Pulmonary lesion mimicking a primary lung tumor: metastatic localization of a primary hepatic neuroendocrine tumor – a case report.

Abstract: Neuroendocrine tumors (NETs) are rare neoplasms, accounting for approximately 1–2% of gastrointestinal tumors. Primary hepatic neuroendocrine tumors (PHNETs) are extremely uncommon, representing less than 0.3% of all NETs. Pulmonary metastases from PHNETs are exceptionally reported. We report the case of a 79-year-old man presenting with exertional dyspnea and persistent cough. Thoracoabdominal computed tomography revealed a right lower lobe pulmonary mass and multiple hepatic lesions, initially suggesting the presence of two synchronous primary tumors. However, ultrasound-guided liver biopsy demonstrated a well-differentiated grade 3 neuroendocrine tumor, with positive chromogranin A and synaptophysin expression and a Ki-67 proliferation index of 30%. A subsequent transthoracic lung biopsy confirmed metastatic involvement. A comprehensive extension workup revealed no extrahepatic primary tumor or additional metastatic sites. The diagnosis of primary hepatic neuroendocrine tumor with pulmonary metastasis was established. The patient was managed with palliative chemotherapy. This case highlights the diagnostic challenge posed by synchronous pulmonary and hepatic lesions and underscores the crucial role of histopathological and immunohistochemical analysis in distinguishing metastatic disease from multiple primary tumors.

Keywords: Neuroendocrine tumors, Primary neuroendocrine tumors of the liver, Pulmonary metastases, Histological analysis, Chemotherapy, Surgical resection

1 INTRODUCTION

Neuroendocrine tumors (NETs) account for approximately 1–2% of gastrointestinal tumors (Fenoglio et al., 2009). Primary hepatic neuroendocrine tumors (PHNETs) are extremely rare, representing about 0.3% of all NETs (Deluzio et al., 2017). The first case was described by Edmondson in 1958 (Edomson, 1956), and fewer than 150 cases have been reported in the literature (Lee & Hsu, 2011).

Pulmonary metastases from PHNETs are rarely described. This may be explained by the biological behavior of NETs, which more commonly metastasize to the liver and lymph nodes.

2 CASE PRESENTATION

A 79-year-old male patient, with no significant medical history, was admitted for evaluation of exertional dyspnea and persistent cough, associated with right upper quadrant abdominal pain and general deterioration.

On physical examination, oxygen saturation was 99%. Pulmonary auscultation was unremarkable, while abdominal examination revealed tenderness in the right upper quadrant. The remainder of the examination was normal.

Thoracoabdominal computed tomography revealed a right lower lobe pulmonary nodule measuring 51 × 47 mm (Figure 1), along with heterogeneous, confluent hepatic lesions involving segments IV, V, VI, and VII (Figure 2).

Abdominal ultrasound showed a large, irregular, poorly defined hyperechoic lesion involving segments V, VI, VII, and VIII.

An ultrasound-guided percutaneous liver biopsy was performed. Histological and immunohistochemical analysis demonstrated a well-differentiated grade 3 neuroendocrine tumor, with strong and diffuse positivity for chromogranin A and synaptophysin, and a Ki-67 proliferation index of 30% (Figure 3).

Given the presence of both pulmonary and hepatic lesions, the initial hypothesis was that of two synchronous primary tumors. A transthoracic lung biopsy was subsequently performed and confirmed the metastatic nature of the pulmonary lesion (Figure 4).

A comprehensive extension workup, including cerebro-cervical and thoraco-abdomino-pelvic CT scans, revealed no evidence of additional primary tumors or metastatic sites in the digestive tract, brain, lymph nodes, or bones.

The final diagnosis was a primary hepatic neuroendocrine tumor with pulmonary metastasis. The patient wasmanagedwith palliative chemotherapy.

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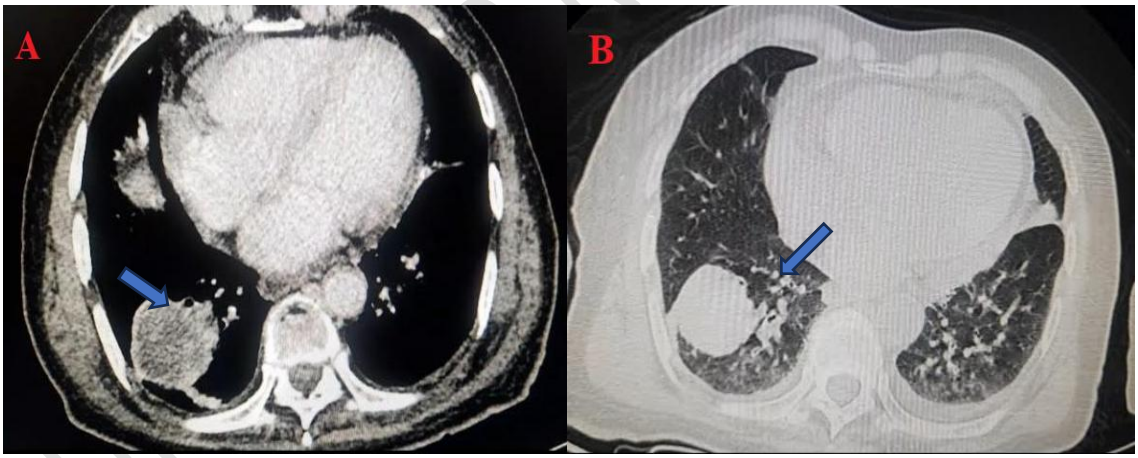

