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Case Report

Late orbital metastasis from colon cancer complicated by multiple tumors in the breast, lung, liver, and spine ^{☆,☆☆}

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ABSTRACT

A 69-year-old woman sustained progressive proptosis for 2 months. The patient had undergone surgery for resection of colon cancer 10 years prior, which was considered to have been completely cured 5 years prior. She was also aware of a hard mass in her left breast, but it had been left untreated. Furthermore, she experienced back pain for a month. Blood examination revealed an elevated level of serum carcinoembryonic antigen, at 17.4 ng/mL (< 5). Computed tomography (CT) revealed a tumor occupying the superolateral part of the right orbit, with intratumoral calcifications and destructive changes in the lateral orbital wall. On magnetic resonance imaging, it appeared as a heterogeneously enhancing, extraconal tumor, 44 mm × 31 mm in maximal dimension, extending into the middle fossa and the adjacent subcutaneous region. Fluorodeoxyglucose positron emission tomography/CT revealed abnormal accumulation in the left breast, T12 vertebra, liver, and lung, in addition to the orbital tumor. The patient underwent total tumor resection through a lateral orbitotomy. Histological examination of the tumor was highly suggestive of a metastatic colon cancer. Late metastasis should be assumed as a differential diagnosis that can be determined only through histological verification.

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Introduction

Metastatic orbital tumors are rare. Cancers arising from the lung, breast, and adrenal gland are thought to be frequent

primary foci, whereas those from the colon have been only sporadically documented [1–8]. Even in breast cancers, orbital metastasis is estimated to occur in only 0.7% of cases, and its treatment strategy is yet to be determined [6,9]. Late metastasis is a very rare manifestation of cancers that can

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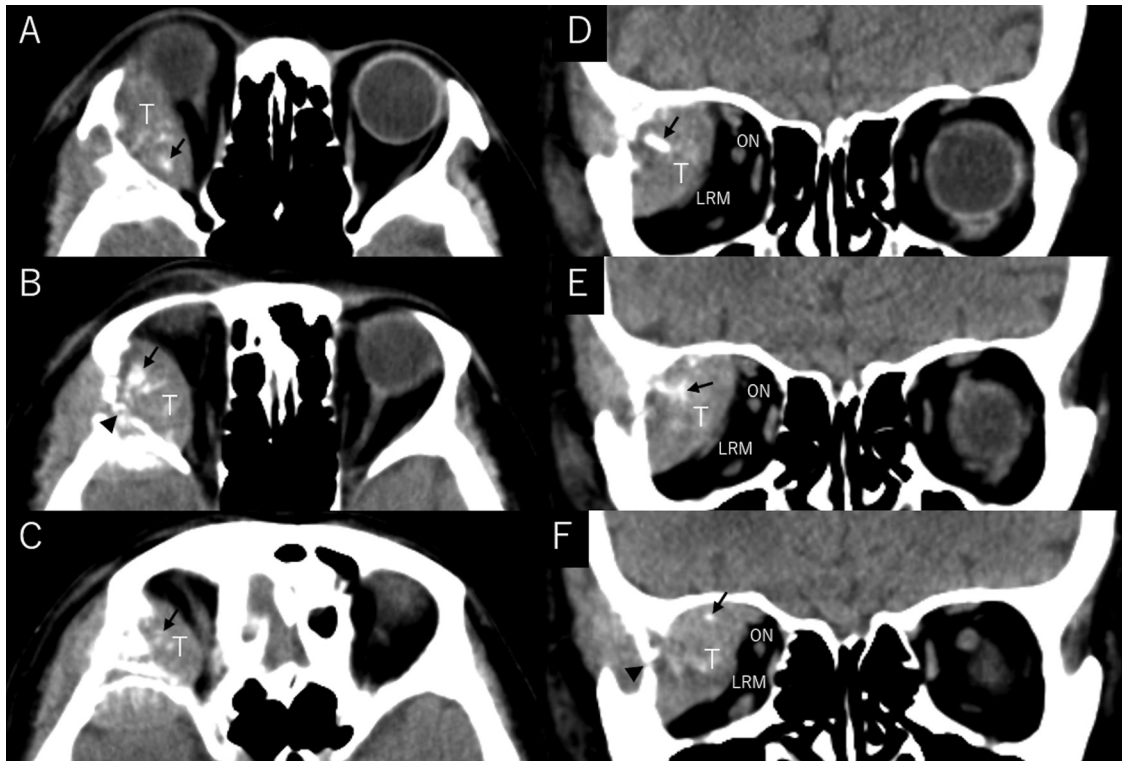


