

Comparative Study of the Pathological Characteristics of Gastric Stump Carcinoma and Carcinoma of the Upper Third of the Stomach

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ABSTRACT: **Background:** Gastric stump cancer is often described as a tumor with a poor prognosis and low resectability rates.

Objectives: To compare the pathological characteristics of gastric stump cancer patients with those of patients with proximal gastric cancer.

Methods: This retrospective study was based on the demographic and pathological data of patients diagnosed with gastric cancer and treated at Assaf Harofeh Medical Center during an 11 year period. The patients were divided into two groups: those undergoing proximal gastrectomy for proximal gastric cancer and those undergoing total gastrectomy for gastric stump cancer.

Results: Patients with gastric stump cancer were predominantly male, older ($P = 0.202$, not significant), and had a lower T stage with less signet-ring type histology, fewer harvested and fewer involved lymph nodes ($P = 0.03$, statistically significant) and less vascular/lymphatic involvement than patients with proximal gastric cancer.

Conclusions: The lower incidence of involved lymph nodes and lymphovascular invasion in gastric stump cancer as compared to proximal gastric cancer in this study may imply that the prognosis of gastric stump cancer may be better than that of proximal gastric cancer. However, to verify this assumption a study comparing patient survival is required.

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KEY WORDS: gastric stump cancer (GSC), gastric remnant cancer (GRC), proximal stomach cancer (PSC), pathological characteristics

remnant stomach at least 10 years after distal gastrectomy, without taking into account whether gastric resection was performed for benign or malignant disease. Reviewing the literature, it becomes evident that different authors mix both definitions for tumors occurring after gastric resection that was performed for either benign or malignant disease [1,3,4]. GSC and GRC are rare, the incidence ranging between 1.1% and 10% [1-7] of all gastric cancer patients. The incidence of primary proximal gastric cancer is reported to be around 3%–4% [1,8]. To simplify the nomenclature, we united GSC and GRC under one term – GSC.

GSC is often described as a tumor with a poor prognosis and low resectability rates in the range of around 38% to 40%, because of extended lymph node metastases and infiltration of adjacent organs [1,5,6,9]. The reported 5 year disease-specific overall survival rate for patients undergoing gastrectomy for GSC ranges from 7% to 20% [1,5-7,9]. The aim of our study was to compare the pathological characteristics of GSC patients with those of patients with PGC.

PATIENTS AND METHODS

This retrospective study, approved by the Institutional Review Board of Assaf Harofeh Medical Center, is based on demographic and pathological data retrieved from a computerized database of all patients with gastric cancer treated at Assaf Harofeh Medical Center during an 11 year period.

The patients were divided into two groups: Group I – patients undergoing proximal gastrectomy for PGC (Siewert type II and III) [1,10], and Group II – patients undergoing completion total gastrectomy for GSC that developed following distal gastrectomy for benign disease (duodenal ulcer) or for distal gastric cancer.

The following parameters were documented: gender, age, T stage, overall number of lymph nodes harvested, percentage of lymph nodes involved by the tumor, tumor differentiation, tumor morphology, and American Joint Committee

The definitions of gastric remnant cancer and gastric stump cancer are somewhat confusing. While Thorban et al. [1] and Safatle-Ribeiro et al. [2] define GSC as a carcinoma developing in the gastric stump at least 5 years following gastric resection that was performed for ulcer disease, Tanigawa et al. [3] define GRC as cancer developing in the

GSC = gastric stump cancer
GRC = gastric remnant cancer

PGC = proximal gastric cancer

on Cancer stage. All pathological slides were re-reviewed by a senior pathologist (J.S.).

Statistical analysis was performed at the Department of Statistics of Tel Aviv University (*t*-test for age, Mann-Whitney test for positive lymph nodes). Other parameters could not be studied due to the limited number of patients in group II.

RESULTS

Group I comprised 48 patients with the tumor located in the cardia – Siewert type II and III. Of these 48 patients, 34 underwent proximal gastrectomy and 14 total gastrectomy [Table 1]. Group II consisted of 9 patients who developed GSC. All nine patients underwent total gastrectomy. There were 29 males and 19 females with a mean age of 64.0 years in Group I, and 6 males and 3 females with a mean age of 70.1 years in Group II (*P* = 0.202, not significant) [Table 1].

The mean number of lymph nodes harvested per patient was 16.7 in Group I as compared to 8.3 in Group II. However, the mean number of metastatic lymph nodes per patients was 3.7 in Group I versus 0.7 in Group II (*P* = 0.03, statistically significant) [Table 1].

