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The yield of UGIE: a study of a ten-year period in the 'Zaanstreek'

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ABSTRACT

Background: Study of the occurrence of abnormalities in the oesophagus, stomach and duodenum, and of changes in specific diagnoses.

Methods: All consecutive upper gastrointestinal endoscopies (UGIEs) carried out in a period of ten years were included.

Results: In ten years 14,927 diagnostic UGIEs were performed (7335 men (49%) and 7592 women (51%)). These procedures were done at the request of the general practitioner in 4995 (33%) cases. A steady yearly increase in the number of open-access UGIEs was noted. Each year a mean of 796 abnormalities was seen in the oesophagus, a mean of 437 in the stomach, and of 162 in the duodenum. The presence of hiatal hernia and reflux oesophagitis significantly increased in the ten years ($p<0.001$). The numbers of Barrett's oesophagus and oesophageal cancer remained constant. Gastritis showed a gradual increase ($p<0.001$), while the number of gastric ulcers found per year decreased significantly in the ten-year period ($p<0.001$). Gastric malignancy remained constant. Presence of duodenal ulcers and bulbitis significantly decreased ($p=0.01$ and $p=0.06$, respectively).

Conclusions: The number of UGIEs carried out at the request of the general practitioner has significantly increased. Peptic ulcer disease shows a significant decrease, while reflux disease increases.

INTRODUCTION

Since its introduction, upper gastrointestinal endoscopy (UGIE) has been widely used, resulting in an increasing UGIE workload. The advantage of the direct visual inspection of the oesophageal, gastric and duodenal mucosa is obvious. Biopsy specimens can be taken for histological or microbiological examination. For this reason UGIE is considered the investigation of choice in cases of dyspepsia, or in the presence of reflux or alarm symptoms, and is mandatory for a precise diagnosis in cases of these upper abdominal symptoms.[1]
As a direct result of the use of gastroscopy, many data on the occurrence and prevalence of diseases in the upper part of the digestive tract have been collected.
There are many reports in the literature on the yield of UGIE. However, no data are present on the yearly yield of these UGIEs. Hence, there is no information on actual changes in specific UGIE morbidity patterns in patients sent for UGIE.
A cross-sectional study, including all consecutive UGIE reports from a ten-year period, was undertaken to study the yearly occurrence of abnormalities in the oesophagus, stomach and duodenum, and changes in the presence of specific diagnoses.

MATERIAL AND METHODS

All consecutive diagnostic UGIEs carried out in a period of ten years (January 1992 to December 2001) in De Heel Zaans Medical Centre, a community hospital in the 'Zaanstreek', were included. The UGIEs were performed at the request of internists, gastroenterologists, and

sometimes paediatricians, cardiologists or surgeons. In addition, there is an open-access facility for general practitioners.

Two experienced endoscopists performed all the procedures. After obtaining informed consent, UGIE was performed with Olympus endoscopes (Paes Nederland BV, Zoetermeer). In 1992, fibreoptic endoscopes were used. From 1993 onwards, the EVIS 100 video-endoscopes were introduced. Since the beginning of 2000, this system has been gradually replaced by the EXERA 160 system of Olympus. UGIE was carried out without sedation or local anaesthesia.

The results were noted in a written standardised report. If clinically indicated, biopsy specimens were taken to confirm the macroscopic diagnosis.

Hiatal hernia was defined as a distance of more than 2 cm between the diaphragm and the Z line. Defective or insufficient lower oesophageal sphincter closure was defined as a widely open sphincter during introduction as well as retrieval of the endoscope. Oesophagitis was scored according to the well-known Savary-Miller system. Endoscopic gastritis was judged to be present if nodularity was seen in the antrum or if erosions or intramucosal bleeding were present.[2] In addition the presence of red stripes, especially in the gastric antrum, was considered an endoscopic sign of gastritis. Barrett's oesophagus was judged to be present if the typical macroscopic appearance of cylindrical epithelium was present in the tubular oesophagus. Bulbitis was defined as the presence of erosions in the duodenal bulb.

Twice a year, all the UGIE results of the preceding six months were stored in a computerised database system. Statistical analysis was performed with chi-square test for contingency tables. A value below 0.05 was considered statistically significant.