Figure 1: Axial section of the thoracic CT scan showing a right lower lobar pulmonary process:
A: The mediastinal window
B: The parenchymal window

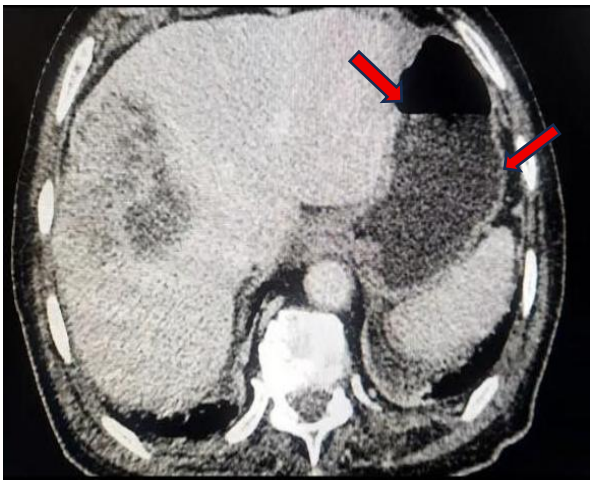

Figure 2: Axial section of an abdominal CT scan showing heterogeneous, confluent lesions in the right liver lobe

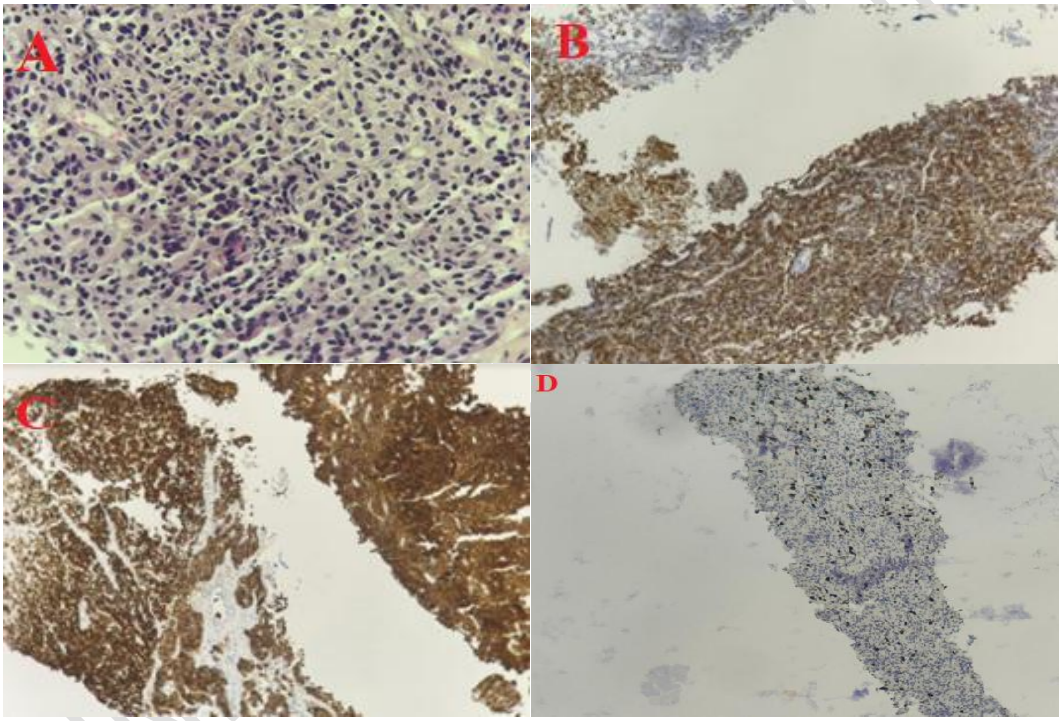

Figure 3: Histological findings of the transparietal liver biopsy:

A: Appearance of a neuroendocrine tumor (HE×40)
B: chromogranin A staining (HE×10)
C: synaptophysin staining (HE×10)
D: Ki-67 proliferation index (HE×10)