DISCUSSION

GSC or GRC are synonyms for the same clinical entity, where gastric cancer develops in the stump or remnant stomach many years after gastrectomy either for benign or malignant disease [1-9,11-13]. The incidence of GSC following distal subtotal gastrectomy for peptic disease increases logarithmically with the years and specifically from the 5th postoperative year onwards [1,4-8]. Hence, this particular group of patients requires gastroscopic surveillance [1,4-7,9,14].

It is believed that once developed, GSC or GRC carries a grave prognosis. Is this really so? Different studies report conflicting results, with some describing the aggressive behavior of these tumors and others a less aggressive clinical course [1-9,11-14]. Different studies compared the pathological features of GSC or GRC to those of gastric cancer located in the cardia [1-9,11,12,14].

We used the same model for our study. We compared nine patients with GSC to 48 randomly selected patients with Siewert type II and III gastric cancer [1,10]. As was the case in other studies [1,4,5,7,9,12], the overall number of patients with GSC was small. Nevertheless, the differences in the various pathological features of tumor aggressiveness are clear. All tumor parameters – such as T stage and N stage; tumor differentiation; vascular, lymphatic or neural invasion; and the presence of signet-ring differentiation – had better prognostic indexes in the GSC group as compared to the PGC group. These findings are shown clearly in the study by Han and co-authors [12] in contrast to the studies by others [4,11].

Table 1. Comparative data on pathological characteristics of the groups studied

	Group I (primary PGC) 48 patients	Group II (GSC + GRC) 9 patients
Mean age (yrs)	64.0 (33–85)	70.1 (51-86)
T stage		
In situ	2 (4.1%)	0 (0%)
T1	3 (6.25%)	2 (22.2%)
T2	12 (25.0%)	3 (33.3%)
T3	30 (62.5%)	4 (44.5%)
T4	1 (2.0%)	0 (0%)
AJCC stage		
IA	2 (4.1%)	2 (22.2%)
IB	10 (20.8%)	3 (33.3%)
II	8 (16.6%)	2 (22.2%)
IIIA	13 (27.0%)	1 (11.0%)
IIIB	6 (12.5%)	0 (0%)
IV	7(14.6%)	1 (11.0%)
Overall lymph nodes harvested	777 (16.7 per patient)	75 (8.3 per patient)
Positive lymph nodes	169 (3.7 per patient)	7 (0.7 per patient)
Pathologic features		
Differentiation		
Well differentiated	4 (8.3%)	0 (0%)
Moderately differentiated	24 (50.0%)	3 (33.3%)
Poorly differentiated	20 (41.7%)	6 (67.0%)
Macroscopic features (Borrmann's classification)		
Ulcer type	24 (50.0%)	2 (22.0%)
Polyp type	11 (22.9%)	3 (33.3%)
Fungating	11 (22.%)	3 (33.3%)
Not reported	2 (4.5%)	1 (11.0%)
Microscopic features (Lauren's classification)		
Diffuse type	12 (25.0%)	4 (44.5%)
Intestinal type	15 (31.25%)	3 (33.3%)
Both types	3 (6.25%)	0 (0%)
Unclassified/indeterminate	18 (37.5%)	2 (22.2%)
WHO classification		
1. Intestinal type: Papillary	1 (2.0%)	1 (11.0%)
Tubular	Not reported	Not reported
2. Diffuse type: signet-ring cells	16 (33.3%)	2 (22.0%)
Mucin production tumors	4 (8.4%)	0 (0%)
Vascular invasion	26 (54.0%)	2 (22.0%)
Neural invasion	18 (37.5%)	2 (22.0%)

PGC = proximal gastric cancer, GSC = gastric stump cancer, GRC = gastric remnant cancer, AJCC = American Joint Committee on Cancer

A point of interest was the number of lymph nodes harvested: 16.7 per patient undergoing primary surgery but only 8.3 per patient undergoing surgery for GSC. The explanation is probably based on the fact that a substantial number of nodes had been harvested during the primary resection.

As the prognosis of patients with gastric cancer depends on the T and N stages, which determine the stage of the disease, it can be clearly seen that in the PGC group most of the patients had stage IIIA, IIIB or IV cancer (54.1%) vs. 22% in the GSC group. Moreover, lymphovascular invasion, another ominous prognostic factor, was again found in 54% of the patients with PGC as compared with 22% in the GSC group. Only poorly differentiated tumors were surprisingly more frequent in the GSC group (67%) as compared to the PGC group (41.7%).

In conclusion, patients with GSC were predominantly male, older ($P = 0.202$, NS), and had a lower T stage with less signet-ring type histology, fewer harvested and fewer involved lymph nodes, and less lymphatic/vascular involvement ($P = 0.03$, statistically significant) than patients with PGC. These data demonstrate the somewhat better pathological characteristics of the patients in Group II.

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