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Case Report

Duodenal metastasis from primary lung adenocarcinoma: A rare case report ☆

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ABSTRACT

Duodenal metastases from pulmonary adenocarcinoma are rare. Early detection, diagnosis, and treatment are crucial for improving the prognosis of patients with duodenal metastases from primary lung cancer, which often go unnoticed due to their low incidence and diagnostic challenges. Here, we present the case of a 64-year-old man with an unusual occurrence of duodenal metastases from pulmonary adenocarcinoma, admitted with symptoms of cholangitis. Radiological findings revealed a mass in the D2-D3 segments of the duodenum. Endoscopic ultrasound with biopsy was performed, and immunohistochemical analysis confirmed that the mass was a duodenal metastasis of pulmonary adenocarcinoma.

Introduction

Lung cancer is the leading cause of cancer-related deaths worldwide. The 2 main subtypes of lung cancer are small cell lung carcinoma (15%) and non-small cell lung carcinoma (85%) [1], which includes squamous cell carcinoma, adenocarcinoma, and large cell carcinoma. Adenocarcinoma is the most common type of non-small cell lung carcinoma and tends to develop slower compared to other types [1]. Metastases from non-small cell lung carcinoma are predominantly observed in the liver, brain, adrenal glands, and bones [1,2]. Gastrointestinal metastases are rare, largely due to their typically asymptomatic presentation [1,2]. Clinical studies have reported a prevalence rate of only 0.2%-1.7% [1]. The small intestine, and particularly the duodenum, is an uncommon site for distant metastases from lung carcinoma [1]. According to the literature, the most common sites for small bowel tumors are the jejunum and ileum, with the duodenum being less frequently affected (15.8%) [2,3]. We report a case of a patient with pulmonary adenocarcinoma who presented with a duodenal metastasis.

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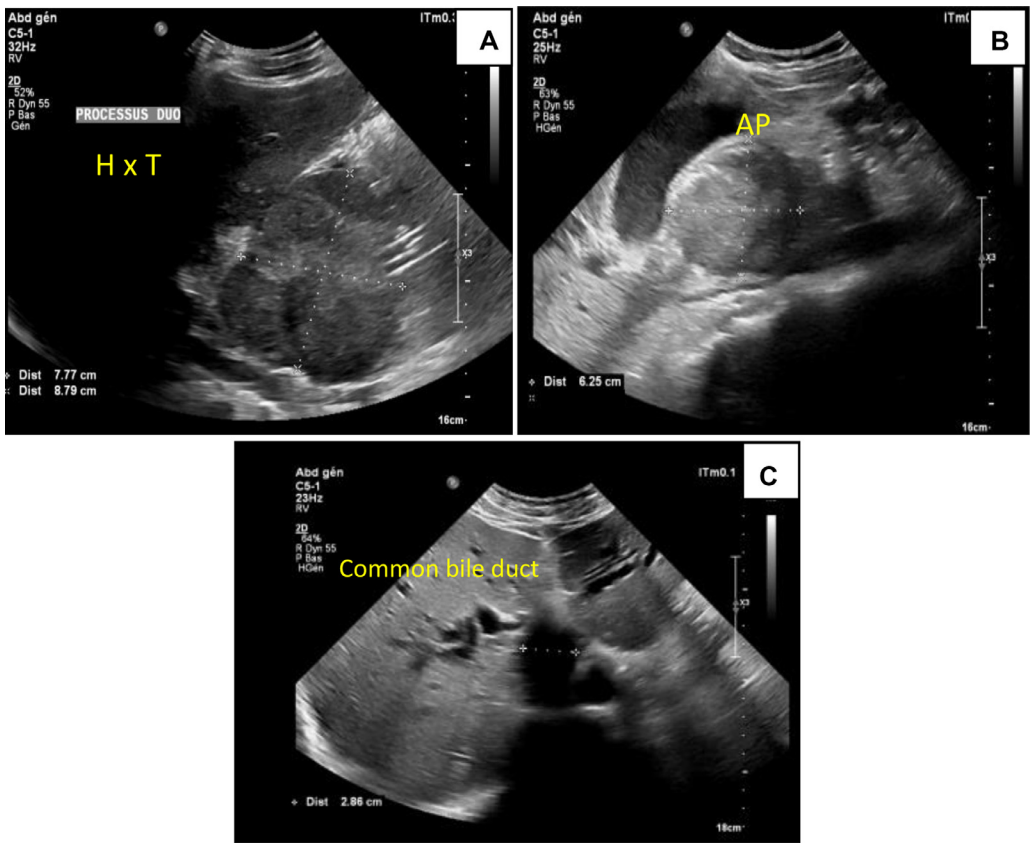

