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Endoscopic diagnosis of submucosal gastric lesions

The results after routine endoscopy

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Summary. The accurate diagnosis of submucosal gastric lesions is difficult. In an attempt to study this problem, the endoscopic records for 8 consecutive years (July 1976–June 1984) were scanned with the help of a computer-based registration of the endoscopic findings. The examinations were identified in which the endoscopic diagnosis indicated the presence of a submucosal tumor. Fifty-four such patients were found in 15,104 routine examinations, giving an incidence of 0.36%. Six patients were lost to follow-up, so the study is based on 48 patients. The most common reason these patients underwent endoscopy was abdominal pain. Five patient groups were identified: (a) nine patients were correctly diagnosed as having gastric wall neoplasia at the initial endoscopy + biopsy; (b) in an additional 13 patients, the suspected gastric wall neoplasia was verified by further nonoperative diagnostic procedures; (c) five patients were found to have benign non-neoplastic gastric disease; (d) five patients had extragastric disease that pressed against the gastric wall; (e) in 14 patients a further work-up indicated that the initial endoscopy was false-positive. These five groups were confirmed by additional diagnostic procedures (including laparotomy) *and* a follow-up time of more than 5 years *or* autopsy. Two patients refused further examinations and died shortly afterward. No autopsies were performed. Based on our data, it would seem that in the vast majority of patients the suspicion of a submucosal gastric lesion at endoscopy indicates the presence of a serious condition.

Key words: Stomach – Endoscopy – Submucosal lesion – Neoplasm – Diagnosis

The advent of gastrointestinal fiber endoscopy has contributed greatly to our understanding of GI pathology. Endoscopy is also more sensitive than radiology in detecting gastric disease [4, 6, 10]. However, an endoscopic diagnosis is reliant on the appraisal of the macroscopic appearance of the mucosa and its folds. Therefore, submucosal gastric lesions (SGL) are particularly difficult to diagnose accurately. Furthermore, conventional biopsies give a low diagnostic yield in SGL [5]. The standard endoscopic possibilities of excluding or confirming neoplasia and malignancy are thus limited. When there is a suspicion of submucosal pathology during endoscopy, variable degrees of therapeutic aggressiveness can be employed. No clear-cut advice can be found in the literature on the clinical management of these patients since most studies are concerned with the management of an established clinical entity.

The present study is an attempt to examine the clinical consequences of suspicion of SGL at endoscopy. It is not our intention to discuss the surgical management of any clinical entity or established disease, but rather to study the manner in which such a diagnosis can be made. We have analyzed our experience with SGL in routine endoscopy, the need for additional diagnostic procedures, the final diagnoses and the reasons for an inaccurate initial diagnosis.

Patients and methods

On the Endoscopy Unit at the Department of Surgery at Lund University, Sweden, approximately 2,900 upper GI endoscopies are now performed annually. For each investigation, among other things, patient identification data and the endoscopic findings are registered in the computer. These data are entered in accordance with the *endoscopist's interpretation* of the findings. Comparisons to histopathology, clinical course, etc. are made outside the data base. Altogether, 17 endoscopists contributed to the material. This endoscopic data base is stored on a Sperry-Univac 1100 main-frame computer. A computer search over an 8-year period (July 1976–June 1984) for patients with the code for submucosal tumor(s) of the stomach disclosed 54 patients. During that period, 15,104 upper GI endoscopies were performed in our department, which has the only endoscopy unit in the area (population 195,000). In the group, there were 27 men and 27 women (mean age 60.3 years; range 23–88). It was possible to retrieve the complete medical records for 48/54. Two patients died shortly after endoscopy; permission for autopsy was refused. All

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other patients had either had an unequivocal histopathological diagnosis or had been followed up for at least 5 years.

Furthermore, the medical records were reassessed for all patients who lived in the region served by our hospital and who had had a gastric malignancy during the study or the follow-up period. The endoscopy and pathology reports were reassessed in a standardized manner, noting especially the technical quality of the biopsies. The definite diagnosis was noted, as was the manner in which it was obtained.

Results

SGL were initially suspected in 0.36% of routine endoscopies. The reasons for endoscopy are given in Table 1. The locations of the initially suspected SGL are shown in Table 2.

Biopsies

Forty patients had biopsies taken at the initial endoscopy. Reappraisal of the technical quality of these biopsies showed good submucosal representation in 14 cases (35%), thus permitting diagnosis. In 9 cases (23%) the submucosa, although present, was insufficient in quantity to allow diagnosis. The biopsies did not include any submucosa in 17 cases [43%).

Final diagnosis

The majority of patients had gastric disease. The final diagnoses are presented in Table 3. Endoscopy plus biopsy proved to be sufficient for the diagnosis in 27 patients. Laparotomy was performed in 14 patients, in 6 instances for diagnostic reasons. One of these 6 was normal at exploration, 2 had benign disease, 2 had gastric leiomyosarcoma and 1 had a carcinoma of the gallbladder infiltrating the gastric wall.

