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CASE REPORT

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Systemic lupus erythematosus complicated with gastric cancer in an old man: A case report and literature review

Ge Nan[1] | Zhang Ning[1] | Qu Xuan[1] | Li Xiao Yi[2] | Liu Xiao Hong[1]

[1]Department of Geriatrics, Peking Union Medical College Hospital, Chinese Academy of Medical Sciences, Beijing, China
[2]Department of Basic Surgery, Peking Union Medical College Hospital, Chinese Academy of Medical Sciences, Beijing, China

Correspondence
Ge Nan, Department of Geriatrics, Peking Union Medical College Hospital, Chinese Academy of Medical Sciences, Beijing, China.
Email: genan32@163.com

1 | INTRODUCTION

Although malignancy and chronic inflammatory diseases seem to be associated with one another, gastric carcinoma (GC) with systemic lupus erythematosus (SLE) remains a very rare association.

2 | CASE PRESENTATION

A 63-year-old man presented with a 4-month history of unintentional decreased appetite, weight loss, and fatigue, but no fever, abdominal pain, or other discomfort symptoms. Endoscopic examination revealed an irregular 5-cm mucosal lesion on the gastric flexure. The pathology examination revealed poorly differentiated adenocarcinoma (mainly signet ring cell carcinoma). Ultrasound endoscopy indicated that the lesion had broken through the muscle layer to the serosal layer, but the serosal layer was still continuous and no enlarged lymph nodes were seen in the abdominal cavity. No lymph nodes or distant metastases were observed on chest-abdomen enhanced computed tomography. No fever, rash, joint pain, baldness, photosensitization, canker sores, or ulceration of the genitals developed during the disease. One of the patient's brothers had died of GC. On physical examination, the patient was lean with a body mass index of 23 kg/m^2. No bleeding spots were observed on the skin or mucous. No abnormality was detected in the cardiopulmonary examination. We observed no pressure pain or lumps in the abdomen, liver, or spleen below the costal space and no edema in the lower limbs.

On biochemical test, urinary protein was negative, and blood examination revealed thrombocytopenia and hypoalbuminemia. D-dimer and erythrocyte sedimentation rate were slightly elevated, and complement C3 and C4 were markedly decreased. Immunological tests showed positive results for anti-nuclear antibodies, double-stranded DNA antibodies, and anti-ribosomal antibody. Immunoglobulin G, high-sensitivity C-reactive protein, anticardiolipin, and anti-β-glycoprotein I antibody showed negative results. Bone marrow smear showed a ratio of granulocytic precursors to erythroid precursor of 2.37; the count of megakaryocytes was 57, with 49 out of 50 granulocytes and one out of 50 naked megakaryocytes; and the platelets were relatively rare. Ultrasonographic scanning of the lower limbs showed that intermuscular venous thromboembolism had occurred. SLE, GC, hypoalbuminemia, and thromboembolism of the double lower limbs and malnutrition were diagnosed based on those findings.

With the patient hospitalized for 15 days, multidisciplinary consultation was organized.

The surgeon and the oncologist offered the following opinion: The diagnosis of gastric carcinoma was definite, as there was no distant metastasis or local invasion. Surgical resection would be preferred; however, the patient was complicated with SLE and the platelet count was too low for surgery to be carried out. If the platelet count could be elevated to $>50 \times E^9$/L, and the patient wanted surgical treatment, surgery might be considered.

The immunologist offered the following opinion: The diagnosis of SLE and immune thrombocytopenic purpura should be considered. Thrombocytopenia may be associated with connective tissue disease.

The geriatrician offered the following opinion: According to the guidelines for the diagnosis and treatment for comorbidities, surgical resection would be preferred. We insisted on surgical treatment after full communication with the patient.

Preoperative preparation was administered using 10 g/d of the human immunoglobulin for 2 days, 20 g/d of the human

TABLE 1 Clinical records of 14 patients diagnosed as gastric cancer complicated with SLE

