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Anthracosilicosis mimicking extensive nodal metastasis from early gastric cancer: A case report

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ABSTRACT

INTRODUCTION: Lymph node metastasis is one of the most important prognostic factors in gastric cancer and precise assessment of nodal status facilitates optimal therapeutic decisions. Many diagnostic modalities including endoscopic ultrasound (EUS), computed tomography (CT), and sometimes, positron emission tomography (PET) have been utilized to improve diagnostic accuracy in detecting metastatic lymph nodes; however, their accuracy remains unsatisfactory.

PRESENTATION OF CASE: We report a case of a 73-year old male patient who was erroneously diagnosed with stage IV gastric cancer due to the distant nodal metastasis from early gastric cancer lesion during the initial staging process. However, surgical exploration revealed an anthracosilicosis-associated lymphadenopathy that mimicked extensive distant nodal metastasis in the preoperative CT and PET-CT scans. The patient was finally diagnosed with stage I gastric cancer confined to the mucosa without nodal metastasis.

DISCUSSION: We report a rare case of gastric cancer concurrent extensive nodal involvement of anthracosilicosis mimicking metastatic nodal disease in the imaging studies. This case implies that PET-CT scan for clinical staging is not specific enough to clearly delineate malignant lesions, causing a diagnostic dilemma.

CONCLUSION: When the characteristics of the primary tumor is poorly correlated to the findings of imaging studies, surgical exploration can be a viable option for a definitive diagnosis before making a hasty decision based only upon the diagnostic imaging results.

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1. Introduction

The accurate clinical staging of gastric cancer patients is crucial because it guides the decision-making process with regard to selecting the optimal treatment modality as well as providing prognostic information. Esophagogastroduodenoscopy (EGD) with or without endoscopic ultrasound (EUS) and abdominal computed tomography (CT) are the most commonly used combinations for clinical staging in gastric cancer patients, providing a relatively high accuracy in predicting tumor depth [1–3]. However, the diagnostic accuracy for node positivity appears to be less reliable, reportedly as low as 17%, in early gastric cancer (EGC) patients, indicating the limited capacity of these imaging studies in detecting metastatic lymph nodes [2,4].

Meanwhile, ¹⁸F-fluorodeoxyglucose (FDG) positron emission tomography (PET) historically has demonstrated lower sensitiv-

ity (22.7–58.3 %) but significantly higher specificity (90.5–100%) in detecting lymph node metastasis of gastric cancer compared to the commonly used CT scans, particularly in intestinal-type tumors [5–8]. FDG-PET integrated with CT can demonstrate anatomic and functional characteristics of the lesions at the same time in one image providing improved diagnostic capacity. Thus, some investigators have advocated the routine use of PET-CT in the preoperative staging workup of gastric cancer because adjunctive PET-CT can influence the therapeutic strategy [9].

We herein report a case of an EGC patient accompanied by anthracosilicosis who was preoperatively misdiagnosed with stage IV gastric cancer with distant nodal metastasis by imaging studies at the tertiary academic hospital in Korea. This work has been reported in line with the SCARE guidelines [10].

2. Case report

A 73-year-old man visited an outpatient clinic for further evaluation due to incidentally found gastric cancer without symptoms. The patient underwent a biannual nationwide screening program regularly and the recent upper gastrointestinal endoscopy identi-

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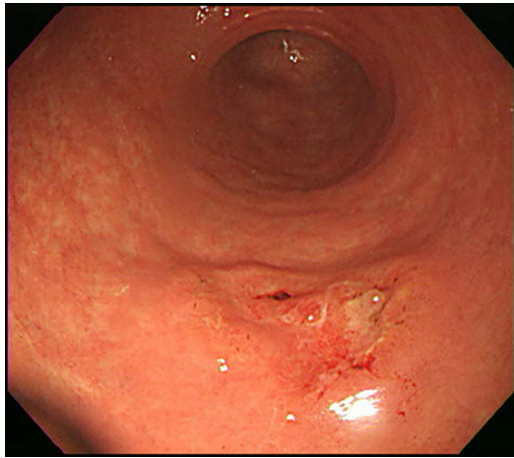


Fig. 1. Endoscopic findings at diagnosis.