Fig. 1 – Abdominal ultrasound revealed a hypoechoic, well-defined mass at the duodeno-pancreatic junction (A, B), associated with dilatation of the intrahepatic and extrahepatic bile ducts (C).

Case

A 64-year-old male patient, a long-term smoker (35 pack-years), had a medical history of stage IIIa lung adenocarcinoma (T2b N1 M0), confirmed by histological examination showing positive immunoreactivity for TTF-1 and CK7, with no EGFR mutation. The patient received 4 cycles of cisplatin-based chemotherapy. Five months later, he was admitted to the emergency department with acute abdominal pain, fever, and pronounced jaundice, consistent with cholangitis. Laboratory tests indicated an inflammatory syndrome, with elevated levels of total bilirubin (25 mg/dL), CRP (142 mg/L) and white blood cells (WBCs = 20,000/μL). Further imaging evaluation with an abdominal ultrasound revealed a hypoechoic, well-defined mass at the duodeno-pancreatic junction, associated with dilatation of the intrahepatic and extrahepatic bile ducts (Fig. 1). External drainage of the bile ducts was performed under ultrasound guidance. Further imaging was requested for better characterization of the mass. Abdomino-pelvic CT scan showed an irregular thickening bulging at the D2-D3 portions of the duodenum, enhanced after PCI injection, infiltrating the pancreatic head, measuring 90 × 62 × 77 mm, causing upstream dilatation of the bile ducts (Fig. 2). Abdominal MRI demonstrated a duodenal mass (D2-D3) with hyperintense signal on T2-weighted imaging, diffusion restriction, and enhancement after gadolinium injection (Fig. 3). Given the context of recent chemotherapy, the presence of an infiltrative duodenal mass with intermediate attenuation, which does not obstruct the gastro-duodenal outflow, and the moderate, homogeneous enhancement, the suspected diagnosis is duodenal lymphoma.

Endoscopic ultrasound revealed a large submucosal duodenal mass, well-vascularized, with histopathological examination confirming an undifferentiated adenocarcinoma localized in the submucosa of the duodenum (Fig. 4A), with tumor cells showing high-grade features, including large nuclei and a high nucleus-to-cytoplasm ratio (Fig. 4B). Immunohistochemical staining was positive for TTF-1 (Fig. 5) and CK7 but negative for CK20. Additionally, mutation analysis for EGFR in the duodenal biopsy was negative, consistent with the known pulmonary origin of the tumor in the patient. Clinically, the patient had a rapid deterioration of their overall condition despite the external biliary drainage. The patient passed away 2 days after undergoing endoscopic ultrasound.

Discussion

Non-small cell lung carcinoma (NSCLC) typically metastasizes to the bones (34%), brain (28%), adrenal glands (17%), liver (13%), and extrathoracic lymph nodes (9%) [1]. Metastasis to the small intestine, particularly the duodenum, is uncommon

