Morphological changes in gastric carcinoma with progression

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Abstract: By combining morphological two indices, namely, (1) the degree of differentiation of glandular tubules (well or poor) and (2) the amount of intracellular mucus (rich or poor), we previously classified histological types of gastric carcinoma into four types. Using this histological classification, we studied the morphological changes of gastric carcinoma according to extra-gastric invasion in 200 autopsy and 200 resected cases. In cases in which the predominant histological type in the lamina propria was “tubular differentiation—well, mucus in cytoplasm—poor,” there was a greater incidence of co-existence with other histological types. In many of these cases, the predominant histological findings changed to “tubular differentiation—poor” in the subserosa, followed by direct invasion into neighboring extra-gastric tissues. In all cases in which the predominant histological type in the lamina propria was “tubular differentiation—poor,” the predominant histological type in the subserosa was also “tubular differentiation—poor.” To understand the mode of extension of gastric carcinoma in relation to the histological type, we must consider not only the characteristics of the predominant histological types of carcinoma but also those of co-existing types, especially in cases of “tubular differentiation—well, mucus in cytoplasm—poor.”

Key words: gastric carcinoma, cancer progression and differentiation, clinical pathology, autopsy, surgical pathology

Introduction

Previously, the authors presented a new histological classification of gastric carcinoma consisting of the following four types: (I) tubular differentiation—well, mucus in cytoplasm—poor (group I); (II) tubular differentiation—well, mucus in cytoplasm—rich (group II); (III) tubular differentiation—poor, mucus in cytoplasm—poor (group III); (IV) tubular differentiation—poor, mucus in cytoplasm—rich (group IV) (Fig. 1).1 In Fig. 2, the relationship of this histological classification with that of the Japanese Research Society for Gastric Cancer2 is illustrated (Fig. 2).

We considered that our histological classification clearly revealed the relationship between the histological type of gastric cancer and the mode of progression.1 In comparison with other established histological classifications,2–7 our new histological classification of gastric cancer has recently been reported to be the only important predictor of outcome by Martin et al.8 Using this classification, we have also reported that the mode of extension of gastric carcinoma was different with each histological type.1 To our surprise, many cases which revealed good tubular differentiation (groups I and II), and which had been thought to develop expansive and non-invasive growth,9 showed a high incidence of direct invasion to the extragastric neighboring organs, although both the rate and the severity were much lower than in those with poor tubular differentiation (groups III and IV)1 (Table 1).

We therefore compared histological findings at invaded site with those in the primary site in autopsy cases. We then also examined the morphological multiplicity of gastric carcinoma in resected cases, in order to clarify the morphological changes related to the predominant histological type in the mucosal layer of the stomach that accompanied by cancer.
progression. The results are described here, together with a statistical analysis.

Subjects and methods

The pathological findings of both autopsy and resected gastric carcinoma cases were studied histologically in detail to analyze the morphological changes of carcinoma that accompanied (1) intra-mucosal proliferation and (2) deeper progression within the gastric wall and to the extra-gastric tissues.

Materials

Autopsy cases. Two hundred cases of primary gastric carcinoma (144 after gastrectomy and 56 without gastrectomy), autopsied at the Department of Pathology, Tokyo Metropolitan Komagome Hospital within 6 h after death, in the 15 years from 1975 to 1989, were selected for this study. One hundred and fifty-five cases showed direct cancer invasion to surrounding organs, such as the omentum, biliary tract, pancreas, liver, and intestine, and these were subjected to further detailed histological study.

Resected specimens. We also selected, from patients operated for gastric cancer at the Department of Surgery in the same institute in the 5 years between 1976 and 1980, 200 resected specimens of gastric carcinoma with cancerous infiltration beyond the subserosa of the stomach (the deepest layer of the cancerous infiltration is subserosa; ss, cancer cells present on the serosal surface and exposed to the peritoneal cavity; se, and cancer cells infiltrating the neighboring tissue; si, gastric carcinoma according to the classification of the Japanese Research Society for Gastric Cancer (Jpn RSGC) in The general rules for study of gastric cancer in surgery and pathology).

Methods

Autopsy cases. In the autopsy cases, sections about 5-mm-wide were cut from the center of the primary and metastatic lesions and fixed with 1:6 formalin. These sections were embedded in paraffin and sliced at intervals of about 4-μm. Hematoxylin and eosin staining and alcian blue and Periodic Acid Schiff (PAS) doublestaining were prepared.

The extragastric direct infiltration to the neighboring organs in autopsy cases was classified, as follows, in terms of degree, namely, severe, moderate, and slight-to-none, in relation to the degree of involvement of the biliary tract and intestine:

Severe: The intestinal and/or biliary tracts are totally obstructed by direct tumor invasion (all the patients are considered to have developed clinical symptoms of intestinal obstruction and/or obstructive jaundice).