Fig. 1 – Axial (A-C) and coronal (D-F) noncontrast computed tomographs at presentation, showing a tumor occupying the superolateral part of the right orbit, with intratumoral calcifications (A-D, arrow) and destructive changes in the lateral orbital wall (B and F, arrowhead), in addition to considerable inferomedial displacement of the lateral rectus muscle by the tumor (D-F). LRM, lateral rectus muscle; ON, optic nerve; T, tumor.

present more than 20 years after the initial diagnosis [10]. To the best of our knowledge, only one case of late metastasis from colon cancer has been reported [11]. The lateral approach is a less invasive technique for approaching the orbit, orbital apex, superior orbital fissure, cavernous sinus, and middle fossa, through a bony window made in the lateral wall of the orbit [12,13].

Here, we present a unique case of late orbital metastasis from colon cancer, complicated by multiple tumors in the breast, lung, liver, and spine, that were successfully resected using the lateral approach.

Case presentation

A 69-year-old woman sustained progressive proptosis in the right eye for 2 months. The patient underwent total resection of stage IIIa cancer of the right colon and relevant lymph nodes 10 years before, followed by chemotherapy with capecitabine. The cancer was considered as having been completely cured 5 years prior. During this period, the serum carcinoembryonic antigen (CEA) level was within the normal range. She was also aware of a hard mass in the left breast that was left untreated. Furthermore, the patient sustained back pain for a month before presentation. At presentation, the patient showed considerable proptosis in the right eye but did not show any focal neurological deficits. She was fully dependent upon others for

her activities of daily living were, and recent weight loss or abdominal symptoms were not noted. Blood examination revealed an elevated CEA level, at 17.4 ng/mL (normal range, < 5 ng/mL).

Noncontrast computed tomography (CT) scans revealed a large tumor occupying the superolateral part of the right orbit, with intratumoral calcifications and destructive changes in the lateral orbital wall, in addition to considerable inferomedial displacement of the lateral rectus muscle (Fig. 1). Magnetic resonance imaging revealed a heterogeneously enhancing, extraconal tumor, 44 mm × 31 mm in maximal dimension, extending into the middle fossa posteriorly and subcutaneously at the frontotemporal region (Fig. 2). There were no intracranial tumors. Fluorodeoxyglucose positron emission tomography (FDG-PET)/CT revealed an abnormal accumulation in the orbital tumor (Fig. 3). In addition, accumulations were found in the left breast, T12 vertebra, liver, and right lung with the tumor located in the lung smallest of them. No accumulation was observed around the previously operated rectum (Fig. 4). The patient underwent microsurgical tumor resection through a lateral orbitotomy with a presumptive diagnosis of metastatic breast cancer. The tumor, elastic hard in consistency and less vascular, was totally resected, involving a highly erosive lateral wall of the affected orbit (Fig. 5).

