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Lung cancer presenting as an acute appendicitis

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Abstract

Appendiceal metastasis is a rare complication of primary lung cancer and an extremely rare cause of appendicitis. We present the case of a 62-year-old male who presented with right lower quadrant abdominal pain which revealed not only appendiceal inflammation, but also a lung mass and mediastinal lymph nodes. He then proceeded to appendicectomy and two days post-operatively an endobronchial ultrasound-guided biopsy. His mediastinal lymph node biopsy revealed a lung adenocarcinoma and his subsequent appendiceal immunohistochemistry revealed the same staining pattern for thyroid transcription factor 1 (TTF-1) and cytokeratin 7 (CK-7). We conducted a literature review which revealed 12 previous case reports of lung metastasis to the appendix causing appendicitis including three patients in whom appendicitis was the presenting complaint leading to lung cancer diagnosis. This case highlights the diversity of presentations for patients suffering from metastatic lung cancer.

Introduction

Lung cancer is the leading cause of cancer-related deaths in Australia, making up around 9% of cancer cases but 18% of cancer-related deaths [1]. While most patients present with locally advanced or metastatic disease, metastasis to the appendix is rare, and rarer still for acute appendicitis to be the initial presenting complaint. In an observational study of 2066 patients with lung cancer, only one had an appendiceal metastasis [2].

In this paper, we present the case of a new diagnosis of metastatic lung cancer presenting with the symptoms of an acute appendicitis secondary to appendiceal tumour deposits. We have conducted a literature review of all cases of lung cancer metastasizing to the appendix.

Case Report

A 62-year-old previously well male presented to the emergency department with sudden onset right lower quadrant abdominal pain. A computed tomography (CT) of the abdomen demonstrated an inflamed appendix with enlarged locoregional lymph nodes along with a 4-cm lesion in the right adrenal gland with central necrosis. Incidentally, there was also found to be a 64 mm × 53 mm × 51 mm mass in the right lower lobe of the lung with several satellite lesions in the right lower and middle lobes (Fig. 1). The patient was admitted and commenced on intravenous amoxicillin and clavulanic acid.

The patient is a lifelong non-smoker and had no respiratory symptoms at presentation. He was fit and physically active and had no family history of malignancy. Other significant medical history included erosive osteoarthritis, obstructive sleep apnoea, diverticular disease, and a previous squamous cell skin cancer excised from his right thigh with clear margins. He had undergone a colonoscopy four years prior which had revealed diverticulosis with no lesions suspicious for malignancy.

On day 2 of his admission, he underwent a laparoscopic appendicectomy which revealed a very thick and erythematous appendix adhered to the mesocolon. Once recovered on day 5 of admission, the patient underwent an endobronchial ultrasound-guided biopsy of his subcarinal lymph nodes which revealed adenocarcinoma. The specimen stained positive for cytokeratin 7 (CK-7), thyroid transcription factor 1 (TTF-1), and napsin A which suggested a

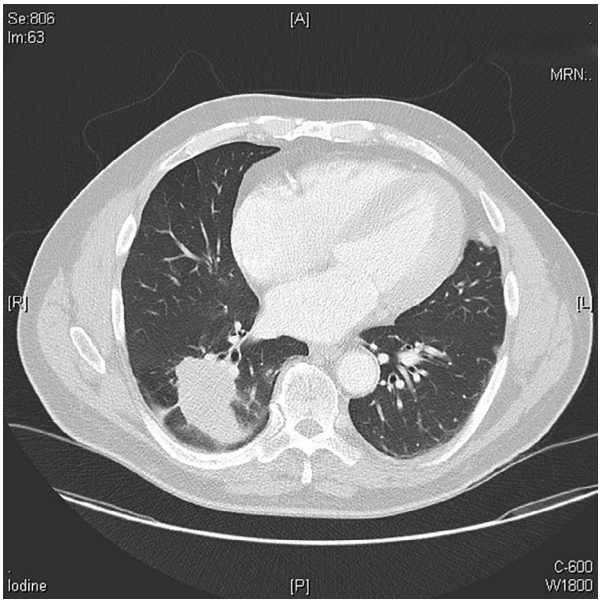

Figure 1. Computed tomography of the chest demonstrating primary lung lesion.

primary lung cancer. The adenocarcinoma was diffusely positive for epidermal growth factor receptor (EGFR) exon 19 mutation and negative for both anaplastic lymphoma kinase (ALK) and c-ros oncogene 1 (ROS-1) mutations (Fig. 2).

