The Natural Course of Upper Gastrointestinal Submucosal Tumors: an Endoscopic Ultrasound Survey

Ehud Melzer MD and Herma Fidder MD

Department of Gastroenterology, Sheba Medical Center, Tel-Hashomer and Sackler Faculty of Medicine, Tel Aviv University, Israel

Key words: submucosal tumor, endoscopic ultrasound

Abstract

Background: Differentiating between benign and malignant submucosal tumors is difficult. Moreover, the natural course of benign-appearing SMTs is not clearly elucidated.

Objectives: To evaluate the natural course of upper gastrointestinal SMTs by endoscopic endosonography.

Methods: We followed 25 consecutive patients with small (<40 mm) SMTs for a mean period of 19 months. Evaluation included maximal tumor diameter, internal echo pattern, and outer margin of lesions.

Results: Follow-up revealed no change in echo features in 24 of 25 patients (96%). In only one patient a homogenous hypoechoic smooth margin lesion converted to a non-homogenous tumor with an irregular outer margin. This lesion also increased in size from 30 to 38 mm. On surgical removal this tumor was found to be a stromal tumor with high malignant potential.

Conclusions: Most small SMTs do not change during a period of 19 months and a conservative policy of surveillance is warranted.

IMAJ 2000;2:430–432

The differentiation between benign and malignant submucosal tumors is difficult and sometimes impossible. Leiomyomas are hard to distinguish from leiomyosarcomas even histologically. Endoscopic ultrasound is recognized as the procedure of choice for the evaluation of upper gastrointestinal SMTs since it may easily detect their size, echo pattern and layer of origin [1–5]. It has been suggested that some echo features of these tumors may predict malignancy. Of benign leiomyomas 74% are echo homogenous, while 93% of leiomyosarcomas are echo non-homogenous. Yet, 26% of benign leiomyomas are also found to be non-homogenous [2–4,6–11]. These studies also proposed that regularity of the outer margin of SMTs is a better predictor for benignity. Margins were found to be regular in 94% of benign SMTs and irregular in 84% of malignant lesions. Little is known about the natural course of SMTs.

The aim of the present study was to evaluate the natural course of small SMTs (<40 mm) using EUS for sonographic surveillance, and viewing no change for at least 6 months as predictive of benignity.

Patients and Methods

The study group comprised 25 consecutive patients with small (<40 mm) esophageal or gastric SMTs. Informed consent was given by all patients in the group. Following conscious sedation of the patients, EUS was performed with a rotating echo endoscope with switchable 7.5/12 MHz frequencies (GF-UM20 Olympus, Japan). Two dimensions of SMTs were measured, with the largest considered as the maximal diameter of the tumor. We also evaluated the lesions' internal echogenicity (hypoechoic, hyperechoic or non-homogenous) and regularity (regular or irregular) of their outer margins. Surveillance was conducted at least 6 months after index EUS. Statistical evaluation was performed with the Student *t*-test.

Results

Gastric SMTs were identified in 16 patients (6 men and 10 women with a mean age of 68 years, range 49–86) and esophageal lesions in 9 (2 men and 7 women, mean age 59, range 39–71).

At index examination, the maximal diameter was 19.4±7.3 mm for SMTs and 19.8±7.4 mm for gastric and esophageal lesions. Two of the 25 lesions arose from the third echo layer corresponding to the submucosa, and appeared hyperechoic. These lesions were considered to be lipomas. The other 23 SMTs emanated from the fourth echo layer, corresponding to the muscularis propria, and were considered to be leiomyomas. Of these 23 SMTs, 19 were homogenously hypoechoic and 4 had a non-homogenous echo pattern with one having an irregular margin as well. The mean maximal diameter of these four SMTs seemed larger than that of the homogenous group (26.0±8.1 vs. 18.4±6.8 mm, respectively), but this trend did not reach statistical significance.

Follow-up examination was conducted 19.0±11.4 months after index EUS (16.7±11.4 and 23.1±11.4

SMTs = submucosal tumors

EUS = endoscopic ultrasound

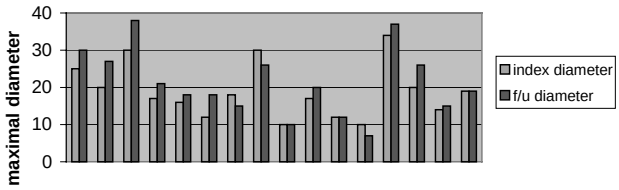

Figure 1. Maximal diameter of gastric submucosal tumors.