Microscopically, the tumor consisted of atypical, high columnar cells with long nucleoli, forming large gland-like structures, and interstitial tissues (Fig. 6A). On the other hand,

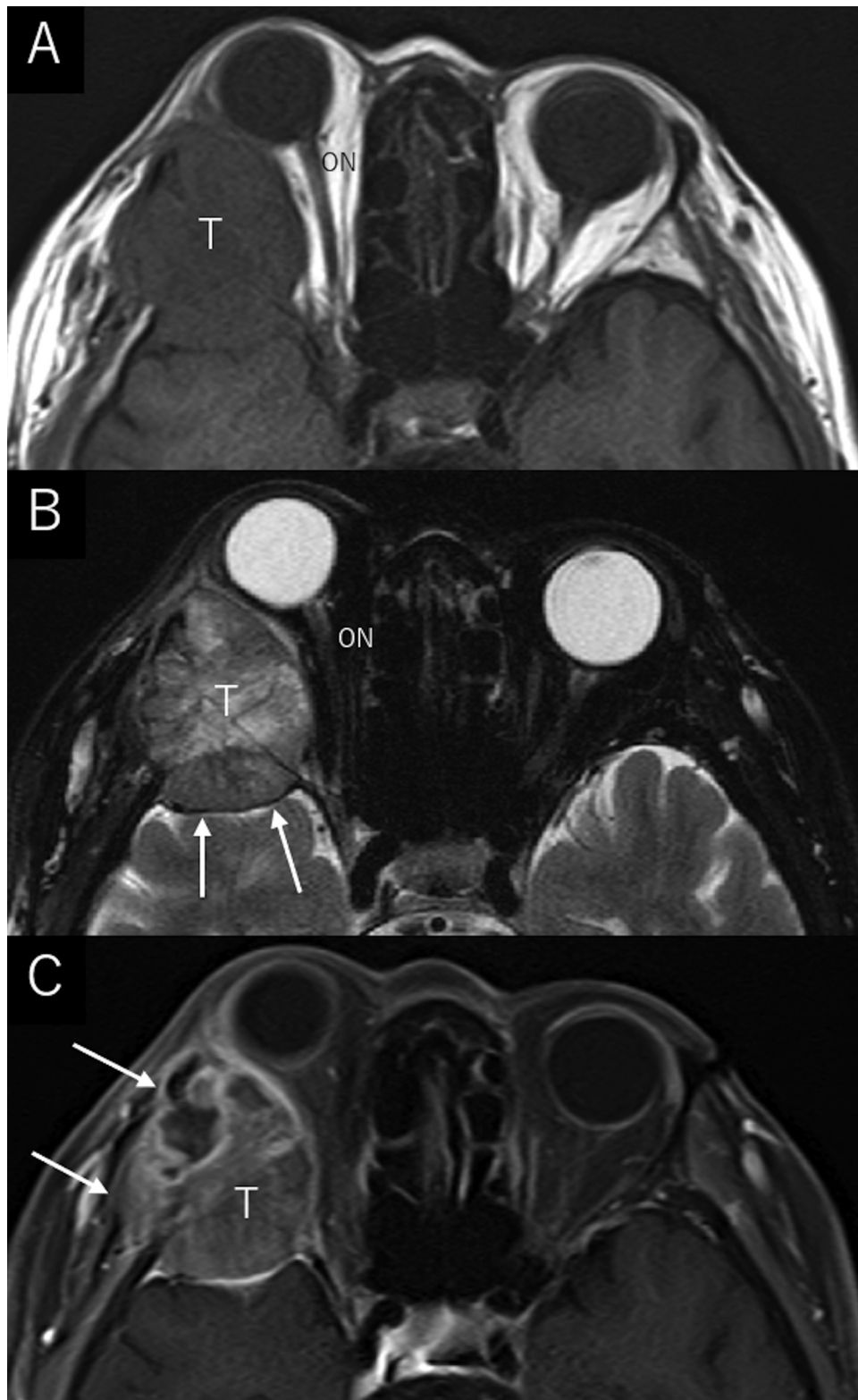


Fig. 2 - Axial T1- (A), T2- (B), and postcontrast T1-weighted magnetic resonance image (C) showing a heterogeneously enhancing tumor, 44 mm x 31 mm in maximal dimension, extending into the middle fossa posteriorly (B, arrows) and subcutaneously in the frontotemporal region (C, arrows). ON, optic nerve; T, tumor.

