International Journal of Surgery Case Reports 125 (2024) 110556

Contents lists available at ScienceDirect

International Journal of Surgery Case Reports

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

Case report

Gastric collision tumor of adenocarcinoma and MALT lymphoma: A rare case report and literature review

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ARTICLE INFO

Keywords:
Gastric collision tumor
Adenocarcinoma
Lymphoma
FLOT chemotherapy
Total gastrectomy

ABSTRACT

Introduction and importance: Gastric collision tumors, characterized by the coexistence of two distinct malignancies within the same organ, are exceptionally rare. We report a case involving a gastric collision tumor composed of adenocarcinoma (ADK) and marginal zone lymphoma, diagnosed postoperatively. To date, only six cases of MALT lymphoma as part of gastric collision tumors have been published, highlighting the rarity of this association.

Clinical presentation: A 58-year-old male with type 2 diabetes and a family history of breast cancer presented with six months of anemia and epigastric pain. Endoscopy showed a 5 cm ulcerated, friable gastric mass, and biopsies indicated a low-grade tubular adenocarcinoma. Imaging revealed gastric wall thickening and lymphadenopathy. He received FLOT chemotherapy followed by total gastrectomy with Roux-en-Y reconstruction. Histopathology confirmed a gastric collision tumor with a minimal adenocarcinoma remnant and extensive MALT lymphoma.

Discussion: Collision tumors are rare and present unique diagnostic and therapeutic challenges due to the coexistence of distinct malignancies. This case highlights the complexity of managing such tumors, as accurate diagnosis requires comprehensive histopathological analysis. The dual presence of adenocarcinoma and MALT lymphoma necessitated a tailored approach with FLOT chemotherapy and total gastrectomy. The patient's ongoing adjuvant chemotherapy emphasizes the need for vigilant, long-term follow-up to monitor for recurrence and potential metachronous malignancies.

Conclusion: Gastric collision tumors involving ADK and MALT lymphoma are rare and challenging. This case contributes to the limited literature on collision tumors, highlighting the necessity for comprehensive diagnostic and therapeutic strategies.

1. Introduction

Gastric collision tumors (GCT) are rare neoplasms composed of two distinct cell populations that develop side by side without intermingling [1]. Preoperative diagnosis is uncommon, and current knowledge is primarily based on case reports and small series, leaving their clinical and pathological behavior, as well as optimal diagnostic and therapeutic strategies, largely unclear [1,2].

These tumors are rare, and their endoscopic and pathological features are not well defined. Only six cases have been reported involving GCT that include both MALT lymphoma and ADK. [2]. Only six cases have been reported involving GCT that include both MALT lymphoma and ADK [2]. Our case was one of them and the diagnosis was made postoperatively. This work has been reported in line with the SCARE 2023 criteria [3].

2. Case presentation

A 58-year-old male patient with a history of type 2 diabetes, treated with oral antidiabetic drugs, presented with a six-month history of functional anemia, marked by asthenia and vertigo, without associated weight loss. The patient also reported epigastric pain persisting for one year, which had not been previously explored.

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https://doi.org/10.1016/j.ijscr.2024.110556
Received 8 October 2024; Received in revised form 28 October 2024; Accepted 31 October 2024
Available online 3 November 2024

Abbreviations

GCT	Gastric collision tumor
ADK	adenocarcinoma
MALT	lymphoma of mucosa associated lymphoid tissue

His family history was notable for breast cancer in both his mother, who was diagnosed at 83 years of age and later deceased, and his daughter, who was diagnosed at 30 years of age and deceased.

The patient's anemia was linked to vitamin B12 deficiency (Biermer's anemia), for which he had been undergoing treatment. An upper gastrointestinal endoscopy revealed a 5 cm ulcerated, polypoid, friable mass that bled on contact, located in the subcardial region.

Histopathological examination of the mass biopsy revealed a low-grade tubular ADK, likely originating from a high-grade dysplastic villous adenoma. No *Helicobacter pylori* (*H. pylori*) bacilli were found.