No.	Country	Sex	Age at diagnosis of SLE (y)	Age at diagnosis of cancer (y)	SLE activity at diagnosis of cancer	Treatment of SLE	Treatment of cancer	Pathological type	SLE activity after surgery
1	Japan[15]	M	72	72	Active	No treatment	Distal gastrectomy	Adenocarcinoma	Remission
2	PUMCH (unpublished)	M	63	63	Active	Glucocorticoids + tacrolimus	Radical gastrectomy + postoperative adjuvant chemotherapy	Poorly differentiated adenocarcinoma, some of which is signet ring cell carcinoma	Remission
3	USA[16]	F	58	58	Active	No treatment	Surgery	Adenocarcinoma	Remission
4	Germany[18]	F	56	56	Active	Glucocorticoids→AZA	Endoscopic resection	Neuroendocrine tumor	ND
5	PUMCH	F	43	43	Stable	Glucocorticoids + CTX + hydroxychloroquine	Neoadjuvant chemotherapy + radical gastrectomy + postoperative adjuvant chemotherapy	Poorly differentiated adenocarcinoma, most of which is signet ring cell carcinoma	Remission
6	India[19]	F	41	41	Active	Glucocorticoids	No treatment	Signet ring cell carcinoma	Dead
7	PUMCH	M	67	71	Stable	Glucocorticoids + leflunomide	Carcinectomy of cardia cancer	Moderately to poorly differentiated adenocarcinoma	Dead
8	USA[1]	F	54	58	Active	ND	Endoscopic resection	Carcinoid	ND
9	China[6]	M	37	42	Stable	Glucocorticoids + total glycosides of *Tripterygium wilfordii*	ND	Poorly differentiated adenocarcinoma	Stable
10	China[7]	F	33	40	ND	Glucocorticoids + CTX	Chemotherapy	Adenocarcinoma	Dead
11	PUMCH	F	27	39	Stable	Glucocorticoids	Radical gastrectomy	Poorly differentiated adenocarcinoma	Stable
12	Turkey[3]	F	27	32	Active	Glucocorticoids	Surgery	Carcinoid	ND
13	Japan[4]	F	21	41	ND	Glucocorticoids	ESD	Carcinoid	ND
14	Greece[2a]	F	13	23	Active	Glucocorticoids	Total gastrectomy	Carcinoid	Remission

AZA, azathioprine; CTX, cyclophosphamide; ESD, endoscopic submucosal dissection; ND, no data; PUMCH, Peking Union Medical College Hospital; SLE, systemic lupus erythematosus.
[a]The occurrence of pulmonary embolism after surgery.

immunoglobulin for 3 days, two doses of platelet therapy, 20 mg/d of metacortandracin, and monitoring the levels of platelet to 95 × E^9/L on August 2. Exploratory laparotomy, enterolysis, and gastrectomy for GC were performed under general anesthesia on August 7. Gastric hypocommercial adenocarcinoma and signet ring cell carcinoma were confirmed by surgical pathology, staging pT3N2M0 and IIIA.

At 3 days after surgery, the patient demonstrated sudden respiratory difficulty and accompanying blood oxygen saturation and blood pressure dropped, blood gas analysis showed type I respiratory failure, and D-dimer was obviously elevated. Computed tomography pulmonary angiography showed bilateral pulmonary embolism. Acute pulmonary thromboembolism was diagnosed.

Intravenous heparin sodium and norepinephrine were administered as well as ventilator-assisted breathing for 5 days in the intensive care unit. Then the patient returned to the normal geriatric ward. He was successfully discharged from hospital 1 month after admission.

Postoperative adjuvant chemotherapy was administered, including one course of SOX (oxaliplatin + gimeracil and oteracil potassium capsule), five courses of XELOX (oxaliplatin + capecitabine), and 20 mg/d of rivaroxaban for 1 year. Therapy for SLE was administered using 20 mg/d of prednisone, 1 mg of tacrolimus twice a day, then decreased half a year to 5 mg/d of prednisone and 0.3 g/d of hydroxychloroquine. The 18-month follow-up showed preserved physical function with no evidence of cancer relapse, as well as remission of SLE.

3 | DISCUSSION

A review of the literature revealed 14 cases of gastric cancer associated with SLE, consisting of 10 females and four males (aged 23-72 years).[1-7] There were nine cases of adenocarcinoma, four cases of carcinoid tumor, and one case of neuroendocrine carcinoma of the stomach. SLE had appeared months to years before the diagnosis of cancer in eight cases, and in the other six cases, the two conditions were diagnosed simultaneously. Remission in SLE or reduced SLE disease activity were reported in eight cases after treatment for cancer. The clinical characteristics of the 14 patients are summarized in Table 1.

The relation between SLE and GC has not been fully elucidated; the mechanism may be as follows: (a) Patients with SLE have an increased risk of developing tumors, possibly related to the disease itself.[8,9] Literature reports also showed the development of tumor was related to the use of immunosuppressive agents, especially cyclophosphamide.[10] (b) Tumors trigger immune abnormalities presented with varieties of rheumatoid lesions, including inflammatory myopathy,[11] arthritis,[12] vasculitis[13] and SLE.[14,15] Immune-related diseases can be improved after tumor treatment.[16-18] In our case, the patient's nephrotic syndrome improved after surgical resection. This is consistent with the previous mechanism. White blood cells and platelets return to normal levels after the treatment of a low dose of hormones and immunosuppressants, which further confirmed the mechanism.

It is worth mentioning that pulmonary embolism occurred on the third day after surgery and a previous study also reported this.[2] In this case, the risk of postoperative thromboembolism was underestimated, leading to thrombosis and pulmonary embolism in the intensive care unit. Herein, elderly patients with high-risk surgery may be regulated better by the surgeon and the geriatrician, but the model has not yet been fully carried out.

ORCID

Ge Nan http://orcid.org/0000-0003-1025-9756

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