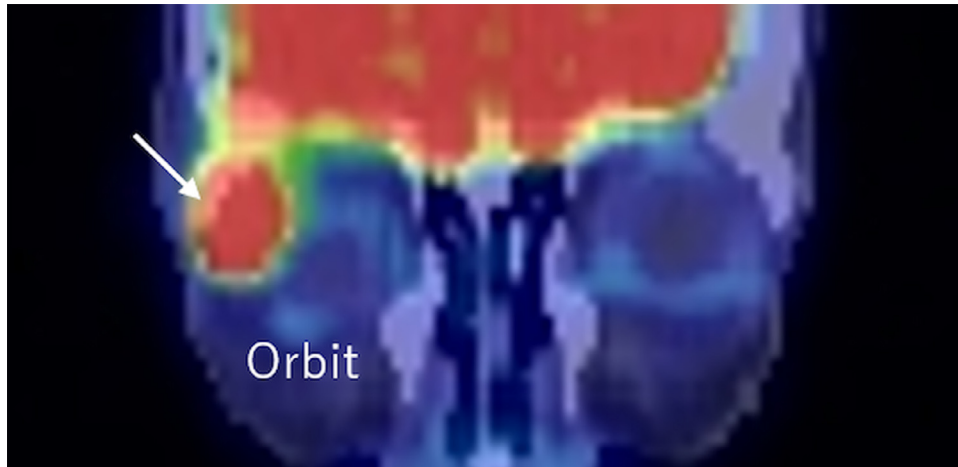


Fig. 3 – Coronal fluorodeoxyglucose positron emission tomograph/computed tomograph showing an abnormal accumulation in the right orbit (arrow).