A contrast-enhanced computed tomography (CT) scan of the thorax, abdomen, and pelvis (TDM TAP) demonstrated an irregular thickening of the gastric wall along the lesser curvature, extending over an area measuring 51 × 27 × 50 mm at the junction between the antrum and fundus (Fig. 1A and B). Enlarged and confluent lymph nodes were observed along the left gastric chain, the largest measuring 12 mm, along with sub-centimeter lateral aortic lymph nodes (Fig. 1B). Additionally, nodular thickening was noted in the greater omentum in the left hypochondrium, with confluent hypodense nodules at the splenic hilum, the largest measuring 18 mm. Diffuse densification of the mesenteric and sub-mesocolic fat was also seen, suggesting possible malignant involvement.

The patient was started on perioperative chemotherapy with the FLOT regimen (5-fluorouracil 5200 mg, leucovorin 400 mg, oxaliplatin 170 mg, docetaxel 100 mg), receiving four cycles. Post-treatment imaging demonstrated a near-stable appearance of the gastric thickening but progression of the lymphadenopathy and increased nodular densification of the mesenteric fat, prompting surgical intervention.

Three weeks after completing chemotherapy, the patient underwent a total gastrectomy with curative intent. The procedure involved a Roux-en-Y esophago-jejunostomy and splenic hilum lymphadenectomy. Intraoperative findings included nodules on the peritoneum and omentum, but no clear signs of malignancy were noted on frozen section analysis of these nodules.

Postoperatively, the patient had an uncomplicated recovery and subsequently received four additional cycles of chemotherapy.

Macroscopic examination revealed a 65 × 50 mm thickening of the gastric wall with a whitish, fleshy, and villous appearance of the fringes (Fig. 2).

Twenty-three lymph nodes were dissected in the perigastric and the splenic hilum.

Histopathological analysis of the resected specimen showed a villous appearance of the gastric surface (Fig. 3A) and the juxtaposition of two distinct tumor types: a small carcinomatous remnant consisting of low-grade tubular ADK and a MALT lymphoma (Fig. 3B).

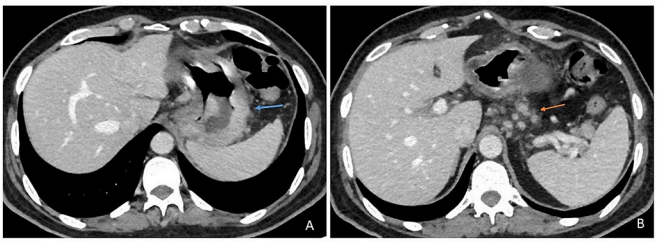

Fig. 1. Axial abdominal CT scan: Tissue thickening of the large gastric curvature (blue arrow) (A) associated with perigastric and splenic hilum adenomegaly (orange arrow) (B)

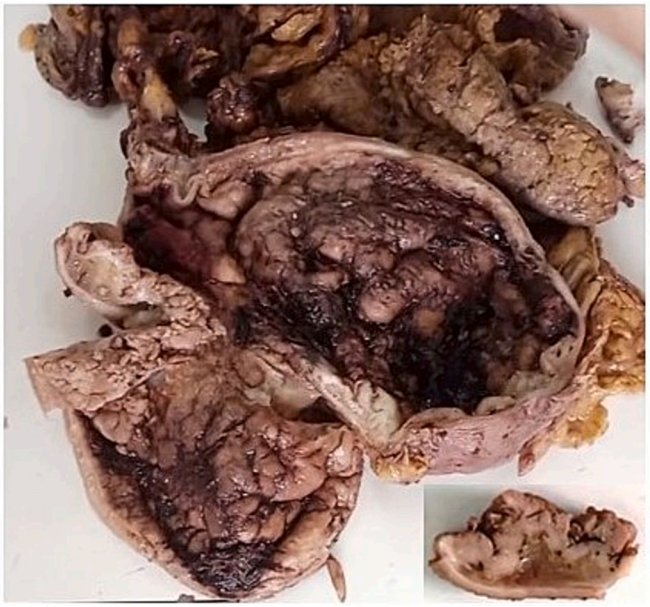

Fig. 2. A large gastric wall thickening with a whitish, fleshy, and villous appearance of the fringes (en cart).