In retrospect, it could be seen that endoscopy plus biopsy were sufficient for the diagnosis in 27 patients. In 21 of these, no further diagnostic investigations were made. Of the remaining 6 patients, 5 were operated upon because of suspected malignancy and 1 patient had a barium meal to confirm the findings at endoscopy. The means by which the final (= correct) diagnosis was established are given in Table 4.

False-positives

Fourteen patients had an initial endoscopic suspicion of SGL, but were later considered to have been false-positives. The reasons for this change in diagnosis are listed in Table 5. Nothing further was found during our 5-year follow-up period that could explain the findings at the initial endoscopy. These patients were considered false-positives and the rate was thus 14/48 (29%).

False-negatives

The case notes were examined of all patients who lived within the region served by our hospital, and who had had

Table 1. Indications for the initial endoscopy

	n
Abdominal pain	20
Bleeding	14
X-ray findings	6
Nausea and/or vomiting	5
Suspected malignancy	3
Weight loss	2
Miscellaneous	4

Table 2. Location of the initially suspected submucosal gastric lesion and its relationship to the final diagnosis

	(*n*)	Proximal stomach (15)	Mid-stomach (17)	Distal stomach (16)
Gastric wall neoplasia	(22)	7	7	8
Benign non-neoplastic gastric disease	(5)	1	2	2
Extra-gastric disease	(5)	4	0	1
False positives	(14)	3	6	5
Total	(46)	15	15	16

Table 3. Final diagnosis ($n = 46$)

Neoplastic disease within the gastric wall		22
Benign polyps	5	
Leiomyosarcoma	4	
Leiomyoma	2	
Malignant lymphoma	2	
Carcinoid	2	
Adenocarcinoma	2	
Neurinoma	1	
Parietal cell carcinoma	1	
Infiltrating extragastric malignancy	3	
Non-neoplastic gastric disease		5
Extragastric disease pressing against the gastric wall		5
False-positives		14

Table 4. True positives ($n = 32$): diagnostic means for the establishment of the final diagnosis. OGD, Oesophagogastroduodenum

First OGD endoscopy	16
Second OGD endoscopy	3
Laparotomy	5
Arteriography	4
Double-contrast barium meal	2
Double-contrast barium enema	1
Computed tomography	1
Ultrasonography	1
Fine-needle biopsy	1
Died – autopsy	1
(Three patients were diagnosed using two modalities each)	

Table 5. False-positives: what changed the diagnosis?

	n
Double-contrast barium meal	6
Ultrasonography	2
Re-endoscopy/ biopsies normal	2
Exploratory laparotomy	1
Died from intercurrent disease, stomach normal at autopsy	1
Follow-up only	2
Total	14

a gastric malignancy or other gastric neoplasm diagnosed during the follow-up period. None had had a negative endoscopy (in our unit or elsewhere) during the study period.

Discussion

The presence of a suspected submucosal gastric lesion at routine endoscopy is rare. The incidence in the present study, 0.36%, is in accordance with previously published figures [3]. The purpose of this study was to determine whether endoscopic indication of SGL, despite its uncertainty, merits further investigation or not. From a surgical point of view, diagnostic aggressiveness is the rule, but it is important to define further the clinical consequences of the suspicion of such a lesion of endoscopy since it has been recommended that the therapist should assume expectant [13] and aggressive [3] attitudes. With prospective registration of all endoscopic findings the design of the present study permits a better analysis than does retrospective analysis of cases with submucosal pathology. Also, our data base is very large and represents the entire, unselected output from our unit. The time period for data-base scanning was chosen to allow a follow-up period of at least 5 years.

The visual impression of a submucosal gastric lesion is dominated by an elevation, most often covered by normal mucosa, and by bridging folds. The bridging folds radially extend from the upper edge of the impression downwards onto normal mucosa, but they may also be absent. The sites for normal impressions into the gastric wall are the upper part of the lesser curvature and the fundus corresponding to the upper pole of the spleen. If too many false-positive cases had been diagnosed as a result of inexperience with these normal findings, this should be reflected in the *location* of the falsely suspected lesion, which was not the case. The distribution of the falsely diagnosed SGL site, was throughout the stomach (Table 2).

Biopsy techniques are difficult in SGL. Despite the endoscopist's intention to obtain submucosal tissue, he was successful in only 35% in making a definitive diagnosis based on the biopsy. One reason could be the inadequate size of standard biopsy forceps. Kaneko et al. [8] and Siegel et al. [12] have tried giant biopsy forceps, but they were no more successful than we were. Fine-needle aspiration cytology has also been tried through the endoscope, but with rather poor results [7, 9]. A more promising approach may be that of Asaki [1] where alcohol injection on the top of the SGL causes sloughing of the mucosa. At repeat endoscopy 1 week later, submucosal biopsies could be obtained in 64%. Another way of obtaining deep bites is described by Crosta et al. [5]. The mucosa is snared and excised using a diathermy loop, thus baring the submucosal tissue. Using this technique, they obtained representative biopsies in 7/9 cases.

