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Is it possible to reduce endoscopy workload using age, alarm symptoms and *H. pylori* as predictors of peptic ulcer and oesophagogastric cancers?

M. Voutilainen [a,*], T. Mäntynen [b], K. Mauranen [c], I. Kunnamo [b], M. Juhola [d]

[a] *Department of Internal Medicine, Jyväskylä Central Hospital, Keskussairaalantie 19, FIN-40620 Jyväskylä, Finland*
[b] *Karstula Health Care Centre, Karstula, Finland*
[c] *Department of Health Policy and Management, University of Kuopio, Kuopio, Finland*
[d] *Department of Pathology, Jyväskylä Central Hospital, Jyväskylä, Jyväskylä, Finland*

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Abstract

Objectives. We examined referrals to oesophagogastroduodenoscopy and the impact of demographic and clinical variables to predict major findings (peptic ulcer, cancer) on oesophagogastroduodenoscopy.

Methods. We collected data on 3669 consecutive patients referred for oesophagogastroduodenoscopy.

Results. Dyspeptic and reflux symptoms constituted 80% of oesophagogastroduodenoscopy referrals. A major finding was observed in 419 patients (11.4%). The mean age of cancer patients was 72.7 years (95% confidence interval (CI) 70.0–76.5 years) and that of peptic ulcer patients 62.0 years (95% CI 60.5–63.5 years). Independent risk factors for a major finding were age >50 years (odds ratio (OR) 1.62, 95% CI 1.24–2.10), male sex (OR 1.38, 95% CI 1.11–1.72), ulcer-type pain (OR 2.33, 95% CI 1.80–3.02), weight loss (OR 1.70, 95% CI 1.14–2.53), anaemia (OR 1.82, 95% CI 1.38–2.40), bleeding symptoms (OR 3.27, 95% CI 2.26–4.75) and *Helicobacter pylori* (OR 2.49, 95% CI 2.00–3.11), whereas reflux symptoms were protective (OR 0.73, 95% CI 0.53–1.00). The area under receiver operating characteristic curve of age over 50 years with alarm symptoms to predict major finding was 0.68 (95% CI 0.65–0.71), which positive *H. pylori* status increased to 0.71 (95% CI 0.69–0.74). Of the major findings, 87.2% were detected in patients with risk factors. Major findings were detected in 15.1% patients with and 8.1% ($p < 0.001$) without alarm symptoms.

Conclusions. Dyspeptic and reflux symptoms constitute the majority of oesophagogastroduodenoscopy workload. Discriminative power of alarm symptoms even with positive *H. pylori* status to detect peptic ulcer or cancer was low. Because of their low cancer risk, reflux and dyspeptic patients younger than 50 years can be treated without oesophagogastroduodenoscopy.

Keywords: Alarm symptoms; Gastroscopy; *H. pylori*; Oesophagogastric cancer; Peptic ulcer

1. Introduction

Endoscopy is the method of choice for diagnosing upper gastrointestinal (GI) diseases, and alarm symptoms and signs such as anaemia, bleeding, weight loss and dysphagia are considered an indication for prompt upper GI endoscopy [1,2]. The endoscopic detection of malignant upper GI tumours in their early phase may significantly improve the survival of these patients [3,4]. The costs of investigating dyspeptic patients and endoscopy workload have significantly increased [5]. Non-invasive testing of *H. pylori* infection and subsequent eradication therapy reportedly reduces the number of endoscopies in the management of dyspepsia [6,7]. A recent decision analysis suggested that in fact, first-line empirical therapy with a proton pump inhibitor may be the most cost-effective strategy to treat dyspepsia [8]. Some investigators have, however, reported that empirical treatment of dyspep-

* Corresponding author. Tel.: +358 14 6691 811; fax: +358 14 2692 770.
E-mail address: markku.voutilainen@ksshp.fi (M. Voutilainen).

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sia with acid suppressive medication or *H. pylori* eradication therapy may result in a delay in diagnosing upper GI cancers [9,10]. We have earlier reported that alarm symptoms, but not increased referral volume to endoscopy, may predict significant upper GI lesions [11,12].

The aim of the present study was to further evaluate the indications for referrals to upper GI endoscopy, and to examine more closely the significance of the so-called alarm symptoms, demographic factors and *H. pylori* infection for predicting major upper GI findings on endoscopy such as cancer and peptic ulcer disease. Such data could help to reduce endoscopy workload.

