**Background**
Systemic lupus erythematosus (SLE) is an autoimmune disease with multi-organ involvement and often occurs in young women. Although SLE has the potential to affect almost all organs [1], including the gastrointestinal system, the essential examination of the gastrointestinal system on patients with SLE is often omitted [2].

In this report, we described an unusual case of a female patient with both SLE and colon cancer, and discussed the difficulties faced during the treatment of this patient.

**Case presentation**
**Case report**
A 43-year-old Chinese woman was diagnosed with SLE 5 years ago, and has been receiving ongoing treatment with prednisone and omeprazole orally. Starting from 2 years ago, the patient had difficult defecation and watery stools with left lower abdominal pain, usually half an hour postprandially. The symptoms had become progressively worse over the previous 2 months, and the patient was referred to our hospital.

Her physical examination on admission was normal except for a palpable lower abdominal mass, about four cube centimeters. Laboratory data displayed a high level of globulin, elevated D-Dimer level and weakly positive fecal occult blood test (Table 1). The serum levels of tumor biomarkers of colon cancer, carcinoembryonic antigen and CA19–9, were normal (Table 1).

Upper abdominal computed tomography (CT) scan showed that wall thickening partly occurred in the ascending colon, indicating a tumor lesion (Fig. 1a). Lower abdominal enhanced CT scan revealed wall thickening in the proximal ascending colon, distal cecum and ileum, which suggests a tumor lesion and peri-intestinal infiltration (Fig. 1b). A colonoscopy displayed a space-occupying lesion in the ascending colon (Fig. 1c).
Based on the evaluation mentioned above, colon cancer with SLE was suspected pending the biopsy results. A radical bowel resection was considered as a preferred strategy. However, the patient had taken prednisone and omeprazole per os for an extended time period, which increases the susceptibility to possible complications, such as infection, gastrointestinal bleeding or perforation, hyperglycaemia, hyperlipemia, osteoporosis and iatrogenic hyperadrenocorticism. Thus, in order to avoid adrenal insufficiency symptoms, the patient was administered methylprednisolone instead of prednisone during surgery (0.8 mg/kg/day, including the day before and after surgery).

During the laparoscopic surgery, a huge and hard space-occupying lesion was observed around the wall of the cecum, extending into the serosa and retroperitoneum (Fig. 2a). The liver, stomach, duodenum and pelvic cavity appeared normal, and the pelvic cavity was negative for peritoneal fluid accumulation. A drainage tube was placed at anastomotic site without preventive colostomy because the tissues of patient were good in elasticity and the blood supply of ileum and transverse colon was normal.

The biopsy report indicated a moderately differentiated adenocarcinoma with mucinous differentiation (size: 7 × 4.5 × 2.2 cm³; Fig. 2a&b). The metastasis was only detected in the adjacent lymph node of the tumor (1/17). The tumor was classified as T3N1M0 (stage III).

The patient was subsequently treated by mFOLFOX6 chemotherapy (oxaliplatin/5-fu/leucovorin). The postoperative level of plasma glucose was carefully monitored. The patient was also treated with proton pump inhibitors post-surgery to prevent the development of stress ulcers. Postoperative calcium supplementation was also offered. Another postoperative consideration was that lipid emulsion was not used. The patient recovered well after the surgery and the chemotherapy (Tables 1 and 2).

**Discussion and conclusions**

Surgery for colon cancer in patients with SLE is difficult due to the concern of triggering adrenal insufficiency symptoms. With limited available reports on the use of chemotherapy after surgery for colon cancer in patients with SLE, we provide further evidence of its potential success.

Approximately 50% of patients with SLE present gastrointestinal symptoms [2]. According to this report, the clinical gastrointestinal symptoms in the patient with SLE and colon cancer showed limited specificity. Difficult defecation, watery stools and abdominal pain can be confounded in lupus-associated enteritis [1]. The causes of these clinical gastrointestinal symptoms are also multiple, including infection, medication side effects or simply a comorbid medical condition [1].

| Table 1 Laboratory data |
|-------------------------|
|                         |
| Pre-surgery             |
| Post-surgery (44d)      |
| Units                  |
|-------------------------|
| Red Blood Cell         |
| 3.89 × 10¹²            |
| 3.72 × 10¹² /L         |
| Hemoglobin             |
| 118                    |
| 113 g/L                |
| White Blood Cell       |
| 6.40 × 10⁹             |
| 4.70 × 10⁹ /L          |
| Granulocytes           |
| 76.70                  |
| 60.30 %                |
| Albumin                |
| 40.60                  |
| 39.60 g/L              |
| Globulin               |
| 42.30                  |
| 34.60 g/L              |
| Albumin/Globulin       |
| 1.0                    |
| 1.1                    |
| D-Dimer                |
| 2.02                   |
| 1.58 mg/L              |
| Fecal Occult Blood Test|
| W+                     |
| –                      |
| Carcinoembryonic Antigen|
| < 0.20                 |
| 0.384 ng/ml            |
| CA19-9                 |
| 2.86                   |
| 4.36 U/ml              |

