Pathology – Research and Practice 210 (2014) 565–570

Contents lists available at ScienceDirect

Pathology – Research and Practice

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

Original Article

Tumor deposits in gastric carcinomas

Ayca Ersen[a,*], Mehtat S. Unlu[a], Tulay Akman[b], Ozgul Sagol[a], Ilhan Oztop[b], Koray Atila[c], Seymen Bora[c], Huyla Ellidokuz[d], Sulen Sarioglu[a]

[a] Dokuz Eylul University, Faculty of Medicine, Pathology Department, Turkey
[b] Dokuz Eylul University, Faculty of Medicine, Department of Medical Oncology, Turkey
[c] Dokuz Eylul University, Faculty of Medicine, Department of General Surgery, Turkey
[d] Dokuz Eylul University, Institute of Oncology, Turkey

ARTICLE INFO

Article history:
Received 7 December 2013
Received in revised form 20 February 2014
Accepted 10 March 2014

Keywords:
Tumor deposit
Gastric adenocarcinoma
Intestinal type
Vascular invasion

ABSTRACT

We performed this study to examine the prevalence of tumor deposits (TD) in gastric adenocarcinomas (GACa), and the relevance of their presence, size and type to clinical outcome.

Ninety-six patients, histopathologically diagnosed as GACa following a total/subtotal gastrectomy were included, and clinicopathologic data were recorded.

Due to the statistical analysis, the majority of TD(+) cases were of intestinal type and showed vascular invasion. In these cases, the incidence of local recurrence was significantly higher. The majority of GACa of intestinal type with TD were of high grade and showed vascular invasion. Recurrence and death were more commonly encountered among them. The recurrence-free survival (RFS) was significantly shorter in patients with TDs, which was also confirmed by multivariate analysis, and there was a significant difference between both RFS and overall survival of TD(+) and TD(−) cases of intestinal type GACa.

In conclusion, in this study, we demonstrate that TDs are not infrequently observed in GACa, they are more commonly associated with the intestinal type and vascular invasive gastric cancers. Our study shows the prognostic impact of TDs, especially regarding the RFS. Therefore, the documentation of TDs might be considered for prospective studies, especially for the intestinal type GACa, a shortcoming of this study.

Introduction

Gastric adenocarcinoma (GACa), classified as intestinal and diffuse types with pathogenetic and prognostic implications by Lauren [9] about half a century ago, is still the second main cause of cancer-related death. A search for histopathological prognostic and predictive factors is still welcome.

Tumor deposits (TD) first recognized by Gabriel in 1935 [6,24] were recently defined in colorectal adenocarcinomas (CRCa) as focal aggregates of adenocarcinoma located in the pericolic or perirectal fat, discontinuous with the primary tumor and with no evidence of a lymph node. They are identified in approximately 30% of tumors of the large bowel [2,11]. These are integrated to the N classification of CRCa in 2010[1].

TDs are identified also in GACa; however, the presence and the prognostic significance of TD in these carcinomas are not well-documented so far. Up to date, there are only two series about the TD in GACa with prognostic implications [10,18]. The AJCC staging for GACa consider all perigastric metastatic nodules without evidence of residual lymph node tissue as regional lymph node metastases.

We performed this study to examine the prevalence of TDs in GACa and the relevance of their presence, size, type and numberto the clinical outcome.

Materials and methods

The patients undergone total/subtotal gastrectomy and histopathologically diagnosed as GACa between January 1999 and December 2010 were reviewed. Excluding the neuroendocrine carcinoma and squamous carcinoma cases, 96 patients with sufficient clinical data and available archival pathology material were included in this study. Medical records for each patient were reviewed to determine the sex, age at initial diagnosis, type of surgery, date of first recurrence, type of adjuvant therapy (if any), and date of death or last encounter. Pathology archival materials were reviewed, and the tumors were reviewed in terms of site,

* Corresponding author at: Dokuz Eylul University, Faculty of Medicine, Pathology Department, 35340 Inciralti, Izmir, Turkey. Tel.: +90 232 4123401.
E-mail address: aycaersen@gmail.com (A. Ersen).

http://dx.doi.org/10.1016/j.prp.2014.03.006
0344-0338/

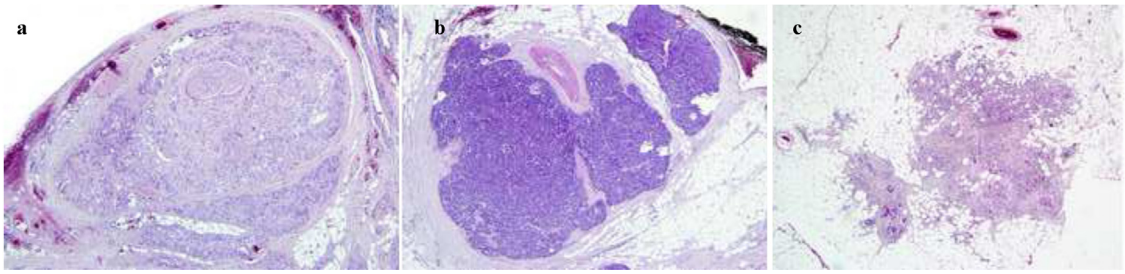

Fig. 1. (a) Perineural TD; adjacent to a peripheral nerve. (b) Perivascular TD; adjacent to a blood vessel. (c) Perilymphatic TD; adjacent to a lymph vessel.