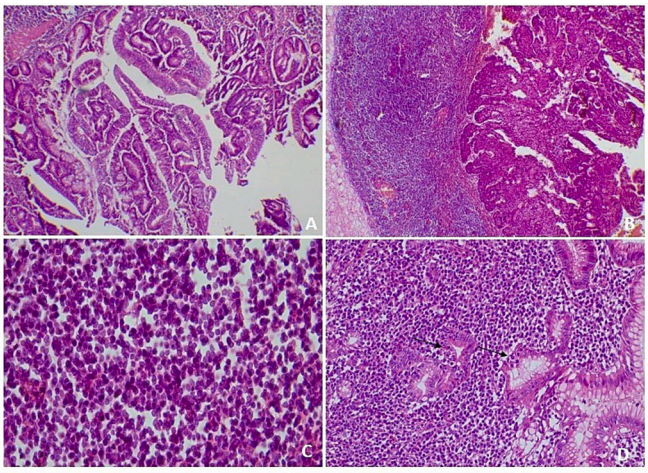

Fig. 3. Histological features: Villous appearance on the surface (HE×40) (A) The two contingents, carcinomatous (on the right) and lymphoid (on the left), are juxtaposed to each other (HE×40) (B) Small lymphoid cells with homogeneous appearance (HE×200) (C) Diffuse lymphoid proliferation with lympho-epithelial lesions (arrows) (HE×100) (D).

For the carcinomatous component, the residual tumor was outgrown by fibrosis, with less than 10 % of the tumor bed occupied by confluent carcinomatous trabeculae of varying thicknesses and glandular structures. These features were indicative of grade 3 in the Mandard tumor regression grade (TRG) classification of the tumor response after neo-adjuvant chemotherapy. The tubular ADK infiltrate the submucosa without going beyond it.

The MALT lymphoma was predominant and composed of small lymphoid cells with a homogeneous appearance (Fig. 3C), leading to lympho-epithelial lesions (Fig. 3D). The lymphoma dissociates the gastric muscularis propria.

Further immunohistochemical studies were performed to characterize the lymphoma cells. They revealed a diffuse expression of CD20 and Bcl2 antibodies, while CD5 and CD10 antibodies were negative

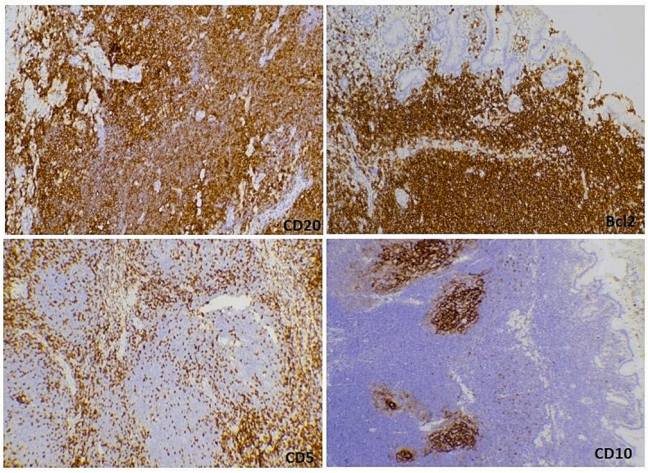

Fig. 4. Immunohistochemistry: Diffuse positivity of the lymphoid cells with CD20 (A) and Bcl2 (B). Negative immunostaining with CD5, which typically stains reactive T lymphocytes (C) Negative immunostaining with CD10, which stains normal lymphoid cells in germinal centers (D).

(Fig. 4).

Two nodules of the greater omentum were identified and examined, showing steatonecrosis without signs of malignancy. All examined lymph nodes were free of malignancy. Longitudinal resection margins were healthy.