RESULTS

In a period of ten years 14,927 diagnostic UGIEs were performed in 7335 men (49%) and 7592 women (51%). The mean number of gastroscopies a year was 1492 (range 1384-1631). Because of direct endoscopic follow-up, 1126 procedures were carried out due to previously diagnosed abnormalities. This was mostly because of upper gastrointestinal bleeding or follow-up because of gastric ulcer or cancer. The results of these UGIEs were, obviously, excluded from the present analysis. However, these follow-up UGIEs were included in the analysis of the applicants for gastroscopy.

UGIE was requested by the general practitioner in 4995 (33%) cases, by internists and gastroenterologists in 9786 (66.1%) cases, and in 146 (0.9%) cases the UGIE was performed at the request of paediatricians, surgeons or cardiologists. In the ten-year period a steady increase in the number of UGIEs carried out at the request of general practitioners was noted, while the number requested by specialists showed a parallel decrease (*figure 1*).

In 32% of the UGIEs (range 26-37%) carried out at the request of specialists no macroscopic abnormalities were detected; this was also the case in 32% (range 30-34%) of open-access gastroscopies (p=ns). The number of UGIEs revealing no macroscopic abnormalities showed very little yearly fluctuation in the ten-year period (*figure 2*), regardless of whether the procedure was done at the request of the general practitioner or a specialist.

Per year a mean of 796 macroscopic abnormalities (range 651-874) was seen in the oesophagus, a mean of 437 (range 377-513) in the stomach, and a mean of 162 (range 134-218) macroscopic abnormalities was diagnosed in the duodenum. The total number of endoscopic diagnoses exceeds the total number of patients as in some patients multiple diagnoses were made. The total number of yearly macroscopic diagnoses showed little fluctuation. Few UGIEs were inconclusive (the patient changed his mind about consent, or the patient forcefully retrieved the endoscope before the procedure was completed).

Hiatal hernia and insufficiency of the lower oesophageal sphincter closure occurred in a mean of 33.7% of cases (range 29.5-38.2%); oesophagitis was seen in 15.8% of gastroscopies (range 11.5-17.8%). Barrett's oesophagus

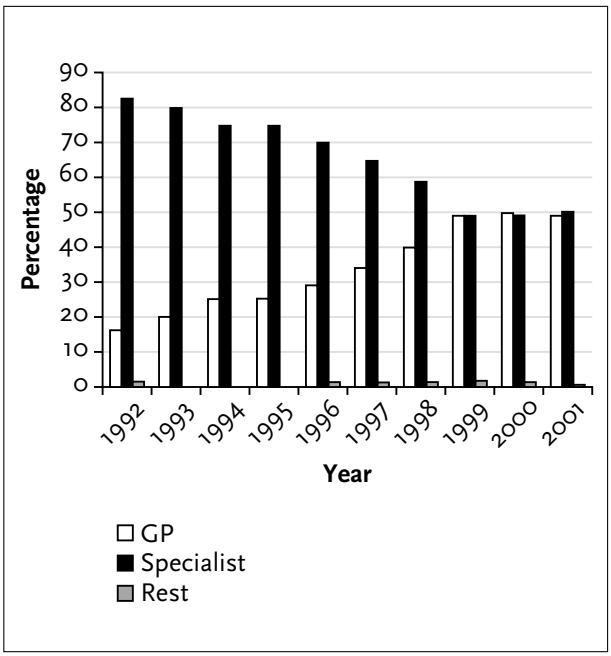

Figure 1

Number of endoscopies performed a year at the request of general practitioners and specialists

Rest indicates endoscopies performed at the request of surgeons, paediatricians or cardiologists.

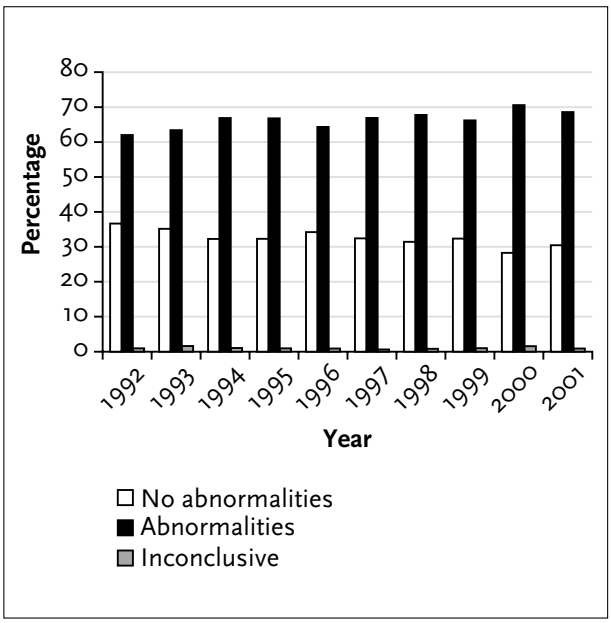

Figure 2
The annual number of endoscopies with macroscopic abnormalities and no abnormal findings