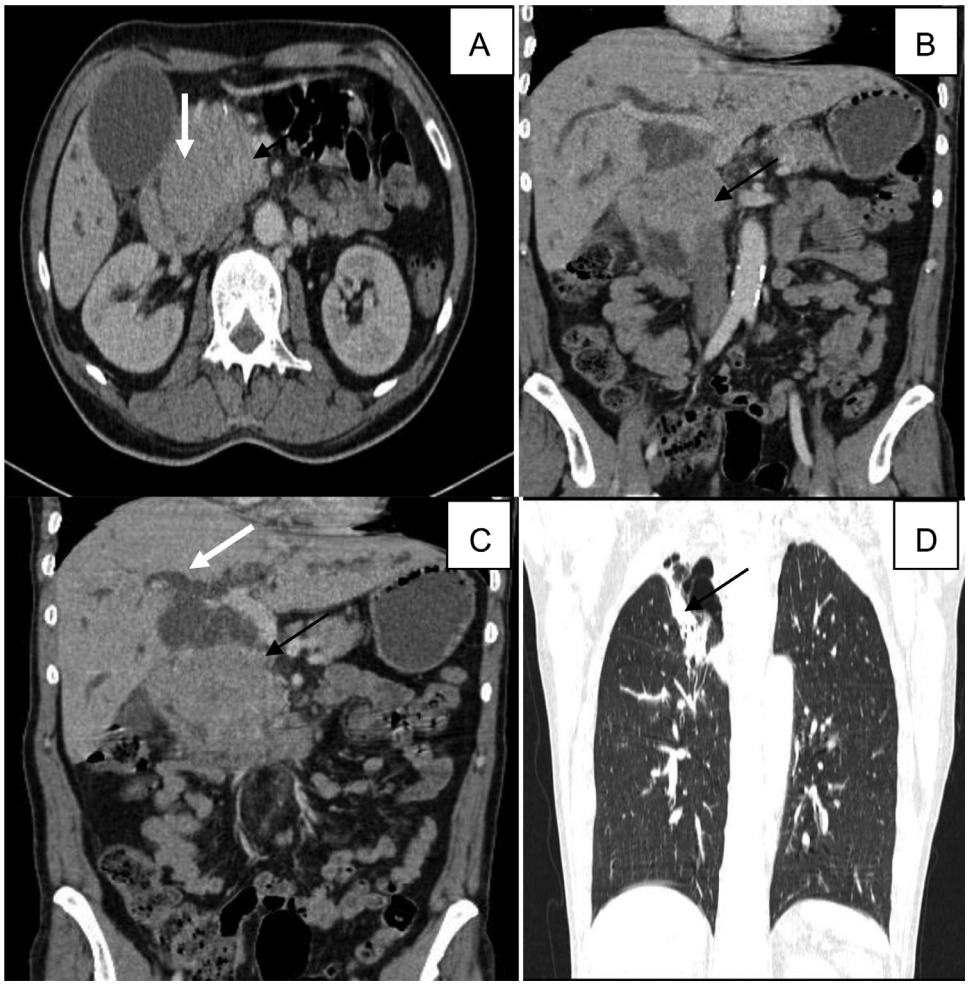

Fig. 2 – Abdomino-pelvic CT scan revealing an irregular thickening bulging at the D2-D3 portions of the duodenum "black arrow (A)", enhanced after PCI injection "black arrow (A-C)", infiltrating the pancreatic head " white arrow (A)", measuring 90 x 67 x 77 mm, causing dilatation of the bile ducts upstream " white arrow (C)". Right apical pulmonary tumor (D).

Table 1 – Overview of reported cases of duodenal metastasis from lung adenocarcinoma.

Authors	Age (y)	Gender	TNM	Interval time	Symptoms	Treatment	Survival
O'Neil et al. [1]	56	Male	-	At the time of diagnosis of lung cancer	Asymptomatic	chemotherapy	-
Kang et al. [1]	66	Male	-	Five months after lobectomy	Melena, dizziness	Total pancreatectomy, jejuna resection, ileal segment resection	5 months
Iwamuro et al. [7]	71	Male	T3N2M1	-	Melena	chemotherapy	5 months
Nishizawa et al. [7]	56	Male	T2N3M1	9.1 months	Abdominal pain	Bypass	25 days
Lin et al. [7]	76	male	-	0.5 months	Melena	Blood transfusion	2.5 months
Kosasih et al. [1]	73	Female	-	At the time of diagnosis of lung cancer	Weakness exertional, dyspnea, melena	Chemotherapy and radiotherapy	-
Qasraoui et al. [1]	57	Female	-	-	Left hip pain, melena	chemotherapy	-
Kastakou et al. [7]	61	Male	-	At the time of diagnosis of lung cancer	Melena, weight loss, hemoptysis	Endoscopic resection, chemotherapy, blood transfusion erythroprotein	-