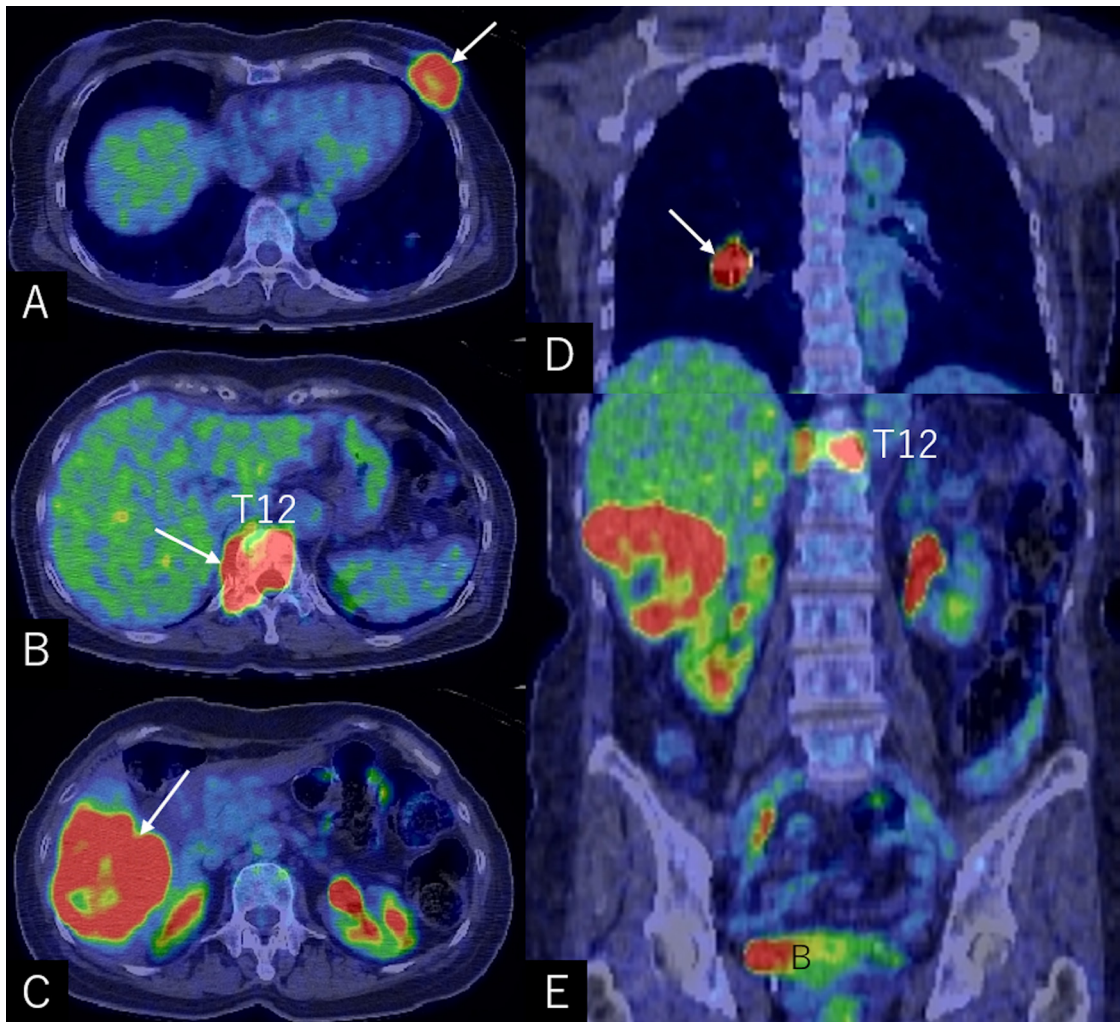


Fig. 4 – Axial (A-C, E) and coronal (D) fluorodeoxyglucose positron emission tomograph/computed tomograph showing abnormal accumulations in the left breast (A, arrow), T12 vertebra (B, arrow), liver (C, arrow), and right lung (D, arrow), with the tumor located in the lung smallest of them. No accumulations around the previously resected right colon (E). B, bladder.