The anatomical pathology from the appendicectomy then revealed an adenocarcinoma with an identical immunohistochemical profile with lymphovascular invasion and involvement of the mesoappendix. A subsequent fluorodeoxyglucose (FDG) positron emission tomography (PET) scan demonstrated diffuse metastatic disease with bone, pancreas, and brain metastasis, confirmed on cerebral magnetic resonance imaging (MRI).

The patient recovered well from his appendicectomy and after confirmation of his EGFR mutation was commenced on osimertinib, a tyrosine kinase inhibitor.

Literature Review

Using the search ("Lung Neoplasms"(Mesh)) AND "Appendicitis"(Mesh)), MEDLINE revealed 32 results, of which 21 were excluded due to either not being related to

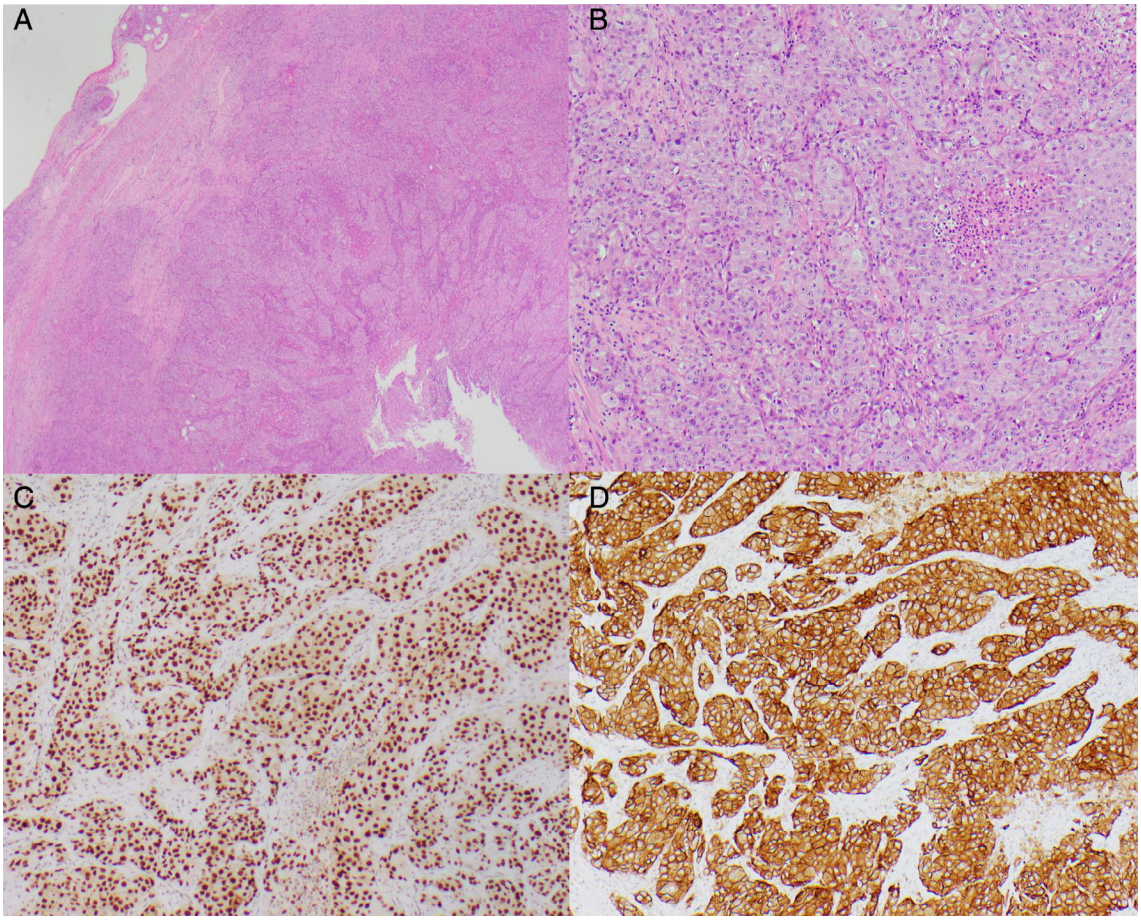

Figure 2. (A) Full-thickness involvement of the appendix by tumour; (B) solid nests of tumour cells; (C) positive immunohistochemical staining for EGFR exon 19; and (D) positive immunohistochemical staining for thyroid transcription factor 1 (TTF-1).

lung cancer, not being related to appendicitis, or not being original research. This revealed 12 case reports for inclusion, of which two were found via review of included report bibliographies, with two publications unable to be included as the full article could not be viewed. All case reports were of metastatic lung cancer causing appendicitis.

