appropriateness and the ability to detect a significant diagnostic lesion improved with each subsequent

endoscopy. Fifty nine percent of patients had significant diagnostic yield after the first endoscopy while 68.5% of patients had significant diagnostic yield with a second endoscopy. Patients undergoing a third endoscopy had an 84.4% significant diagnostic yield. Only 18 emergency UGI endoscopies were performed after office hours (i.e. between 5 p.m to 8 a.m) three of which were on patients above 65 years of age and 8 of who

were haemodynamically unstable. Four of these patients died within a few days following EUGIE. For EUGIE performed after office hours, the proportion of significant diagnostic yield was 72.2% compared to endoscopy within office hours (63.5%). However, this difference was not statistically significant ( $\chi^2 = 0.572$ , df =1,  $P > 0.05$ ).

**Table I: Indications for UGI endoscopy based on ASGE guidelines**

INDICATIONS	n (%)
1a. Upper abdominal symptoms, which persist despite an appropriate trial of therapy	14 (2.5)
1b. Upper abdominal symptoms associated with other symptoms or signs suggesting serious organic disease (e.g., anorexia and weight loss) or in patients over 45 years of age	57 (10.0)
1c. Dysphagia or odynophagia	43 (7.6)
1d. Oesophageal reflux symptoms, which are persistent or recurrent despite appropriate trial of therapy	6 (1.1)
1e. Persistent vomiting of unknown cause	20 (3.5)
1f. Other diseases in which the presence of upper GI pathology might modify other planned management	0 (0.0)
1g. Familial adenomatous polyposis syndrome	0 (0.0)
1h. For confirmation and specific histologic diagnosis of radiologically demonstrated lesions: * Suspected neoplastic lesion * Gastric or oesophageal ulcer * Upper tract stricture or obstruction	1 (0.2)
1i. Gastrointestinal bleeding: * In patients with active or recent bleeding * For presumed chronic blood loss and for iron deficiency anaemia when the clinical situation suggests an UGI source or when colonoscopy is negative	345 (60.7)
1j. When sampling of tissue or fluid is indicated	3 (0.5)
1k. In patients with suspected portal hypertension to document or treat oesophageal varices	55 (9.7)
1l. To access acute injury after caustic ingestion	3 (0.5)
1m. Treatment of bleeding lesions	5 (0.9)
1n. Banding or sclerotherapy of varices	14 (2.5)
1o. Removal of foreign bodies	0 (0.0)
1p. Removal of selected polypoid lesions	0 (0.0)
1q. Placement of feeding or drainage tubes	1 (0.2)
1r. Dilatation of stenotic lesion	0 (0.0)
1s. Management of achalasia	1 (0.2)
1t. Palliative treatment of stenosing neoplasms	0 (0.0)
<b>TOTAL</b>	<b>568 (100.0)</b>

**Table II: Clinical indications for emergency UGI endoscopy**

Indications	n	%
Abdominal pain	323	16.4
Symptomatic anaemia	312	15.8
Melaena	291	14.8
Haematemesis	201	10.2
Loss of appetite	164	8.4
Persistent vomiting	138	7.0
Loss of weight	130	6.6
Nausea	93	4.7
Dysphagia	47	2.4
Heartburn	37	1.9
Other	236	12.0
<b>TOTAL</b>	<b>1972</b>	<b>100.0</b>

**Table III: Diagnostic yield of emergency UGI endoscopy according to clinical presentation**

Presentation	Total	With Significant Diagnostic Yield	Without Significant Diagnostic Yield	X <sup>2</sup>	df	P value
Persistent vomiting	138	80	58	2.534	1	0.111
Nausea	93	52	41	2.888	1	0.089
Anorexia	5	5	0	-	-	0.165
Loss of weight	130	85	45	0.182	1	0.670
Loss of appetite	159	103	56	0.092	1	0.762
Dysphagia	47	31	16	0.104	1	0.747
Haematemesis	201	148	53	12.097	1	0.001
Melaena	291	211	80	17.033	1	0.005
Symptomatic anaemia	312	224	88	16.309	1	0.005
Heartburn	37	20	17	1.601	1	0.206
Abdominal pain	323	197	126	2.095	1	0.148
Other	236	140	96	3.128	1	0.077

**Table IV: Endoscopic diagnosis of emergency UGI endoscopy**

Endoscopic diagnosis	n	%
Normal	66	6.4
Hiatal hernia	24	2.3
Non-erosive gastritis	192	18.8
Non-erosive duodenitis	94	9.2
Oesophagitis	58	5.7
Erosive gastritis	114	11.1
Erosive duodenitis	14	1.4
Oesophageal ulcer	11	1.1
Gastric ulcer	132	13.0
Duodenal ulcer	81	7.9
Oesophageal varices	93	9.1
Gastric fundal varices	13	1.3
Benign oesophageal stenosis	3	0.3
Oesophageal cancer	16	1.6
Gastric cancer	21	2.1
Portal hypertensive gastropathy	10	1.0
*Other lesions	82	8.0
TOTAL	1024	100.0

\*Other lesions include Mallory-Weiss tear, candidiasis, post cricoid web etc

## Discussion

Patient selection to undergo medical procedures should be based on appropriate indications to maintain quality of healthcare. Almost 85% of patients in this study undergoing EUGIE with positive diagnostic yield were aged 40 and above while the proportion of inappropriately referred patients was higher for those aged 40 or below. Patients in the younger age group have a far lesser tendency to provide meaningful diagnoses following endoscopy as demonstrated by a previous study<sup>1</sup>. However, normal endoscopic findings may give the patients an assurance that they are healthy, therefore avoiding the consumption of any other inappropriate medication.