Adjacent gastric mucosa showed chronic pangastritis with atrophic fundic mucosa and extensive intestinal metaplasia, as well as low- and high-grade glandular dysplasia lesions. No *H. pylori* bacilli were found.

The postoperative course was favorable, with no major complications, and the patient remains on adjuvant chemotherapy for continued management.

3. Discussion

A collision tumor refers to the coexistence or intermingling of two distinct malignant neoplasms arising from different tissue types, classified as a unique form of synchronous cancer [4,5]. This condition is extremely rare in clinical practice, and its pathogenesis remains poorly understood [2,4]. Collision tumors can develop in various organs, including the esophagus, stomach, lungs, uterus, kidneys, rectum, brain, and testis [6].

The first documented case of a GCT was likely reported by Jernstrom and Murray in 1966, involving a collision between a gastric carcinoid and an adenocarcinoma (ADK) [4,7]. They typically present in older adults, with a higher incidence in males than females [8]. GCT is uncommon, and reports of gastric ADK coexisting with lymphoma are exceedingly rare (Table 1) [4,9].

Common tumorigenic factors in GCT may include gene mutations, *Helicobacter pylori* (*H. pylori*) infection, Epstein-Barr virus (EBV) infection, and radiation exposure [4]. However, no definitive diagnostic test has been established to confirm these associations [4].

It is widely recognized that gastric *H. pylori* infection is linked to an elevated risk of developing MALT lymphoma [4,9,10]. The pathogenesis of *H. pylori*-induced lymphoma is a multistep process influenced by bacterial virulence factors, such as CagA, VacA, and OipA, as well as host genetic factors and environmental conditions [11].

Studies have shown that cytotoxin-associated gene A (CagA), a virulence factor of *H. pylori*, is linked to the activation of the protein kinase B pathway (AKT pathway) in MALT and diffuse large B-cell lymphoma (DLBCL) cells [4,11].

H. pylori is closely related to the development of both lymphoma and ADK by inducing chronic mucosal inflammation. This inflammation can be the breeding ground for marginal zone lymphoma, as well as glandular atrophy and intestinal metaplasia, which may progress to gastric ADK [3,11].

However, our patient has autoimmune fundic gastritis and does not have an *H. pylori* infection in the histological exam. Studies have not shown a significant association between atrophic gastritis and the risk of gastric lymphoma [12].

In our patient with Biermer anemia, the pathogenesis is primarily characterized by autoimmune destruction of gastric parietal cells, resulting in impaired production of intrinsic factor necessary for vitamin B12 absorption. This deficiency leads to macrocytic anemia and chronic atrophic gastritis, which is associated with an increased risk of gastric cancer due to the persistent inflammation and potential for dysplastic changes in the gastric mucosa [4,13].

Neuroendocrine tumors of the fundus are usually the most common in this context, secondary to hypergastrinemia which is reactive to the gastric hypochlorhydria [4,13].

However, the chronic inflammation inherent to pernicious anemia may also create a microenvironment conducive to malignant transformation, making vigilant monitoring for gastric malignancies essential in patients with this condition [4].

The general treatment strategy for collision tumors follows similar principles as for single malignancies, with surgery being the primary approach, complemented by comprehensive treatments such as chemotherapy, radiotherapy, targeted therapy, and immunotherapy [4]. In this case, the patient received both preoperative and postoperative FLOT chemotherapy (5-fluorouracil, leucovorin, oxaliplatin, and docetaxel), followed by a radical total gastrectomy with a Roux-en-Y esophagojejunostomy [14].

Collision tumors involving both ADK and MALT lymphoma pose unique treatment challenges [4]. While lymphomas typically respond to regimens like R-CHOP, the ADK in this patient required a FLOT-based approach [4].

In managing GCT, such as those involving ADK and lymphoma, perioperative chemotherapy plays a crucial role in enhancing treatment

Table 1
Reported cases of gastric collision tumors including adenocarcinoma and primary MALT lymphoma.