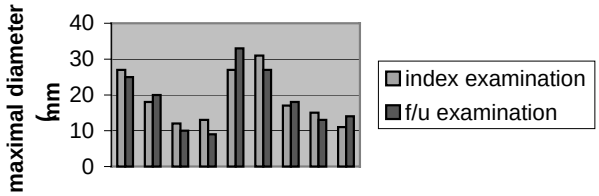

Figure 2. Maximal diameter of esophageal SMTs.

months for gastric and esophageal SMTs, respectively). At follow-up, maximal SMT diameter did not change significantly (21.7±9.0 and 19.7±8.2 mm for gastric and esophageal lesions, respectively) [Figures 1 and 2]. The echo pattern of 24 of the tumors did not change either. One of these patients insisted on surgery during which the tumor was resected and found to be a benign leiomyoma. One gastric lesion changed from hypoechoic to non-homogenous, and the regular margins changed to irregular after 17 months follow-up [Figure 3]. This lesion enlarged further during follow-up from 30 to 38 mm. The patient was operated on and a stromal tumor with high malignant potential was resected. In three other patients there was an increase of over 25% in maximal diameter at surveillance 12, 16 and 17 months after index EUS. In none of the three was a change in echo pattern or outer margins observed and they were not considered for surgery.

Following EUS surveillance, patients who did not undergo surgery were clinically followed. Two patients died from unrelated disease 24 and 15 months after the last EUS examination. Of the remaining 21 patients, 14 were lost to follow-up and 7 were well and denied gastrointestinal complaints 18–49 months (mean 35) after the last EUS examination.

Discussion

We demonstrated that during a mean period of 19 months there was no signficant change in the size of SMTs, neither was there any change in the echo pattern or outer margins of lesions in 24 of 25 patients (96%). The only patient in whom significant changes were observed was operated on and the resected tumor was found to be of high malignant potential.

Preoperative suspicion of malignancy of SMTs is generally difficult if not impossible. Most lesions are identified incidentally during endoscopy or a barium meal, and in most cases the patient has no symptoms related to the lesion. It is therefore extremely important to decide when

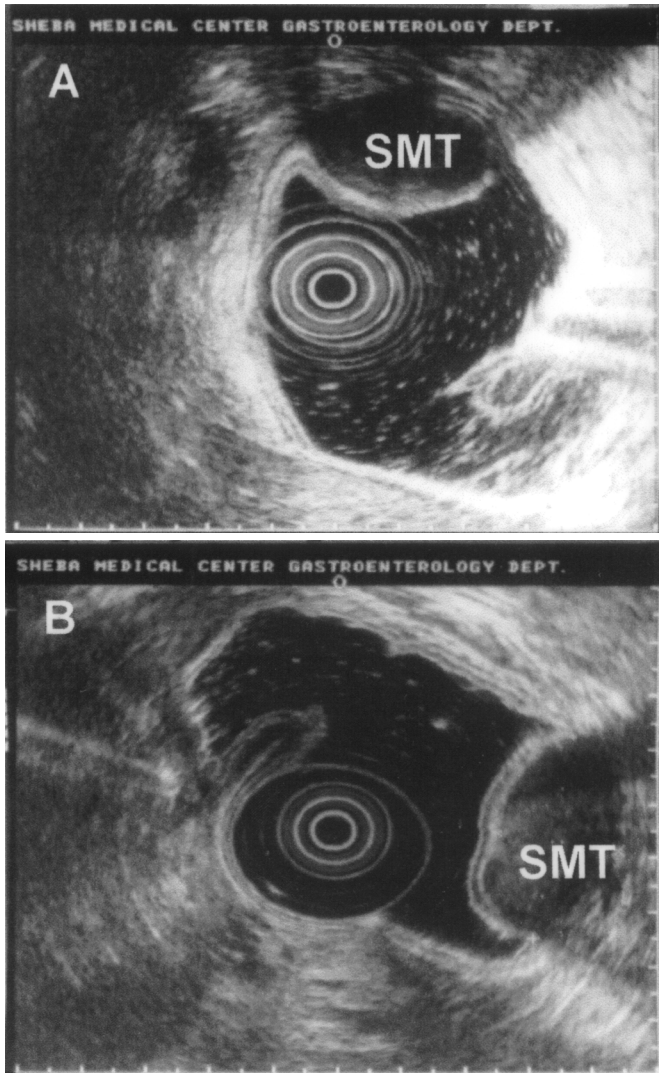

Figure 3. [A] Index EUS of a gastric SMT, showing a smooth margin and homogenous echogenicity. [B] Follow-up EUS of the same SMT, showing irregularity of margins and non-homogenous echogenicity.