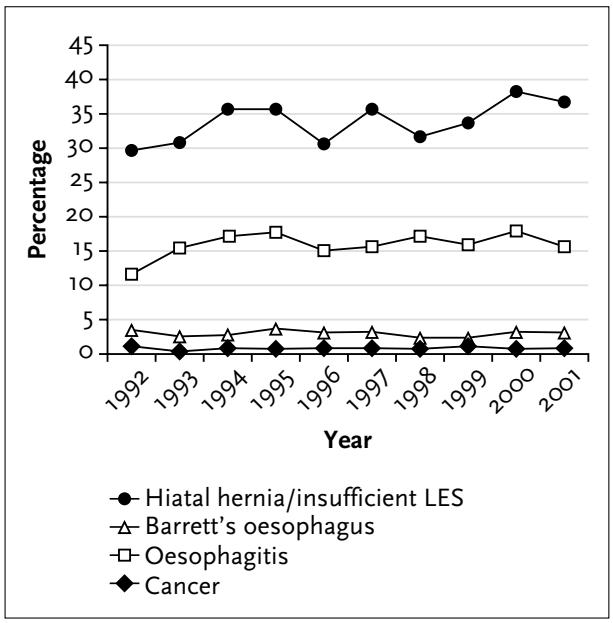

Figure 3
Relevant endoscopic findings seen in the oesophagus in the consecutive years

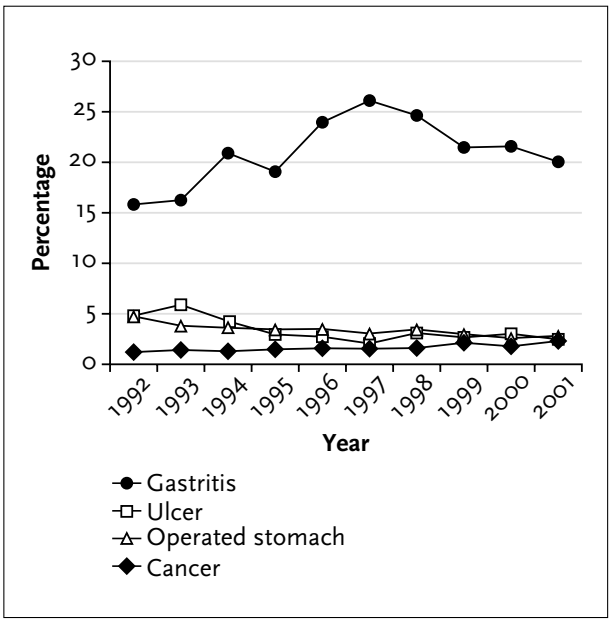

Figure 4
Relevant endoscopic diagnoses seen in the stomach in the consecutive years

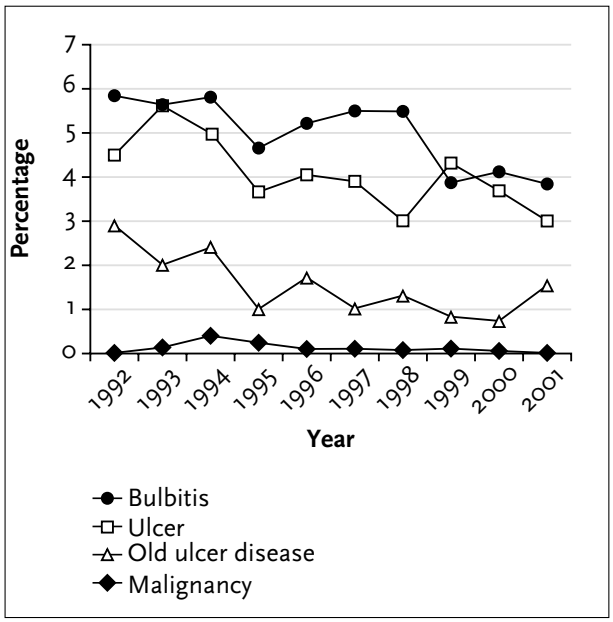

Figure 5
Relevant endoscopic diagnoses seen in the duodenum in the consecutive years