Additional diagnostic procedures were thought to be necessary in most patients. Fourteen were operated on and only 2 of them had normal findings at operation. Four of the five patients with extragastric disease were correctly diagnosed preoperatively using CT scan and ultrasonography. Arteriography was employed in four cases (one normal, one splenic vein malformation).

The false-positive rate was 27%. This is compatible with that of Blackstone [3] in his series involving 5,000 patients. In order to clear patients for endoscopic follow-up alone, 9 of the 14 false-positive patients underwent more studies than just repeat endoscopy. On the other hand, we could identify no false-negatives using the follow-up techniques available. This low false-negative rate should be fairly reliable since Swedes tend to stay in one place and not move often [2].

Our data speak in favor of the liberal use of additional diagnostic procedures in which the deeper layers of the gastric wall and its immediate surroundings can be visualized. Endosonography equipment seems at present to meet these demands best. It can be used during the same endoscopy session when an SGL is suspected. The technique allows good evaluation of the gastric wall and its surroundings [14] and has been shown to be superior in diagnosing submucosal lesions in the stomach [15], as well as in the esophagus [11]. In the absence of such equipment we suggest repeat endoscopy by an experienced colleague and the use of normal abdominal ultrasonography. This could be of particular value when the histopathology results are not conclusive. Because of our high rate of malignancies, we suggest further that laparotomy and excision also be used if the lesions is still suspect in endoscopy, even in the absence of histopathologic or ultrasonographic evidence of neoplasia.

In conclusion, SGL's occur infrequently, but when there is a suspicion at endoscopy, the chances are high that there is either a true underlying submucosal tumor or some other serious condition.

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References

1. Asaki S, Ishii N, Nishimura T, Ohara S, Yamaguchi N, Tamura T (1986) New bioptic method for submucosal tumour of the gastrointestinal tract. Tohoku J Exp Med 150: 401–406
2. Bengtsson T (1989) Population changes 2: mobility between municipalities (in Swedish). Central Bureau of Statistics for Sweden, Stockholm
3. Blackstone MO (1984) Endoscopic interpretation. Raven Press, New York, pp 158–169
4. Cotton PB (1973) Fibre-optic endoscopy and the barium meal – results and implications. Br Med J 2: 161–165

5. Crosta C, Meroni E, Alloni R, Botti F, Carrara A, Taschieri AM (1987) Gastric submucosal neoplasms: new diagnostic and therapeutic procedures. Ital J Surg Sci 17: 131–134
6. Herlinger H, Glanville JN, Kreel L (1977) An evaluation of the double contrast barium meal against endoscopy. Clin Radiol 28: 307–314
7. Iishi H, Yamamoto R, Tatsuta M, Okuda S (1986) Evaluation of fine-needle aspiration biopsy under direct vision gastrofiberscopy in diagnosis of diffusely infiltrative carcinoma of the stomach. Cancer 57: 1365–1369
8. Kaneko E, Kumagai J, Honda N, Nakamura S, Kino I (1983) Evaluation of the new giant-biopsy forceps in the diagnosis of mucosal and submucosal gastric lesions. Endoscopy 15: 322–326
9. Lange P, Kock K, Laustsen J, Arffmann E, Teglbjaerg PS (1987) Endoscopic fine-needle aspiration cytology of the stomach. Endoscopy 19: 72–73
10. Mountford RS, Brown P, Salmon PR, Alvarenga C, Neumann CS, Read AE (1980) Gastric cancer detection in gastric ulcer disease. Gut 21: 9–17
11. Murata Y, Yoshida M, Akimoto S, Ide H, Suzuki S, Hanyu F (1988) Evaluation of endoscopic ultrasonography for the diagnosis of submucosal tumours of the oesophagus. Surg Endosc 2: 51–58
12. Siegel M, Barkin J, Rogers S, et al. (1983) Gastric biopsy: a comparison of biopsy forceps. Gastrointest Endosc 29: 35–36
13. Silverstein FE, Tytgat GNJ (1987) Atlas of gastrointestinal endoscopy, vol 6. Gower Medical, London New York, p 18
14. Strohm WD, Classen M (1986) Benign lesions of the upper GI tract by means of endoscopic ultrasonography. Scand J Gastroenterol 21 [Suppl 123]: 41–46
15. Tio TL (1988) Endosonography in gastroenterology. Springer, Berlin Heidelberg New York, pp 104–116