Eighty one percent of EUGIE performed in our centre were judged as appropriate according to the ASGE guidelines. The remaining 124 (19%) procedures were undertaken for indications not provided in the guidelines and thus considered inappropriate. Our results for procedures judged to be inappropriate concurred with a recent study from the west which found 17% of cases to be inappropriate<sup>4</sup>. This is also in

concordance with a multicentre study using the current ASGE guidelines in 3414 patients which demonstrated 23% inappropriate procedures<sup>5</sup>. The results are however favourable when compared to studies with reported figures of inappropriately performed EUGIE of up to 31%<sup>6</sup> even though a direct comparison with our results is difficult because the authors of the latter studies used a more explicit Swiss criteria<sup>7</sup>. Even though the number of inappropriate procedures performed in the present study is comparable to European studies, this still indicates that there is a degree of overutilisation of EUGIE. Up to a fifth of all cases in our series could have been avoided and translated into potential saving of health and financial resources and greater efficiency. This in turn requires a greater awareness for appropriate upper gastrointestinal endoscopic indications amongst health personnel directly responsible for arranging this procedure. In contrast, efforts to reduce costs in health care may instead raise concerns about underutilisation of medical procedures. It is a paradox of healthcare improvement whereby the simultaneous need to reduce wasteful overutilisation due to inappropriateness must come hand in hand with the scrutiny to prevent underutilisation of appropriate and vital procedures<sup>8</sup>.

The high rate of inappropriate indications could be explained by insufficient treatment, or no treatment of dyspeptic symptoms prior to endoscopy<sup>9</sup>. It must also be emphasised that the decision to perform EUGI endoscopy in previously untreated dyspeptic patients is a common clinical situation resulting in overuse<sup>10</sup>, a finding which was demonstrated in our series of patients.

In our study, upper gastrointestinal bleeding (melaena, haematemesis and anaemia) accounted for 40.8% of all cases referred for EUGIE which is similar to figures quoted in a study by Kahn et al<sup>4</sup>. Approximately two thirds of all appropriate or indicated cases were due to upper gastrointestinal bleeding which is not surprising as the routine use of EUGIE should generally be considered to be standard care for patients with upper gastrointestinal haemorrhage<sup>10</sup>.

Potential benefits of pursuing accepted or recommended guidelines on EUGIE includes successfully triaging further management based on endoscopic findings as well as providing therapeutic procedures to certain higher risk subgroups<sup>11,12</sup>. Although earlier studies demonstrated no benefit of routine diagnostic endoscopy on patient outcomes,<sup>13</sup> more recent studies suggested that the early use of endoscopy may improve the management of low risk patients<sup>11,14</sup>. Over the last decade, several randomised controlled trials, as well as two meta-analyses have demonstrated a beneficial effect of endoscopic therapy in reducing mortality, recurrence of bleeding, or the need for emergency surgery in patients with peptic ulcer disease and endoscopic features of active bleeding or possible rebleed<sup>15-17</sup>. This allows patients subsequently found to have low risk diagnosis to be discharged early, thus minimising overall hospital costs<sup>11</sup>.

The main purpose of this study was to explore the relationship between the appropriateness of use of UGI endoscopy and the detection of clinically significant diagnostic lesions. Our results show that significant lesions were found more often in clinical situations rated

appropriate, as compared to situations considered to be inappropriate (70% versus 36.3%) in contrast to Gonvers et al who reported that the probability of finding a significant lesion did not differ between the endoscopies judged to be appropriate (50%) and those considered inappropriate (46%)<sup>9</sup>. The frequency with which abnormalities are detected during endoscopy is a measure of its appropriate utilisation even though this does not imply that a normal test result is of no value<sup>18</sup>.

In patients undergoing their first EUGIE, a considerable percentage (approximately 40% in our series) may yield no significant findings. This may be due to inappropriate indications but other factors may be responsible such as the lower threshold for upper gastrointestinal endoscopy in the elderly and the debilitated or in those with a medical background of peptic ulcer disease or liver cirrhosis. There is a need for the referring physician to keep up with evidence-based medicine and updated formal guidelines as well as for health authorities to enforce the appropriate utilisation of endoscopic services to procure effective utilisation and economical utilisation of health resources.

## Conclusion

Our study findings demonstrate that EUGIE performed for appropriate indications yields more significant findings. Standard guidelines should be utilised to improve or maintain standards of endoscopic services in ensuring cost-benefit and quality assurance. Future research should address the issue of the outcome of patients with indications labelled inappropriate because endoscopies labelled inappropriate were found to be associated with occasional important endoscopic lesions.

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