was present in 3% of the patients (range 2.6-3.7%), and cancer of the oesophagus was diagnosed in 0.7% (range 0.2-1.0%) (*figure 3*). The presence of hiatal hernia and insufficient lower oesophageal sphincter closure showed a statistically significant increase in ten years ($p<0.001$), while the number of patients with reflux oesophagitis showed a less impressive, but still significant increase ($p<0.001$). The number of patients with Barrett's oesophagus and oesophageal cancer remained very constant each year. Relevant diagnoses in the stomach were endoscopic gastritis 20.9% (range 15.9-26.1%), ulcer 2.3% (range 1.8-5.8%), operated stomach (Billroth resection or gastroenterostomy) 3.3% (range 2.8-4.6%), and malignancy located in the stomach 1.5% (range 1.1-2.3%) (*figure 4*).

Gastritis showed a gradual increase (p<0.001), while the number of gastric ulcers significantly decreased yearly in the ten-year period (p<0.001). Gastric malignancy remained constant.
In the duodenum ulceration was present in 4% (range 3-5.6%), bulbitis in 5% (range 3.8-5.8%), scarred bulbus in 1.5% (range 0.7-2.9%), and malignancy in 0.09% of the patients (range 0-0.4%) (*figure 5*). The numbers of duodenal ulcers and bulbitis significantly decreased (p=0.01 and p=0.06, respectively).
Table 1 shows the diagnostic yield of UGIEs carried out at the request of general practitioners or specialists. Overall the specialist UGIEs more often yielded a Barrett's oesophagus (mean percentage 3.5% versus 2% of the general practitioners' UGIEs) and ulcer disease (7.5% versus 3.8%). The number of cancers, reflux oesophagitis, bulbitis, hiatal hernia and insufficient lower oesophageal sphincter closure, and gastritis showed no difference.

DISCUSSION

In the literature no data have been published on the yearly yield of UGIEs, except for data on the yield of a total number of gastroscopies in a certain time. This is the first study, at least in the Netherlands, in which the yearly yield of UGIE is studied.
In the 1980, the number of UGIEs showed a dramatic escalation. This was especially true after the introduction of open-access facilities for general practitioners.[3] The annual demand in the 1990s was calculated at 12 per 1000 of the population.[4] Since the Zaanstreek has a population of approximately 132,000, this figure, which was calculated in the United Kingdom in 1989, turned out to be astonishingly accurate. The annual number of diagnostic UGIEs ranges from 1384 to 1631, and thus is in accordance with this figure. In disagreement with an earlier report,[5] the total number of UGIEs did not rise significantly. In addition there was no difference between men and women, both sexes equally often underwent an UGIE. Despite the general assumption that UGIE workload is increasing, this is not supported by the data from the present study. There is almost no waiting time for gastroscopy in the Zaanstreek. The average time between the decision to do an UGIE and the actual gastroscopy varies from one to ten days. The waiting time will only be longer in case of holidays. Hence, it can be assumed that all patients in the region who have a clinical reason for undergoing UGIE are actually sent to the UGIE department of De Heel Zaans Medical Centre. This certainly indicates that there is a good balance between supply and demand of gastroscopies in this region.
In accordance with other reports, the number of UGIEs performed at the request of the general practitioner significantly increased.[6] The explanation is not only the presence of an open-access facility, but also the more prominent place of gastroscopy in the work-up of dyspepsia

Table 1
Relevant macroscopic abnormalities seen in endoscopies done at the request of general practitioners and specialists

