International Journal of Surgery 51 (2018) 97–103

Contents lists available at ScienceDirect

International Journal of Surgery

journal homepage: www.elsevier.com/locate/ijsu

Original Research

Clinicopathological characteristics and prognostic factors of remnant gastric cancer: A single-center retrospective analysis of 90 patients

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ARTICLE INFO

Keywords:
Remnant gastric cancer
Clinicopathological features
Prognosis
Gastrectomy

ABSTRACT

Background: The prognosis of remnant gastric cancer (RGC) is significantly poor. However, the mechanism and some clinical features of RGC have not been fully understood and are still under debate.

Materials and methods: From January 2000 to January 2014, 90 RGC patients were enrolled in this retrospective study. Patients were divided into two groups according to primary disease. Clinicopathological features and survival outcomes were compared between two groups.

Results: A total of 34 (37.8%) patients were diagnosed with remnant gastric cancer following benign disease (RGCB) and 56 (62.2%) were diagnosed with remnant gastric cancer following malignant disease (RGCM). The mean time interval from the primary operation to the development of RGC was 12.5 ± 13.3 years in all RGC patients. The mean time interval in RGCB was significantly longer than that in RGCM ($P < 0.01$). The 1-, 2-, and 3- year overall survival rates of all patients were 56.1%, 38.2% and 33.2%, respectively. Univariate analysis indicated that tumor size, curability, histology type, serosa invasion, nodal involvement and distant metastasis were prognostic factors for RGC. The multivariate Cox regression analysis revealed that distant metastasis was an independent prognostic factor for RGC.

Conclusion: RGC occurred earlier in patients with gastrectomy for primary malignant disease than for primary benign disease, even though the primary disease made no difference to the survival of RGC. Nonetheless, RGC patients experienced dismal overall survival. Therefore, early diagnosis plays a significant role in successfully carrying out curative resection and improving the prognosis for RGC.

1. Introduction

Gastric cancer (GC) remains the fourth most frequent malignancy and the second leading cause of cancer-related death in the world [1]. Especially, a high prevalence of GC can be observed in Eastern Asian countries, such as China, Korea and Japan [2].

Remnant gastric cancer (RGC) is a less prevalent GC, which was first described in 1922 as a carcinoma occurring in remnant stomach at least five years after the initial surgery for a benign disease [3]. Recently, RGC refers to all cancers detected from the remnant stomach after partial gastrectomy, irrespective of the primary disease [4–7]. According to reports, the incidence of RGC ranged from 1 to 8% of all GC cases [8,9]. Nevertheless, RGC was frequently diagnosed at advanced stage, which was associated with low rate of curative resection and dismal prognosis, suggesting that RGC may have distinct biological features from primary GC [10,11]. To investigate the characteristics of RGC, some authors have compared RGC with primary GC, and discovered no significant difference in survival between RGC and primary GC. However, others insisted that RGC was linked with a worse prognosis than primary GC [12,13]. In addition, some characteristics of RGC have already been described in previous studies [8,14–16], such as the time interval between primary and second surgeries, tumor location, TNM stage and primary disease. However, no consistent results have been obtained. In addition, it is difficult to fully clarify the clinical characteristics of RGC due to its relative rarity. As a result, some characteristics of RGC remain a source of controversy, which are under discussion. For instance, it is unclear whether tumor location and primary disease will affect RGC survival. Therefore, the current study was thereby conducted aiming to clarify the clinicopathological characteristics and examine the factors affecting the survival of RGC patients from our institution.

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https://doi.org/10.1016/j.ijsu.2018.01.019
Received 18 October 2017; Received in revised form 15 November 2017; Accepted 2 January 2018

2. Materials and methods

This study was registered a priori with http://www.ResearchResgistry.com/. The work has been reported in line with the STROCSS criteria [17].

2.1. Definition of RGC

In the current study, RGC was defined according to the Japanese Classifications and Treatment Guideline for Gastric Cancer (14th edition) [18], which was defined as all carcinomas in the remnant stomach following gastrectomy, regardless of the primary disease (benign or malignant), risk of recurrence, extent of resection or reconstruction type. In the present study, patients with positive pathological margins in the initial operation were excluded and only patients with negative pathological margins were enrolled. Patients with negative pathological margins in the initial gastrectomy who developed local recurrence in the gastric stump were also diagnosed with RGC and included in this study.

A total of 90 patients with RGC treated in the Gastrointestinal Surgery Department of West China Hospital from January 2000 to January 2014 were enrolled in this retrospective study. All cases had complete medical data and were diagnosed based on endoscopic and pathological examinations. Forty-two patients underwent surgical treatment, whereas the remaining 48 received non-surgical treatment as a result of distant metastasis or poor physical conditions. Additionally, total gastrectomy and Roux-en-Y reconstruction were performed during the second operation. Data collected from the Surgical Gastric Cancer Patient Registry database of West China Hospital were employed in this retrospective cohort study. Moreover, this study had been registered in the Clinical Research Committee of Gastric Cancer Surgery in West China Hospital.