to recommend surgical removal of an incidental upper gastrointestinal SMT. Many studies have tried to define sonographic features that may predict malignant potential of lesions [2–4,6–11]. Although some of these features were found to be of significant predictability, little is known about the natural course of an incidental finding of a small SMT (less than 40 mm). Tio et al. [3] followed four esophageal, eight gastric and two duodenal asymptomatic small leiomyomas for 1–3 years, and found no change in size, echo pattern or regularity of outer margins in any of the lesions. In our study the group of patients was twice as large and our findings agree with Tio's results. Ueyama et al. [12] assessed the clinical implication of tumor volume doubling time of seven gastric smooth muscle tumors during a follow-up of 6–51 months. All tumors were eventually resected. There was a strong negative correlation between the mitotic rate and the tumor volume doubling time, but their sample was too small and its

reliability was questionable. We could not evaluate tumor volume since EUS is a bi-dimensional study. Yet, in the one patient in whom the echo pattern changed during surveillance, there was also an increase in the maximal diameter of the tumor.

We conclude that since most small SMTs (<40 mm) do not exhibit changes that would raise the suspicion of malignant potential, a conservative policy of surveillance is probably safe.

References

1. Yasuda K, Nakajima M, Kawai K. Endoscopic ultrasonography in the diagnosis of submucosal tumors of the upper digestive tract. *Scand J Gastroenterol* 1986;21(Suppl 123):59–67.
2. Caletti GC, Zani L, Bolondi I, Brocchi E, Rollo V, Barbara L. Endoscopic ultrasonography in the diagnosis of gastric submucosal tumors. *Gastrointest Endosc* 1989;35:413–18.
3. Tio TL, Tytgat GNJ, den Hartog Jager FCA. Endoscopic ultrasonography for the evaluation of smooth muscle tumors in the upper gastrointestinal tract: an experience with 42 cases. *Gastrointest Endosc* 1990;36:342–50.
4. Yasuda K, Nakajima M, Yoshida S, Kiyota K, Kawai K. The diagnosis of submucosal tumors of the stomach by endoscopic ultrasonography. *Gastrointest Endosc* 1989;35:10–15.
5. Boyce GA, Sivak MV, Rosch T, Classen M. Fleischer DE, Boyce W, Lightdale CJ, Botet JF, Hawes RH. Lehman GA. Evaluation of submucosal upper gastrointestinal tract lesions by endoscopic ultrasound. *Gastrointest Endosc* 1991;37:449–54.
6. Hashimoto H, Mistumaga A, Suzuki S, Kurokawa K, Obata H. Evaluation of endoscopic ultrasonography for gastric tumors and presentation of three dimensional display of endoscopic ultrasonography. *Surg Endosc* 1989;3:173–81.
7. Kiyota K, Yasuda K, Fujimoto S, Nakajima M, Kawai K. Endoscopic ultrasonography in the diagnosis of esophageal submucosal tumors. In: Dancygier H, Classen M, eds. Fifth International Symposium on Endoscopic Ultrasonography. Munich: Demeter Verlag (*Zentralbld Gastroenterol Suppl*),1989:29–33.
8. Nakazawa S, Yoshino J, Nakamura T, Yamanaka T, Hase S, Kojima Y, Ohashi S, Niwa Y. Endoscopic ultrasonography of gastric myogenic tumors. A comparative study between histology and ultrasonography. *J Ultrasound Med* 1989;8:353–9.
9. Yamada Y, Kida M, Sakaguchi T, Matama S, Saigenji K. Differential diagnosis of submucosal tumors in the upper digestive tract using the endoscopic ultrasonography [Abstract]. World Congress of Gastroenterology, Sydney 1990
10. Rosch T, Lorenz R. Dancygier H, von Wichert A, Classen M. Endosonographic diagnosis of submucosal upper GI tract tumors. *Scand J Gastroenterol* 1992;27:1–8.
11. Murata Y, Yoshida M, Akimoto S, Ide H, Suzuki S, Hanyu F. Evaluation of endoscopic ultrasonography for the diagnosis of submucosal tumors of the esophagus. *Surg Endosc* 1988;2:51–8.
12. Ueyama T, Kawamoto K, Iwashita Y, Masuda K, Haraguchi Y, Oiwa T, Yoshida M, Utsunomiya T. Correlation between tumor volume doubling time and histologic findings in gastric smooth muscle tumors: clinical implications of tumor volume doubling time. *J Surg Oncol* 1995;60:12–17.

Correspondence: Dr. E. Melzer, Dept. of Gastroenterology, Sheba Medical Center, Tel-Hashomer 52621, Israel. Tel. (972-3) 530 2679; Fax. (972- 3) 530 2913.