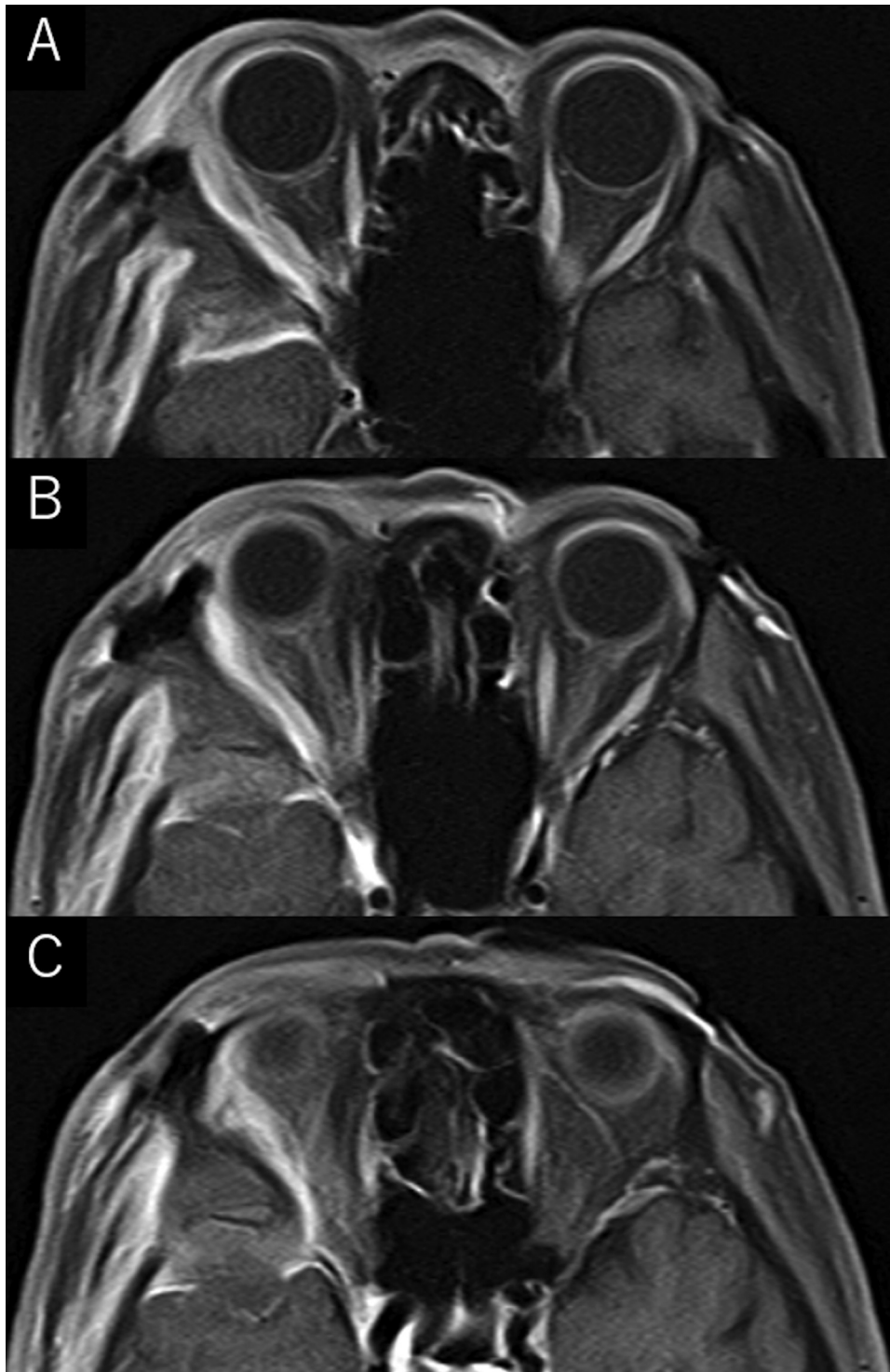


Fig. 5 – (A-C) Postcontrast axial T1-weighted magnetic resonance images showing total resection of the tumor.

the left breast tumor was diagnosed with an invasive ductal carcinoma. It consisted of atypical cells with triangular nucleoli, forming small gland-like structures, and scant interstitial tissues (Fig. 6B). Furthermore, the histological appearance of the previously resected colon cancer was similar to that of the orbital tumor (Fig. 6C). Immunohistochemical examination showed partial positive staining for carcinoembryonic

antigen and cytokeratin 20, while showing negative staining for cytokeratin 7 and estrogen receptor (ER) (Fig. 7). The ER was intensely stained in the breast tumor (not shown). These findings strongly suggested a metastatic orbital tumor from colon cancer. Postoperatively, the patient underwent spinal irradiation for pain relief. Lesions in the lung, liver, and spine were not biopsied.