fied a 2.5 cm superficially depressed early gastric cancer lesion at the antrum and greater curvature of his stomach (Fig. 1). The endoscopic biopsy finding was well-differentiated adenocarcinoma. An abdominal CT scan showed multiple enlarged lymph nodes with or without calcification in the perigastric, para-esophageal, pericardial, and anterior diaphragmatic areas with a maximum size of approximately 2 cm. A chest CT scan showed enlarged non-calcified lymph nodes at the right lower cervical, paratracheal, subcarinal, and cardiophrenic areas, as well as around the inferior vena cava, with a strong likelihood of metastatic nodes considering their nature (Fig. 2). The patient was evaluated with additional ^{18}F -FDG PET-CT; the results demonstrated mild uptake in the greater curva-

ture of the stomach, where the primary gastric cancer was located, along with the multiple hypermetabolic lymph nodes at the perigastric, retrocausal, mediastinal, hilar, and right cervical areas; the lymph nodes were highly suspicious of metastatic nodes (Fig. 3). Based upon these test results, the patient was tentatively diagnosed with stage IV gastric cancer with distant lymph node metastasis according to the 7th edition of the American Joint Committee on Cancer.

The patient was recommended to undergo neck node biopsy to facilitate differential diagnosis between metastatic gastric cancer versus localized gastric cancer with concurrent lymphoma or other lymphoproliferative disease and to determine the therapeutic strategy. The patient underwent repeated ultrasonography-guided fine-needle aspiration for the enlarged right supraclavicular lymph node. Histologic analysis, however, failed to attain a confirmative diagnosis, instead demonstrating aggregation of polymorphous lymphoid cells without evidence of malignancy.

After discussion with the oncologists, we decided to conduct exploratory surgery for diagnostic purposes and simultaneous curative gastrectomy, if possible. Surgical exploration discovered numerous dark-pigmented lymph nodes along the celiac axis; the most prominent one was retrieved and sent for intraoperative pathologic examination (Fig. 4). Frozen sectioning revealed that the lymph node contained numerous histiocytic infiltrations without evidence of malignancy. Therefore, we proceeded with standard distal gastrectomy with D2 lymphadenectomy, as intended.

The resected stomach showed a well-differentiated adenocarcinoma confined in the muscularis mucosa of the stomach. The enlarged two lymph nodes out of 47 perigastric lymph nodes were composed of chronic granulomatous inflammation with extensive caseous-like necrosis, admixed with anthracotic pigment, fibrosis, and calcification (Fig. 5). To differentiate tuberculosis,

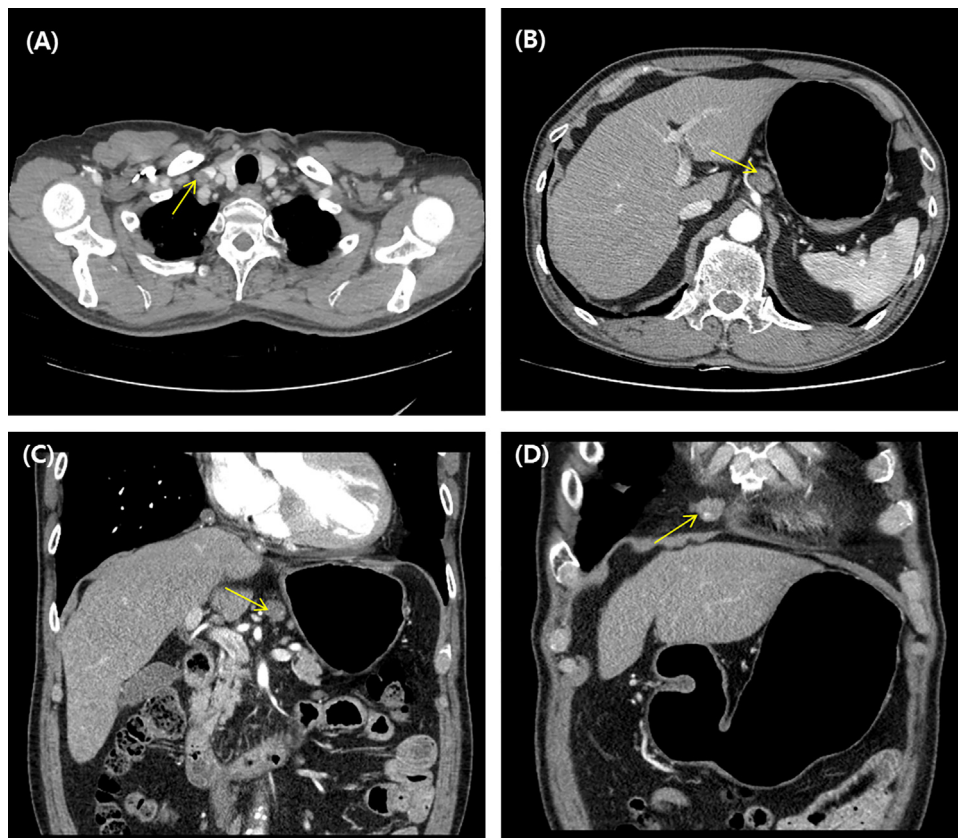


Fig. 2. Computed tomography (CT) findings of the abdomen and chest. Multiple enlarged lymph nodes are noted (A) at the right cervical, (B) & (C) along the celiac axis, and (D) the cardiophrenic areas.