Specifically, the medical records were reviewed, and clinicopathological as well as follow-up data were collected. Additionally, clinicopathological data were recorded in strict accordance with the Japanese Classification of Gastric Carcinoma (3rd English edition) [18]. Besides, the tumor-node-metastasis (TNM) classification of all patients was reevaluated based on the seventh edition of the AJCC TNM staging criteria [19]. Meanwhile, tumor histological type was categorized as differentiated or undifferentiated type. Of them, the differentiated type included papillary adenocarcinoma, as well as well- or moderately-differentiated adenocarcinoma; whereas the undifferentiated one referred to poorly-differentiated or undifferentiated adenocarcinoma, signet ring carcinoma, and mucinous carcinoma. Both benign and malignant diseases were included as the initial diseases. Furthermore, patients were grouped into remnant gastric cancer following benign disease (RGCB) and remnant gastric cancer following malignant disease (RGCM) according to the initial disease. RGC location was classified into anastomotic and non-anastomotic site.

2.2. Follow-up

Follow-up was mainly performed by regular out-patient visits and telephone interviews. Follow-up information was updated until January 1, 2017. Patients were followed-up every 3–6 months for the first 2 years and 6–12 months for the next 3–5 years, then annually. Patients would have physical examination, laboratory blood tests, ultrasound, abdominal CT scan and endoscopy each time. There were 6 patients lost to follow-up, because they refused reexamination in our hospital. The rate of follow-up was 93.3%.

2.3. Statistical analysis

All data were analyzed using SPSS version 19.0 statistical software package (SPSS, Chicago, IL, USA). Continuous variables were expressed as mean ± standard deviation, while categorical variables were compared using chi-square test and Fisher's exact test. Survival curves were plotted according to the Kaplan-Meier method, which were subsequently compared using log-rank test. Independent factors correlated with the prognosis of RGC were identified through multivariate analysis using the Cox proportional hazard regression model. A probability (P) less than 0.5 was considered statistically significant. All P-values were calculated using two-sided test.

Table 1
Clinicopathlogical features of 90 RGC patients and association between clinicopathological features and initial disease.

Factors	RGCB (34)	RGCM (56)	*P* value
Gender, n (%)			0.039
Male	31 (91.2)	41 (73.2)	
Female	3 (8.8)	15 (26.8)	
Age (year) (mean ± SD)	62.4 ± 8.3	55.9 ± 5.1	0.003
Age (year), n (%)			0.320
< 60	17 (50)	34 (60.7)	
≥60	17 (50)	22 (39.3)	
Tumor size (cm) [n (%)]			0.356
< 5 (N = 40)	13 (38.2)	27 (48.2)	
≥5 (N = 50)	21 (61.8)	29 (51.8)	
Tumor size (cm) (mean ± SD)	5.8 ± 3.1	5.8 ± 2.8	0.724
Reconstruction type of the first operation, n (%)			0.048
B-I	9 (26.5)	12 (21.4)	
B-II	25 (73.5)	35 (62.5)	
GEA	0 (0)	9 (16.1)	
Tumor location, n (%)			0.478
Anastomotic site	22 (64.7)	32 (57.1)	
Non-anastomotic	12 (35.3)	24 (42.9)	
Treatment types, n (%)			0.708
Curative resection	14 (41.2)	21 (37.5)	
Palliative resection	2 (5.9)	5 (8.9)	
Exploratory operation	12 (35.3)	24 (42.9)	
Without operation	6 (17.6)	6 (10.7)	
Histology type, n (%)			0.925
Differentiated (G1/G2)	7 (20.6)	12 (21.4)	
Undifferentiated (G3/G4)	27 (79.4)	44 (78.6)	
Serosa invasion, n (%)			0.437
Negative	7 (20.6)	8 (14.3)	
Positive	27 (79.4)	48 (85.7)	
N status, n (%)			0.973
N (−)	8 (23.5)	13 (23.2)	
N (+)	26 (76.5)	43 (76.8)	
M stage, n (%)			0.729
M0	14 (41.2)	21 (37.5)	
M1	20 (58.8)	35 (62.5)	
TNM stage, n (%)			0.985
I	4 (11.8)	6 (10.7)	
II	3 (8.8)	5 (8.9)	
III	7 (20.6)	10 (17.9)	
IV	20 (58.8)	35 (62.5)	
Combined resection, n (%)			0.925
Yes	7 (20.6)	12 (21.4)	
No	27 (79.4)	44 (78.6)	
Interval years (mean ± SD)	23.8 ± 11.8	5.6 ± 8.6	< 0.001
Chemotherapy, n (%)			0.219
No	32 (94.1)	48 (85.7)	
Yes	2 (5.9)	8 (14.3)	

RGC, remnant gastric cancer; RGCB, remnant gastric cancer remnant gastric cancer following benign disease; RGCM, remnant gastric cancer following malignant disease; GEA, gastroesophageal anastomosis; SD, standard deviation; G1/G2, well or moderately differentiated; G3/G4, poorly or undifferentiated.

3. Results

3.1. Comparison of clinicopathological characteristics between RGCB and RGCM groups

The demographic and clinicopathological features of all the 90 RGC patients were presented in Table 1. Thirty-five (38.9%) patients qualified for curative resection, while 7 (7.8%) received palliative resection.