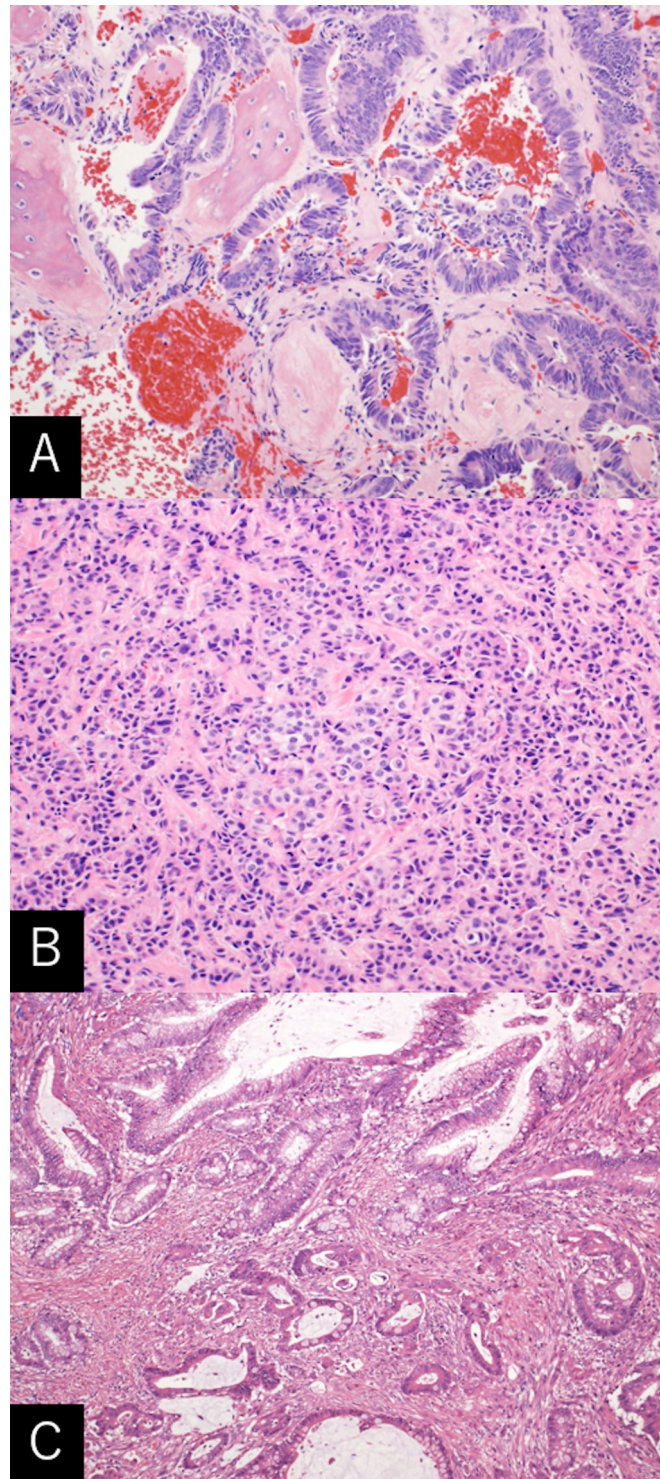


Fig. 6 – (A) Photomicrograph of the resected tumor consisting of atypical, high columnar cells with long nucleoli, forming large gland-like structures, and interstitial tissues. **(B)** Photomicrograph of breast tumor consisting of atypical cells with triangular nucleoli, forming small gland-like structures, and scant interstitial tissues. **(C)** Photomicrograph of previously resected colon cancer showing an appearance similar to that of the orbital tumor consisting of high columnar cells forming gland-like structures, and rich interstitial tissues. A-C: Hematoxylin and eosin staining. Original magnification: A: x80; B: x80; and C: x150.