histologic type (diffuse/intestinal; according to Lauren classification [9]), histologic grade (according to the current CAP protocol, version: 3.2.0.1), pathologic tumor and lymph node (pT, pN [1]), status of surgical margins, number of metastatic lymph nodes, status of perineural/lymphatic/vascular invasion. The number of metastatic lymph nodes was counted along with the TDs and pN classification was revisited.

Evaluation of tumor deposits

Type of TDs was classified as follows according to the adjacent histologic structures (a modified classification of Goldstein et al. [7] and Ratto et al. [15]): perineural; TDs adjacent to a peripheral nerve (Fig. 1a), perivascular; TD adjacent to a blood vessel (Fig. 1b), perilymphatic; TD adjacent to a lymph vessel (Fig. 1c), mixed; TDs of at least 2 types together.

Also, the maximum diameter of the deposits was measured, and the number of TDs was documented.

Statistical Analysis

Statistical analyses were performed using SPSS 15.0 software (SPSS, Chicago, IL). The Kolmogorov–Smirnov test was used to analyze the normal distribution of the variables ($P > 0.05$). Comparisons between TD and other clinicopathologic factors were estimated using the Chi-square or Mann–Whitney U test. Overall and recurrence-free survival rates were determined using the Kaplan–Meier estimator. The log-rank test was used to identify differences between the survival curves of different patient groups. Multivariate analyses using the Cox proportional hazards model were carried out to estimate the impact of various parameters on recurrence-free and overall survival.

Results

Clinicopathological features and the prevelance of TDs

Fifty-five cases (53.7%) were female and 41 cases (42.7%) were male. The mean age at the time of diagnosis for all patients was 57 years, with a range of 33 to 78. A total of 58 patients (60.4%) have died due to the disease, and 38 patients (39.6%) were alive. The mean overall survival time was 33 months (range 1–91 months). The other clinicopathologic features were shown in Table 1.

Twenty-three (24%) of the cases had TDs of any type. Ten cases had only one type (perilymphatic, parivascular or perineurial) TD, and 13 cases had at least 2 types of TD, which were accepted as mixed type. The number of TDs ranged from 1 to 47,.The smallest diameter was 4 mm and the greatest diameter was 14 mm. After excluding TDs which were previously accepted as lymph node metastasis, 4 cases (17.3% of the cases with TD) had a different pN status.

Table 1
Clinicopathologic features of the cases.

Clinicopathologic features	% (*n*)
Localization	
Cardia	19.8 (19)
Antrum	34.4 (33)
Corpus	36.5 (35)
Fundus	5.2 (5)
Histologic type	
Diffuse	47.9 (46)
Intestinal	52.1 (50)
Histologic grade	
1	10.4 (10)
2	20.8 (20)
3	60.4 (58)
4	8.3 (8)
Extent of resection	
Total	60.4 (58)
Subtotal	39.6 (38)
pT	
1	6.3 (6)
2	33.3 (32)
3	13.5 (13)
4	46.9 (45)
pN	
0	17.7 (17)
1	16.7 (16)
2	20.8 (20)
3	44.8 (43)
Perineurial invasion	
Positive	63.5 (61)
Negative	36.5 (35)
Vascular invasion	
Positive	34.4 (33)
Negative	65.6 (63)
Lymphatic invasion	
Positive	70.8 (68)
Negative	29.2 (28)
Surgical margins	
Positive	13.5 (13)
Negative	86.5 (83)
Adjuvant therapy	
Chemotherapy	79.2 (76)
None	20.8 (20)
Tumor deposit	
Present	24.0 (23)
Perilymphatic	5.2 (5)
Perineurial	1.0 (1)
Perivascular	4.2 (4)
Mixed	13.5 (13)
Absent	76.0 (73)

Statistical analysis

TDs and clinicopathologic features

In univariate analysis (Chi square test), there was no significant correlation between the presence of TDs and histologic grade, pT, pN, perineurial invasion, lymphatic invasion or positive margins. However, there was a significant correlation between the presence of TD and histologic type and/or vascular invasion. The majority of TD(+) cases were of intestinal type and/or showed