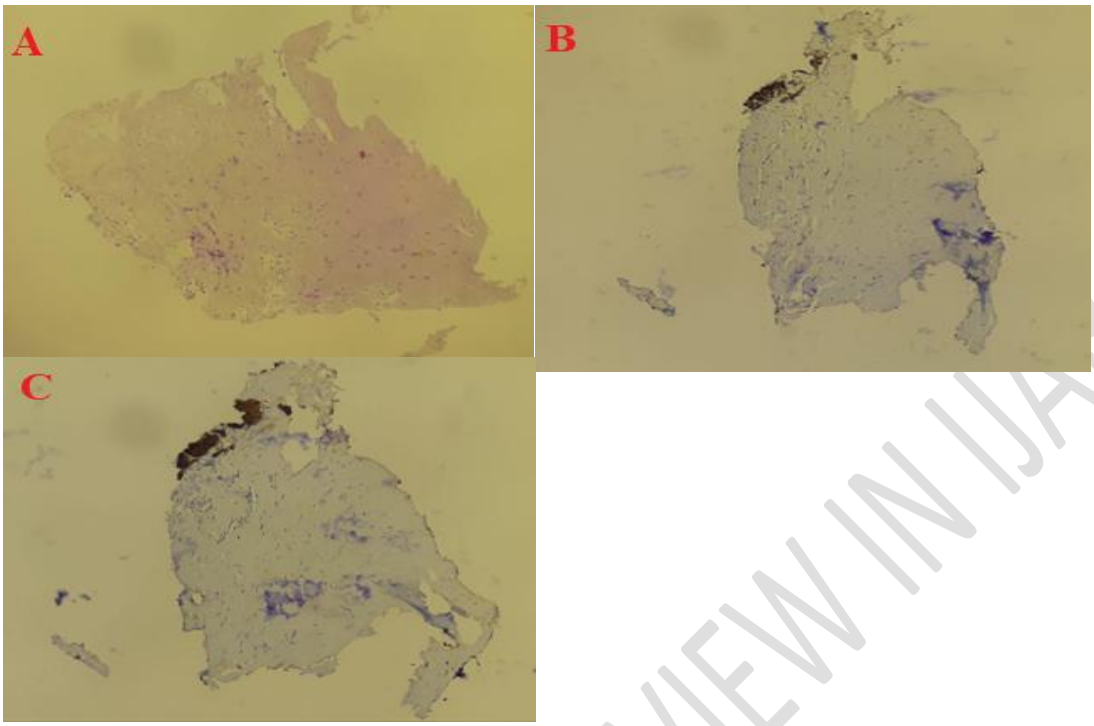

Figure 4: Histological findings of the transparietallung biopsy:
A: Appearance of a neuroendocrine tumor (HE×10)
B: chromogranin A staining (HE×10)
C : synaptophysinstaining (HE×10)

3 DISCUSSION

PHNETs are extremely rare tumors, with approximately one hundred cases reported in the literature (Lin et al., 2009; Huang et al., 2010). Their pathogenesis remains unclear. Several hypotheses have been proposed, including origin from ectopic pancreatic or adrenal tissue, or from neuroendocrine cells within the biliary epithelium. Another theory suggests development secondary to intestinal metaplasia induced by chronic biliary inflammation (Lin et al., 2009).

The diagnosis of PHNET is particularly challenging because the liver is the most common site of metastasis for neuroendocrine tumors of extrahepatic origin, especially from the gastrointestinal tract.

Clinical presentation is often non-specific, and up to 13% of cases may be asymptomatic (Lin et al., 2009). Radiological findings are also non-specific. On ultrasound, lesions may appear as hypo- or hyperechoic masses, sometimes with cystic components. On CT imaging, these tumors are typically hypervascular, making differentiation from hepatocellular carcinoma or metastatic lesions difficult (Kellock et al., 2014).

Therefore, definitive diagnosis relies on histopathological and immunohistochemical analysis. Chromogranin A and synaptophysin are key markers confirming the neuroendocrine nature of the tumor (Fenoglio et al., 2009; Lin et al., 2009).

In our case, the coexistence of pulmonary and hepatic lesions initially raised suspicion of two synchronous primary tumors. However, histopathological and immunohistochemical concordance between liver and lung biopsies established the metastatic nature of the pulmonary lesion. A thorough extension workup failed to identify any extrahepatic primary tumor, supporting the diagnosis of a primary hepatic origin.

Pulmonary metastasis from PHNET is exceptionally rare and may occur via hematogenous or lymphatic spread. Clinical manifestations are non-specific and may delay diagnosis (Modlin et al., 2005).

Surgical resection remains the treatment of choice when feasible, with a reported resectability rate of 86% and a 5-year survival rate of 74% (Lin et al., 2009; Knox et al., 2003). In advanced or unresectable cases, treatment is palliative and includes systemic chemotherapy. In some cases, intra-arterial hepatic chemoembolization may be considered (Fenoglio et al., 2009; Touloumis et al., 2008). Somatostatin analogues may also be used, particularly in cases with carcinoid syndrome.

CONCLUSION

Primary hepatic neuroendocrine tumors are rare entities that pose significant diagnostic challenges. The presence of concomitant pulmonary and hepatic lesions may initially suggest multiple primary tumors. However, histopathological confirmation is essential to establish the correct diagnosis. This case highlights the importance of a thorough diagnostic approach and multidisciplinary management.

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