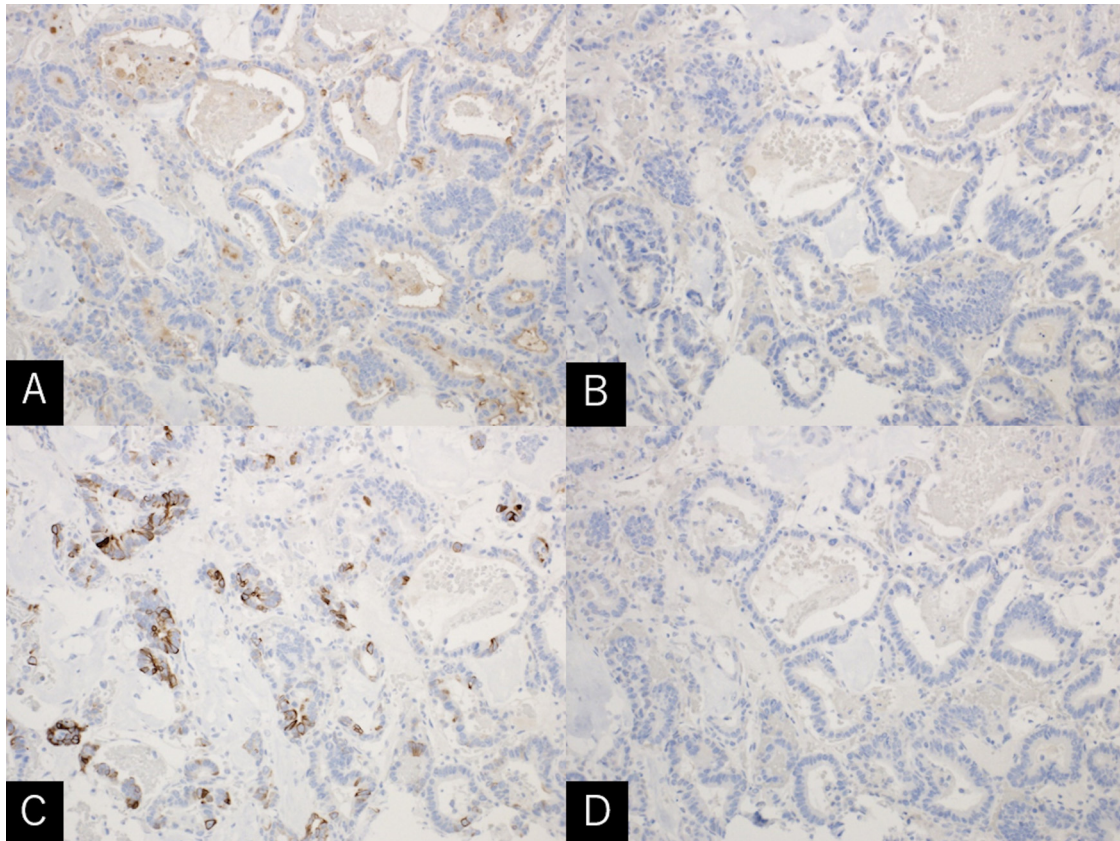


Fig. 7 – Immunohistochemical examinations showing partial positive staining for carcinoembryonic antigen (A) and cytokeratin 20 (C) and negative staining for cytokeratin 7 (B) and estrogen receptor (D). A-D: original magnification, x80.

After repeated discussions on the treatment plan, the patient requested to undergo a palliative therapy.

Discussion

To our knowledge, late metastasis from colon cancer presenting as an orbital tumor has not been reported to date. In the present patient, orbital, breast, lung, liver, and spinal tumors were simultaneously found, 10 years after the diagnosis of colon cancer. The colon cancer had been well-controlled, without recurrence or increased serum CEA levels, for a long period. In addition, at presentation, the serum CEA level was considerably elevated, which was not seen previously. Furthermore, FDG-PET/CT showed multiple accumulations located near the tumors. The accumulations were least present in the lung, in addition to being absent around the previously resected right colon. Therefore, we initially assumed that not only the orbital tumor, but also other tumors in the spine, liver, and lung might be metastases from the de novo breast cancer. However, the histological appearance of the orbital tumor was highly suggestive of colon cancer. Given that the present orbital tumor involved the extraconal aspect of the orbit, the lateral orbital wall sustaining considerable destructive changes, and the adjacent subcutaneous region, the tumor was assumed to have metastasized to and grown in the

diploe of the lateral wall. Although rare, bone metastasis from colon cancer has been documented in the literature [14,15].

In addition, this case highlights the importance of histological verification, if feasible, in a setting with multiple primary cancers, where radiological examinations may not or may only partly explain the complex pathology. Even in such circumstances, the lateral approach can be safely performed for both resection and histological verification of orbital tumors. Although not determined, histological diagnoses of tumors identified in the spine, liver, and lung, if available, can help understand the etiology and planning treatment strategy. Late metastasis should be considered as a differential diagnosis when patients who have undergone cancer treatment previously present with apparently de novo tumors after a long period since having been considered to be completely cured.

Conclusion

Late metastasis should be assumed as differential diagnosis that can be determined only through histological verification.

Patient consent

Patient consent has been obtained.

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