Fig. 3. Preoperative positron emission tomography findings. Multiple hypermetabolic lymph nodes highly suspicious of metastasis are visible at the perigastric, retrocaval, mediastinal, hilar, and right cervical areas.

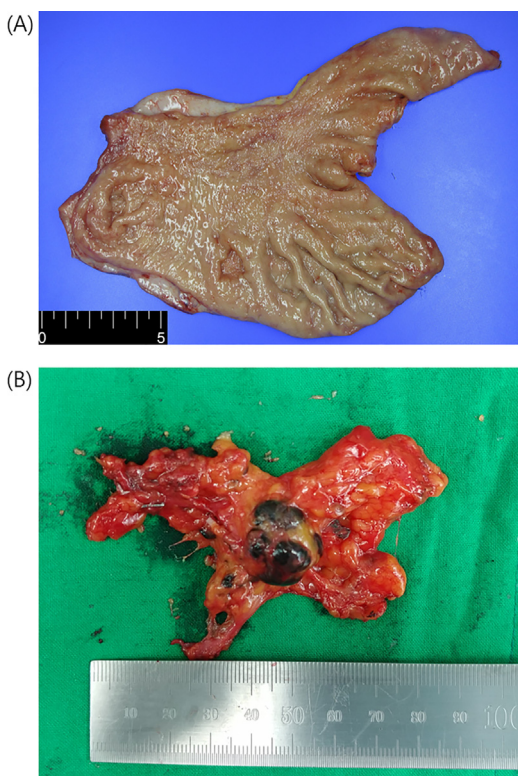


Fig. 4. Gross findings. (A) Gross examination of the resected stomach showed a superficial depressed mass measuring 2.8×2.0 cm, consistent with type 0-IIc early gastric cancer, in the greater curvature of antrum. (B) Dark-pigmented lymph nodes retrieved at the celiac axis.

polymerase chain reaction (PCR) for *Mycobacterium tuberculosis* was performed on DNA samples extracted from a formalin-fixed paraffin-embedded lymph node tissue block and was proven negative. Notably, it was considered that lymph node enlargement was attributable to anthracosilicosis. The patient was finally diagnosed with stage IA (T1N0M0) gastric cancer according to the 8th edition of the American Joint Committee on Cancer staging system and planned for regular follow-up without further treatment. The detailed occupational information of the patient taken in detail after the pathological report revealed that he had worked as a supervisor in the construction field for a long time.

3. Discussion

The therapeutic strategy in gastric cancer largely depends on the presence of metastatic lymph nodes. Therefore, an accurate assessment of the nodal status is of crucial importance to identify patients eligible for surgical resection and to determine the surgical extent. Lymph node metastasis occurs in approximately 8.0–20.0% of EGC patients and serves as the most important prognostic factor in EGC. The likelihood of nodal metastasis in EGC is significantly associated with the characteristics of the primary tumor *per se*; submucosal invasion, lymphovascular invasion, undifferentiated histology, and larger tumor size are considered independent risk factors for node metastasis in EGC [3,11,12]. Metastatic lymph nodes from EGC, whenever present, are usually limited to the perigastric area within the second-tier of lymph nodes [13]. Although distant nodal metastasis from EGC is extremely rare, cases of EGC accompanied by nodal metastasis beyond the second-tier lymph nodes have been reported in which extensive surgery proved ineffective to improve their long-term prognosis [14]. Thus, careful scrutiny is required to avoid unnecessary surgical stress by utilizing various imaging modalities such as EUS, abdominopelvic and chest CT, and PET-CT.

Since the sensitivity and specificity of CT scan to identify metastatic lymph nodes remains unsatisfactory in gastric cancer patients, ^{18}F FDG PET-CT scan is frequently used as a complementary tool to verify distant metastasis in gastric cancer patients with equivocal CT findings. PET-CT has demonstrated high specificity rate, ranging from 90.5 to 100% in detecting metastatic nodes of gastric cancer patients in recent studies, albeit with a markedly lower sensitivity of 22.7–58.3% [5–8]. Although infrequently encountered, false-positivity of PET-CT scans has been reported, including cases of metabolically active but benign diseases such as infection (including tuberculosis and aspergillosis), sarcoidosis, and other granulomatous diseases [15].

