Preoperative predictors of malignant gastric submucosal tumor

Ho Goon Kim, Seong Yeob Ryu, Sang Kwon Yun, Jae Kyoong Joo, Jae Hyuk Lee, Dong Yi Kim

Division of Gastroenterologic Surgery, Department of Surgery, Department of Pathology, Chonnam National University Medical School, Gwangju, Korea

Purpose: The preoperative prediction of malignant potential in patients with gastric submucosal tumors (SMTs) plays an important role in decisions regarding their surgical management. Methods: We evaluated the predictors of malignant gastric SMTs in 314 patients with gastric SMTs who underwent surgery in Chonnam National University Hospital. Results: The malignant SMTs were significantly associated with age (odds ratio [OR], 1.067; 95% confidence interval [CI], 1.042 to 1.091; P < 0.0001), presence of central ulceration (OR, 2.690; 95% CI, 1.224 to 5.909; P = 0.014), and tumor size (OR, 1.791; 95% CI, 1.483 to 2.164; P < 0.0001). Receiver operating characteristic curve analysis showed that tumor size was a good predictor of malignant potential. The most relevant predictor of malignant gastric SMT was tumor size with cut-offs of 4.05 and 6.40 cm. Conclusion: Our findings indicated that age, central ulceration, and tumor size were significant preoperative predictors of malignant SMTs. We suggest that 4 cm be selected as a threshold value for malignant gastric SMTs. In patients with a gastric SMT larger than 4 cm with ulceration, wide resection of the full thickness of the gastric wall or gastrectomy with adequate margins should be performed because of its malignant potential.

Key Words: Stomach neoplasms, Submucosal tumor, Malignant factor, Preoperative predictor

INTRODUCTION

Gastric submucosal tumors (SMTs) account for less than 2% of all neoplasms of the stomach and stromal tumors are the most common tumors of the gastric submucosa [1,2]. Most SMTs are asymptomatic and benign, but 15 to 30% are malignant [3,4]. Endoscopic ultrasonography (EUS) is widely used following endoscopy for the evaluation of SMTs, but EUS is not yet reliable enough to differentiate between benign and malignant SMTs. Brand et al. [5] reported a sensitivity of 95% and a specificity of 72% for diagnosing gastrointestinal stromal tumors, while Oguz et al. [6] reported a sensitivity of 50% and specificity of 72% for diagnosing gastrointestinal SMTs. More than 30% of the patients with malignant tumors develop local recurrence and distant metastases [7]. Therefore, the preoperative prediction of malignant potential in patients with gastric SMTs plays an important role in the decision regarding surgical management. This study examined the preoperative predictors of malignant gastric SMTs.
METHODS

Patients and specimens

From January 2004 to December 2009, 314 patients (151 males, 163 females) with suspected SMT of the stomach underwent surgery in Chonnam National University Hospital, Gwangju, Korea. Patient information was gathered from the hospital records retrospectively. Eleven variables were evaluated for each patient: patient age and gender, the use of EUS, pre- and postoperative diagnosis, tumor growth pattern, exploration method, type of operation, presence of central ulceration, and tumor location and size. To establish the diagnosis and determine the extent of the disease, all patients underwent a preoperative work-up including esophagogastroduodenoscopy, EUS, and computed tomography (CT). We classified the patients into malignant potential and benign groups. The aggressive risk was defined according to the size and mitotic rate of the tumors, as proposed by Fletcher et al. [8]. We evaluated the accuracy of the preoperative diagnosis and the sensitivity and specificity of the preoperative diagnosis in all cases. Furthermore, we compared the sensitivity and specificity of diagnosis with and without performing EUS.

Operation

The operative indications included a SMT > 20 mm in size and definitely visible by endoscopy, irrespective of symptoms. Tumors < 20 mm in size measured on EUS or CT were observed or a gastrectomy was performed when the patient requested surgery because of concern. Laparoscopic resection and local excision were performed using three methods: extragastric wedge resection was performed for SMTs with an exophytic growth pattern; transgastric resection was performed for endophytic SMTs; and intragastric resection was performed for SMTs located at the esophagogastric junction. Intraoperative gastroscopy was used to identify and mark small tumors and to ensure that the tumor was excised with an adequate margin. Conventional open surgery was performed via an upper midline laparotomy.

Statistical analysis

To identify significant independent correlates of overall and malignant risk, a stepwise procedure was applied for selected factors with $P < 0.05$ in order to identify independent potent risk factors. A multiple logistic model was applied to evaluate the odds ratios of the major risk factors. Statistical analyses were conducted using PASW ver. 18.0 (IBM Co., Armonk, NY, USA).

RESULTS

Table 1 shows the clinicopathological features of the pa-