![Fig. 1 CT scan and colonoscopy showed wall thickening and a space-occupying lesion in the colon of the patient. a, upper abdominal CT scan showed wall thickening (red arrow) in the ascending colon; b, lower abdominal enhanced CT scan revealed wall thickening (red arrow) in the proximal ascending colon, distal cecum and ileum; c, a colonoscopy displayed a space-occupying lesion (black arrow) in the ascending colon. CT, computed tomography](image)
Table 3 summarized the information of four other patients with SLE and coexisting colorectal cancer [3–6]. The type of neoplasms in our patient and those in the case reports in Table 3 was adenocarcinoma. Only our report provided the data of the tumor biomarkers, carcinoembryonic antigen and CA19–9 [7], which was though not significantly elevated. Our report is also first to describe the details of the surgical preparations, e.g. selecting proper surgical approaches for the possible complications of the drug treatment for SLE, and reducing the potential adrenal insufficiency symptoms during and after surgery.

The radical bowel resection is a preferred method to improve long-term survival of patients with colon cancer [8]. Before the surgery, an evaluation of the postoperative intestinal condition is necessary to prevent surgery-induced intestinal fistula. In this report, the patient has taken a long-term glucocorticoid treatment for SLE, which increases the susceptibility to infection, gastrointestinal bleeding, hyperglycaemia, hyperlipemia, osteoporosis and iatrogenic hyperadrenocorticism. However, sudden withdrawal of SLE medications to reduce the risk of anastomotic leakage might cause severe symptoms of adrenal insufficiency, such as nausea, vomiting, weakness, hypotension and shock. Thus, the patient in our report was administered methylprednisolone during the surgery instead of oral prednisone. In addition, potential

Table 2 Timeline in this case report

| Date                | Information                                      |
|---------------------|--------------------------------------------------|
| Jun/19/2017         | The patient was referred to our hospital         |
| Jun/19-Jun/25/2017  | Physical examination;                            |
|                     | Abdominal computed tomography scan and colonoscopy|
| Jun/27/2017         | Pre-operative examination;                       |
|                     | Methylprednisolone (40 mg/d)                     |
| Jun/28/2017         | Radical bowel resection;                         |
|                     | Methylprednisolone (40 mg/d)                     |
| Jun/29-Jul/1/2017   | Post-operative observation;                      |
|                     | Methylprednisolone (40 mg/d)                     |
| Jul/28/2017         | mFOLFOX6 chemotherapy                            |
postoperative surgical site infection, adrenal insufficiency and adrenal crisis were also taken into consideration.

In conclusion, reports on treating patients diagnosed with both SLE and colon cancer are extremely limited, and an established treatment strategy is lacking yet necessary. We demonstrated that surgical resection to treat colon cancer in patients with SLE has the potential to produce systematic complications, and pharmacological adverse effects must be strongly considered. In this report, we provided a reference for safely and effectively treating a patient with both colon cancer and SLE through radical resection and subsequent chemotherapy.

Abbreviations
CT: Computed tomography; SLE: Systemic lupus erythematosus

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Availability of data and materials
The dataset supporting the conclusions of this article is owned by Jiading District Central Hospital Affiliated Shanghai University of Medicine and Health Sciences but could be made available on request. Personal information will not be provided to ensure anonymity of the patient.

Authors’ contributions
SJ and FJ performed literature review and wrote the manuscript. YQ, SL and WB provided the necessary clinical data of the patient. CQ participated in literature review. CY performed the radical resection. SJ and CY made substantial contributions to the conception and design of the study. All authors read and approved the final manuscript.

Ethics approval and consent to participate
The study was performed under the approval of the ethics committee of Jiading District Central Hospital Affiliated Shanghai University of Medicine and Health Sciences.

Consent for publication
Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Competing interests
The authors declare that there are no competing interests.

Table 3 Summary of Colorectal Cancer reported in patients with SLE

| Reference | Age | Sex | Cancer | Topography of lesions |
|-----------|-----|-----|--------|-----------------------|
| [3]       | NC  (32–63) | NC  | Adenocarcinoma | Colon |
| [4]       | 39  | Female | Adenocarcinoma | Rectum |
| [5]       | 17  | Female | Adenocarcinoma | Colon (one in the sigmoid and three in the colon ascendens) |
| [6]       | 75  | Male | Adenocarcinoma | Descending colon |

NC not clear

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Note