Anthracosilicosis or “coal workers pneumoconiosis” is a well-known respiratory disease that results from occupational exposure to a mixture of silica and coal dust. It usually presents with radiologic abnormalities of thoracic manifestations, from nodular infiltration to massive fibrosis of the lung parenchyma. However, extrathoracic involvement without prominent respiratory findings is rarely reported. To our knowledge, this is the first report of a gastric cancer patient with concurrent extensive nodal involvement of anthracosilicosis mimicking metastatic nodal disease. Although the patient remained asymptomatic until the diagnosis, considering his occupational history, prolonged exposure to a low concentration of silica or dust might have caused extrathoracic anthracosilicosis via a retrograde lymphatic spread from the chest to the subdiaphragmatic nodes.

As shown in the present case, it is important to be aware of the fact that numerous diseases, as well as malignancy, can cause hypermetabolic nodes in PET-CT scans. When the radiologic findings are poorly correlated to the characteristics of the primary tumor, the possibility of false-positivity should be questioned con-

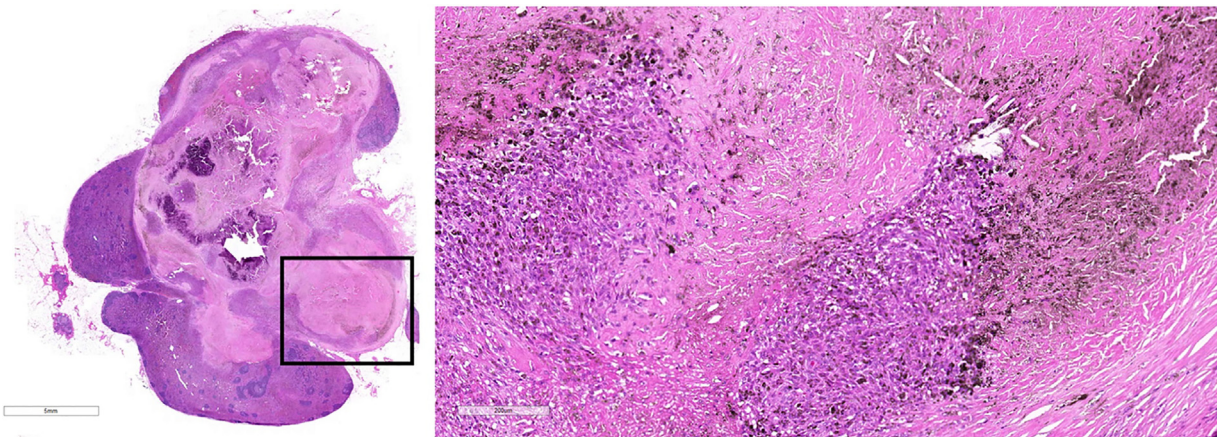


Fig. 5. Representative scan view of enlarged lymph node composed of extensive necrosis, calcification, fibrosis, and inflammation (taken at 0.4× objective). When magnifying square, aggregates of epithelioid histiocytes were intermingled with other inflammatory cells and pigments of brown to black color surrounding the extensive necrotic region (taken at 10× objective).

sidering the rare incidence of supradiaphragmatic nodal metastasis from EGC, particularly from those with well-differentiated types of cancers. This is particularly true because the prognosis and the treatment could completely differ based on different interpretations and diagnoses.

4. Conclusion

We report a case of an EGC with concurrent extrathoracic anthracosilicosis mimicking extensive nodal metastasis in imaging studies. This case implies that PET-CT scan for clinical staging is not specific enough to clearly delineate malignant lesions, causing a diagnostic dilemma. Although metastasis from the primary gastric cancer is the most concerning and common origin, other potential causes should also be considered based upon the clinicopathologic findings of the primary tumor. Surgical exploration can be a viable option for a definitive diagnosis, unless the etiology of the lymphadenopathy can be differentiated by less-invasive procedures such as fine-needle aspiration or core-needle biopsy.

Conflict of interest

There is no potential conflict of interest or financial ties to declare.

Sources of funding

None.

Ethical approval

Ethical approval has been exempted for case reports at our institution.

Consent

Written informed consent was obtained from the patient for publication of this case report.

Author contribution

Dr. Ji Yeon Park – study concept, data collection and interpretation, and manuscript writing.

Dr. An Na Seo contributed to this case report as a pathologist, which is described in the acknowledgement section.

Registration of research studies

This is a case report not a research study and, therefore, registration of research studies is not required.

Guarantor

Dr. Ji Yeon Park.

Acknowledgement

Dr. An Na Seo contributed to this case report as a pathologist.

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