	1992 %	1993 %	1994 %	1995 %	1996 %	1997 %	1998 %	1999 %	2000 %	2001 %	MEAN %
Barrett's oesophagus											
GP	2.0	0.7	2.3	3.6	3.6	2.5	1.8	1.2	2.5	3.0	2.0
Specialist	4.0	3.2	3.1	3.7	3.0	3.8	2.5	3.6	4.4	3.6	3.8
Ulcer											
GP	12.8	14.0	11.5	6.9	6.9	4.5	5.6	4.9	4.6	4.8	3.8
Specialist	8.2	10.3	8.5	6.2	6.6	6.4	6.2	8.8	8.6	5.6	7.5
Cancer											
GP	2.4	1.6	2.3	1.7	1.9	1.7	3.0	3.7	2.1	2.7	2.3
Specialist	2.5	1.8	2.4	2.3	2.3	2.7	1.7	2.2	2.3	3.4	2.4
Reflux oesophagitis											
GP	9.5	13.8	11.5	16.5	20.2	20.0	17.0	18.7	22.8	19.2	16.9
Specialist	12.0	15.7	19.5	18.3	12.7	13.0	17.6	12.7	12.2	11.4	14.5
Bulbitis											
GP	6.6	5.6	6.9	7.8	5.0	4.2	4.7	4.1	5.0	3.8	5.4
Specialist	6.1	5.5	3.4	3.5	5.3	6.2	6.0	3.6	3.1	3.8	4.7
Hiatus hernia/insufficient LES											
GP	31.8	35.7	38.5	42.5	36.1	38.0	36.2	41.2	42.1	40.4	38.3
Specialist	29.0	29.4	34.6	32.8	28.0	33.8	28.2	30.4	33.7	32.7	31.3
Gastritis											
GP	12.0	16.7	21.0	20.4	25.6	27.7	26.7	22.3	22.7	20.4	21.6
Specialist	16.8	16.0	20.8	37.4	23.1	25.3	23.4	20.5	20.1	19.4	22.3

and reflux disease that was introduced in general practice in the Netherlands in 1996. The number of gastroscopies carried out at the request of internists and gastroenterologists showed a parallel decrease in these ten years. This clearly indicates that the majority of patients with upper abdominal symptoms were no longer referred to the outpatient clinic. The general practitioner deals with the treatment of dyspepsia and reflux in the majority of cases.

The number of UGIEs revealing no macroscopic abnormalities is in accordance with the literature.[7,8]

No abnormal macroscopic findings were detected in approximately 33% of cases. No significant difference was present between open-access UGIEs and procedures done at the request of specialists. UGIEs at the request of specialists more frequently yielded ulcers and Barrett's oesophagus. The explanation could be that ulcers are responsible not only for dyspepsia but more importantly for bleeding (manifest or occult) and anaemia, which are reasons for referral. Patients with Barrett's oesophagus belong to the oldest age cohorts and often have comorbidity, which is a reason for specialist consultation. As the diagnostic yield is almost identical, these results provide very strong evidence in favour of unrestricted open-access policy.[9]

The presence of peptic ulcer disease showed a gradual and significant decrease in the ten-year period. The obvious explanation for this observation is the instalment of anti-*Helicobacter pylori* therapy, which is generally used in cases of ulcer disease since 1993. Also many patients with documented ulcer disease in the past underwent anti-*H. pylori* therapy without confirmation of the diagnosis by UGIE. Another explanation for the decreasing numbers of ulcers is the decreasing acquisition of *H. pylori*.

The number of cases of cancer diagnosed on a yearly basis remained very constant. Each year the same number of cancers, oesophageal as well as gastric, are diagnosed. There is no obvious explanation for this observation, but it is clearly in contradiction with data in the literature, reporting a definite increase in oesophageal cancer and a decrease in stomach cancer.

The results of UGIE with respect to gastritis and malignancy are in accordance with the literature.[7] The explanation for the rise in endoscopic gastritis is obviously the introduction of the video-UGIE. The macroscopic detection of gastritis has improved significantly. The visualisation of the gastric mucosa is much better with the video systems, as more details can be seen. The total number of UGIEs revealing peptic ulceration, carcinoma, oesophagitis, and bulbitis are in keeping with another study in the Netherlands.[10]

The results of this study clearly indicate changes in morbidity patterns. Possibly this has implications for future planning in UGIE, especially since the number of general internists performing gastroscopies is expected to decrease, while there are currently not enough gastroenterologists. These data can be used in planning healthcare expenditures. The increasing numbers of patients with reflux disease (reflux oesophagitis as well as hiatal hernia, or defective lower oesophageal sphincter) implicate a rise in the use of acid suppressive therapy. The decreasing numbers of peptic ulcer, obviously often related to *H. pylori*, point to a decrease in the use of anti-*H. pylori* therapy in the near future. The relation to diagnostic yield of UGIE and ethnicity of the patients must be the goal of future studies since important differences in morbidity patterns can be present if people of different ethnic origins are compared.[11]

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