2. Methods

The present endoscopy data were collected from 1 January to 31 December 1996 in Jyväskylä Central Hospital referral area with 258,960 inhabitants. All doctors in our hospital referral area were pre-informed about the study. When referring patients for endoscopy, general practitioners completed a structured questionnaire on GI symptoms and their duration, and medication for current symptoms. On the questionnaire, the indications for endoscopy were classified as presented in Table 1. The following symptoms and clinical findings were classified as alarm symptoms and signs: weight loss, dysphagia, vomiting, anaemia, or symptoms and signs of upper GI bleeding. All patients aged 15 years or older who were referred to diagnostic upper GI endoscopy were included in the present study. We also included patients sent to endoscopy due to suspicion of celiac disease, because one-third of them also had other indications for endoscopy (see Table 1). The endoscopies were performed by physicians ($N = 23$) at Jyväskylä Central Hospital, Jokilaakso Hospital and 11 health care centres. Endoscopy data were recorded on a structured questionnaire formulated for the study.

Heartburn and regurgitation were considered the symptoms suggestive of gastrooesophageal reflux disease. Heartburn was defined as a substernal burning sensation and acid regurgitation as the upward flow of bitter- or sour-tasting fluid into the throat or mouth. Ulcer-type pain was defined as burning or gnawing or dull pain located at the midline of the upper abdomen. Dyspepsia was defined as other chronic or recurrent symptoms centred in the upper abdomen (bloating or distension, belching, nausea, or early satiety). Non-cardiac chest pain was defined as recurrent retrosternal pain without cardiac abnormality (clinical examination, electrocardiogram and/or treadmill test).

Table 1
The distribution of symptoms of the 3669 patients referred for diagnostic upper GI endoscopy

Indication	Number of patients
Dyspepsia and ulcer-type epigastric pain	1777 (48%)
Treatment failure of empirical dyspepsia treatment	408 (11%)
Reflux symptoms	785 (21%)
Non-cardiac chest pain	306 (8%)
Weight loss	218 (6%)
Dysphagia	215 (6%)
Vomiting	379 (10%)
Anaemia	559 (15%)
Signs and symptoms of acute upper GI-bleeding	190 (5%)
Suspicion of celiac disease	227 (6%)

Same patients had more than one indication for endoscopy.

The doctors performing upper GI endoscopies filled a structured form on endoscopical findings. On endoscopy, the presence of one or more mucosal breaks (erosions or ulcerations) in the distal oesophagus was considered the diagnostic criterion for endoscopic erosive oesophagitis or endoscopy-positive reflux disease. If columnar-lined distal oesophagus was observed, biopsy specimens were obtained from this columnar mucosa; the detection of incomplete intestinal metaplasia at histopathological examination was considered the diagnostic criterion for Barrett's oesophagus.

On endoscopy, gastric or duodenal ulcer was defined as a lesion at least 0.5 cm in diameter, possessing unequivocal depth and located in gastric or duodenal bulb mucosa, respectively. The presence of gastric ulcer, duodenal ulcer, or histologically verified oesophageal or gastric cancer were defined as major endoscopical findings. Biopsy specimens were obtained from the duodenum, gastric antrum and corpus (two specimens from each site), and from every abnormal endoscopic lesion (tumour, ulcer). Biopsy specimens were fixed in formalin. Sliced biopsy specimens were stained with haematoxylin and eosin, alcian blue (pH 2.5) periodic acid Schiff and modified Giemsa to detect *H. pylori*. Data on *H. pylori* infection for determining ROC curves were obtained from histopathological investigation of endoscopic biopsy specimens. All histological specimens were examined by the pathologists of Jyväskylä Central Hospital. The histopathological data were collected via structured questionnaire. All clinical, endoscopical and histological data were transferred to electronic database (SPSS® software).

3. Statistics

Chi-squared and Fischer's tests were used to compare non-continuous variables and the Mann–Whitney *U*-test to compare continuous variables. p values <0.05 were considered statistically significant. Multivariate analysis was used to detect independent risk factors for peptic ulcer disease and oesophagogastric cancer. Odds ratios (OR) with 95% confidence intervals (CI) were expressed for independent risk factors. Receiver operating characteristics (ROC) curves were determined for clinical and demographic variables to predict peptic ulcer or cancer (major finding) on endoscopy. Statistical analyses were performed using SPSS 11.5 for Windows® software.

4. Ethics

This study was approved by the ethics committee of Jyväskylä Central Hospital.