Authors/year	Patient age/ gender	Symptoms	Treatment	Outcome
Wotherspoon et al., 1995	Not specified	Not specified	Total gastrectomy; additional chemotherapy depending on staging	Improved prognosis for MALT lymphomas when treated early
Goteri et al., 1997	Not specified	Not specified	Partial gastrectomy combined with chemotherapy for adenocarcinoma	Prognosis like standalone adenocarcinoma
Manabe et al., 2001	Not specified	Not specified	Removal of remaining gastric tissue following previous pancreatoduodenectomy	Complicated post-surgery recovery: further data limited
Araki et al., 2012	76/F	Epigastric pain, melena	Endoscopic resection followed by chemotherapy for adenocarcinoma	Ongoing monitoring
Shin et al., 2013	58/M	Nausea, weight loss	Partial gastrectomy; eradication of *H. pylori* with antibiotics	Stable post-treatment
Ratbi et al., 2022	64/M	Abdominal pain, hematemesis	Radical gastrectomy with D2 lymphadenectomy, R-CHOP chemotherapy (rituximab, cyclophosphamide, doxorubicin, vincristine, prednisone)	No recurrence

ADK: Adenocarcinoma MALT: marginal zone lymphoma of mucosa associated lymphoid tissue.

outcomes [4,12]. For our patient, preoperative chemotherapy was administered to reduce tumor burden and facilitate surgical resection. This approach not only aims to shrink the tumor but also addresses any micrometastatic disease that may not be visible at the time of surgery [4,13]. Postoperatively, adjuvant chemotherapy is often recommended for ADK to further decrease the risk of recurrence, particularly in cases with aggressive histological features [11,12]. In the context of lymphoma, if more aggressive forms are present, additional treatment modalities, including immunotherapy, may also be considered following surgery [8]. The postoperative course was uncomplicated, and follow-up assessments have shown stable disease without recurrence.

Studies have demonstrated that *H. pylori*-associated gastric DLBCL is often less invasive, involves fewer lymph nodes, and has a better prognosis when treated with chemotherapy, particularly regimens containing rituximab [4,11]. These cases tend to have higher complete response rates and improved overall survival and progression-free survival [4].

Given this patient's Biermer anemia and total gastrectomy, a thorough follow-up plan is essential. Regular endoscopic and imaging evaluations should be implemented to monitor for any recurrence of gastric ADK or the emergence of metachronous malignancies [4,11].

4. Conclusion

This case adds to the limited literature on gastric collision tumors, illustrating the importance of a multidisciplinary approach for accurate diagnosis and personalized treatment. The coexistence of adenocarcinoma and MALT lymphoma within the same organ highlights the necessity of detailed histopathological evaluation. Ultimately, vigilant postoperative follow-up is essential for monitoring recurrence and optimizing patient outcomes in such rare and complex cases.

Patient consent

Written informed consent was obtained from the patient for the publication of this case report and its accompanying images. A copy of the written consent is available for the Editor-in-Chief of this journal to review upon request.

Ethical approval

Ethical approval is not applicable/waived at our institution. Due to the specific nature of case reports, which involve detailed descriptions of observations and interventions that have already been conducted on patients, as opposed to prospective studies involving planned interventions, our institution does not require formal ethical approval for such cases. We recognize the importance of ethics in medical research and are fully committed to upholding ethical standards in our medical and research practices.

Guarantor

Dr. Ahmed Omry

Research registration number

N/A

Declaration of Generative AI and AI-assisted technologies in the writing process

AI tools were not used for the elaboration of the manuscript.

Grant information

The author(s) declared that no grants were involved in supporting this work.

Funding

This research did not receive funding from any specific grant provided by public, commercial, or not-for-profit organizations.

Author contribution

Wael Ferjaoui and Ahmed Omry contributed to manuscript writing and editing, and data collection;

Sadok Megdiche and Sahir Omrani contributed to data analysis;

Sana Ben Slama and Dhouha Bacha contributed to conceptualization and supervision;

All authors have read and approved the final manuscript.

Conflict of interest statement

No conflicts of interest.

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