Fig. 3 – Abdominal MRI revealed a duodenal mass (D2-D3) with dilatation of the intrahepatic and extrahepatic bile ducts upstream, showing hypersignal on T2-weighted images (A, B), restricted diffusion (C) with low ADC (D), and enhancement after gadolinium injection (E, F).

for lung carcinoma (Table 1). Gastrointestinal metastases from pulmonary adenocarcinoma are rare, with an incidence ranging from 0.3% to 1.7% [3], and are reported to be very infrequent in the literature. Xu et al. reported a gastrointestinal metastasis incidence of less than 2% among 366 lung cancer cases, while Yang et al. described a prevalence of 1.7% [2]. Lung metastases can occur throughout the gastrointestinal tract, including the esophagus (6.3%), small bowel (2.6%), stomach (1.2%), and colon (0.7%) [3]. Within the small intestine, the jejunum (50.9%) is the most commonly involved site, followed by the ileum (33.3%), with the duodenum being rarely affected (15.8%) [2,4].

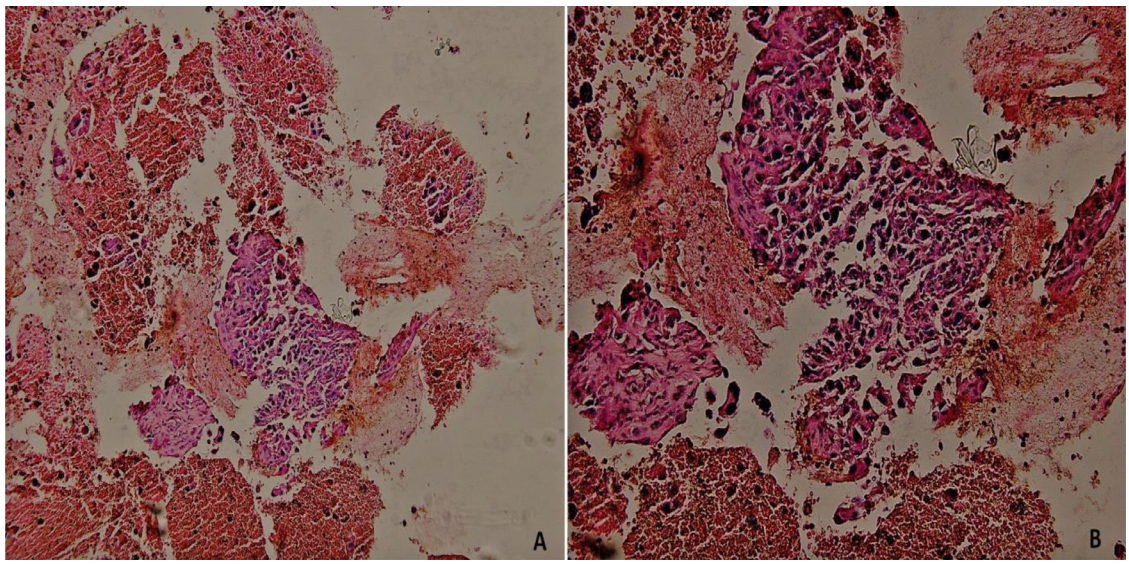

Fig. 4 – Representative micrograph of the tumor. Lesion shows undifferentiated tumor proliferation (A). Tumor cells appear high grade with large nuclei and high nucleus to cytoplasm ratio (B). (Hematoxylin-eosin; A: x100, B: x200).