Of the 12 cases included, the mean age was 63.7 years with 11 of 12 cases being male. In only three cases did the patients present with an appendicitis which subsequently led to the diagnosis of metastatic lung cancer. Of the eight patients with a pre-existing diagnosis of metastatic lung cancer, the mean time from diagnosis was just less than eight months, with six of these receiving chemotherapy at the time of presentation. Out of 12 cases, 10 presented with a perforated appendix.

Of these 12 cases, half were small cell and half were non-small cell carcinomas [3–14].

Discussion

This case highlights an unusual first presentation of metastatic lung cancer with acute appendicitis. Given the histology, the proposed mechanism for appendicitis is occlusion of the appendiceal orifice either by enlarged lymph node or metastatic deposit in the wall with subsequent bacterial proliferation and invasion of the mucosal wall, which may have been facilitated by a degree of immunocompromise related to metastatic cancer in addition to breakdown of mucosal integrity from direct tumour invasion.

The overrepresentation of small cell cancer (which represents 15% of all lung cancers in Australia [[15]]) in these cases likely reflects its propensity to be widely metastatic at initial presentation.

This case also highlights the importance of positive staining for TTF-1, napsin, and CK-7, along with negative staining for CK-20, to correctly identify the pulmonary origin of metastatic adenocarcinoma. This combination was crucial in the diagnosis of stage IV NSCLC as opposed to synchronous primaries in our patient [16].

This case reminds us of the diverse range of complications from metastatic lung cancer and to consider malignancy as a differential diagnosis in patients who present with a lung mass and an apparent unconnected additional diagnosis.

Disclosure Statement

Appropriate written informed consent was obtained for publication of this case report and accompanying images.

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References

1. Australian Government, Cancer Australia. Lung cancer in Australia statistics. 2020. https://www.canceraustralia.gov.au/affected-cancer/cancer-types/lung-cancer/statistics (accessed 24 October 2020).
2. Taira N, Kawabata T, Gabe A, et al. 2017. Analysis of gastrointestinal metastasis of primary lung cancer: clinical characteristics and prognosis. Oncol. Lett. 14(2):2399–2404.
3. Dieter RA. 1970. Carcinoma metastatic to the vermiform appendix. Dis. Colon Rectum 13(4):336–340.
4. Goldstein EB, Savel RH, Walter KL, et al. 2004. Extensive stage small cell lung cancer presenting as an acute perforated appendix: case report and review of the literature. Am. Surg. 70(8):706–709.
5. Gonzalez-Vela MC, García-Vattuille AI, Fernández FA, et al. 1996. Metastasis from small cell carcinoma of the lung producing acute appendicitis. Pathol. Int. 46(3):216–220.
6. Haid M, Larson R, and Christ M. 1992. Metastasis from adenocarcinoma of the lung producing acute appendicitis. South. Med. J. 85(3):319–321.
7. Keramidaris D, Oikonomou C, Theodorolea K, et al. 2019. Acute perforated appendicitis due to metastatic small-cell lung cancer. Turk. J. Gastroenterol. 30(11):993–994.
8. Kimura Y, Machimoto T, Yasukawa D, et al. 2018. Acute appendicitis caused by metastatic adenocarcinoma from the lung: a case report. Surg. Case Rep. 4(1):59.
9. Murray H, and Meade J. 1962. Bronchogenic carcinoma metastasising to the vermiform appendix. Lancet 279(7234): 836–837.
10. Pang L-C. 1988. Metastasis-induced acute appendicitis in small cell bronchogenic carcinoma. South. Med. J. 81(11): 1461–1462.
11. Shiota N, Furonaka M, Kikutani K, et al. 2016. Appendicitis complicated by appendiceal metastasis via peritoneal dissemination from lung cancer. Respirol. Case Rep. 4(4): e00164.
12. Sundararajan R, and Landman AB. 2012. Acute appendicitis from metastatic small cell lung cancer. West. J. Emerg. Med. 13(1):94–95.
13. Wolf C, Friedl P, Obrist P, et al. 1999. Metastasis to the appendix: sonographic appearance and review of the literature. J. Ultrasound Med. 18(1):23–25.
14. Yunaev M, Mahajan H, and Suen M. 2011. Appendicitis secondary to metastatic small cell lung cancer. Pathology 43 (3):284–287.
15. AIHW. 2014. in Australian cancer incidence and mortality (ACIM) books. Canberra, Australia, Australian Institute of Health and Welfare.
16. Su Y-C, Hsu Y-C, and Chai C-Y. 2006. Role of TTF-1, CK20, and CK7 immunohistochemistry for diagnosis of primary and secondary lung adenocarcinoma. Kaohsiung J. Med. Sci. 22(1):14–19.