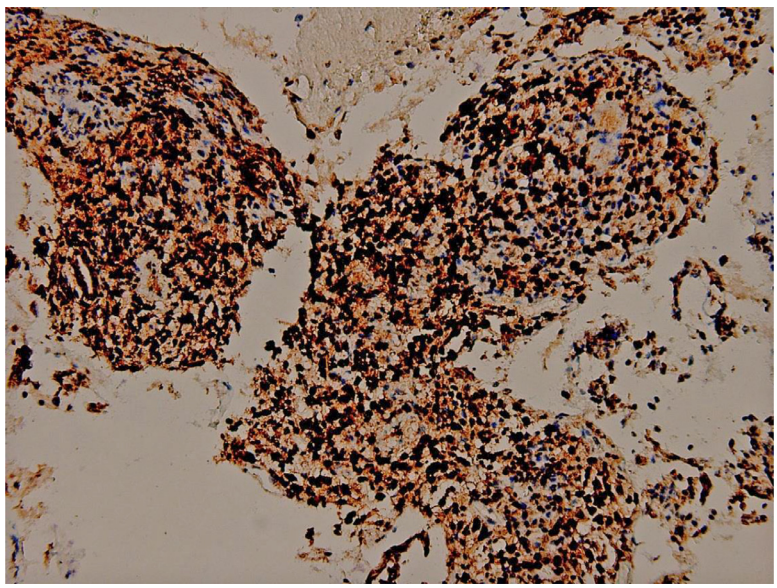

Fig. 5 – Immunohistochemical profile of the lesion. The tumor cells are positive for TTF1.

Small intestine metastases are often asymptomatic but can present with symptoms such as nausea, obstructive jaundice due to extraluminal compression of the bile ducts, small bowel obstruction, perforation, or upper gastrointestinal bleeding from involvement of the duodenal artery [2]. In our case, the patient presented with symptoms of cholangitis.

Imaging may reveal an intraluminal polypoid mass or thickening of the duodenal wall, mucosal irregularities, or ulcerations [2,5]. Park SW et al. reported a sensitivity of 93% for CT scans in detecting gastrointestinal metastases from lung cancer [2]. Positron emission tomography (PET) scans are also useful for identifying metastases but are not always feasible [6]. PET/CT may be useful for detecting duodenal metastatic tumors in the duodenal bulb region or periampullary region of the second part of the duodenum. However, the sensitivity and specificity of PET/CT in diagnosing small intestine metastases remain inadequate to date [5]. Endoscopic evaluation with biopsy remains the most effective diagnostic method [6]. In our patient, endoscopic ultrasound confirmed the presence of a duodenal mass detected by imaging.

Immunohistochemistry is a valuable tool for diagnosis, with TTF-1 being an important marker for lung adenocarcinoma [2]. TTF-1, a transcription factor involved in the embryonic development of the thyroid and lungs, is considered the best marker for lung adenocarcinoma and effectively excludes squamous cell carcinoma. CK7 expression is observed in the majority of carcinomas, including lung, breast, ovarian, and endometrial cancers, but not in colon cancer.

However, positive CK20 staining is observed in nearly all cases of colorectal carcinomas. Thus, the expressions of CK7, CK20, and TTF-1 are useful for the differential diagnosis between metastatic adenocarcinoma of pulmonary and colorectal origins [6]. In our patient's case, TTF-1 was positive in both pulmonary and duodenal biopsy samples [1].

There is no standard treatment for duodenal metastases, but surgery, endoscopy, and chemoradiotherapy have been reported as options. Endoscopic resection may be a viable and safe option for masses smaller than 1 cm, while surgical resection may be considered if the mass is larger than 1 cm, although this carries risks [1,7]. The prognosis is generally poor, with a median survival of only 4 months for patients with duodenal metastases from primary lung cancer [1].

Conclusion

Gastrointestinal metastases of lung cancer are rare and often asymptomatic, underscoring the complexity of their presentation, particularly duodenal metastases. Close monitoring of cancer patients is essential to early detection of new symptoms, enabling prompt diagnosis and intervention.

Patient consent

Written informed consent was obtained from the patient for their anonymized information to be published in this article.

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