Substernal Mass: A Rare Presentation of Hepatocellular Carcinoma

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ABSTRACT

A 62-year-old female with a history of hepatitis C presented with one week of worsening abdominal distension. On physical examination, she had icterus, abdominal distension, shifting dullness, and a positive fluid wave. Computed tomography (CT) of the abdomen and pelvis demonstrated a small left hepatic lobe lesion and moderate ascites. Chest CT demonstrated a large substernal mass (3.5 × 1.7 cm) in the anterior mediastinal fat in the region of prepericardial lymph nodes. Following resection of the substernal mass, histopathology revealed metastatic involvement by poorly differentiated hepatocellular carcinoma (HCC). The patient was in fulminant liver failure postoperatively and succumbed to her disease. Mediastinal lymph nodes metastases in HCC are rare and often portend a poor prognosis when present. We discuss a case of HCC presenting with a substernal mass, and provide a literature review of the management and prognosis of lymphatic spread of HCC.

CASE REPORT

A 62-year-old female presented to the emergency department (ED) with one week of progressively worsening abdominal pain and distension. Her pain was located in the left upper quadrant, radiated to her back, was 10/10 in severity, and sharp in quality. Her pain was aggravated by lying down or rising from bed and alleviated by staying still. Review of systems was positive for one week of constipation and one episode of non-bloody, non-bilious vomiting three days before presentation, and an episode of hematuria without dysuria on the day of presentation. She presented to her primary care physician four days before arriving at the ED, and was prescribed acetaminophen, ciprofloxacin, and docusate with minimal interval improvement.

Her medical history was significant for chronic hepatitis C diagnosed two years prior, hypothyroidism, chronic obstructive pulmonary disease, hypertension, type II diabetes mellitus, and osteoarthritis of bilateral knees. Of note, she does not have a documented prior history of varices or gastrointestinal bleeding. Past surgical history was significant for a percutaneous liver biopsy performed two years prior, which was reported by the patient to be benign. She had a 30-pack year history of smoking. She denied alcohol or intravenous drug use. The patient reported nonadherence to hepatitis C treatment at the time of presentation.

Physical exam was notable for mild distress, but the patient was alert and oriented and responding appropriately. There was mild scleral and oral mucosal icterus. The abdomen was markedly distended, firm to touch, and dull to percussion in all four quadrants. There were normal bowel sounds on auscultation,
and there was no pain on superficial palpation. Significant pain was elicited with deep palpation in the left upper quadrant, but no rebound tenderness or guarding was present. No asterixis was present. There was no appreciable caput medusa, clubbing, palmar erythema, or spider telangiectasias.

Pertinent laboratory tests included an alanine aminotransferase of 483 units/L, aspartate aminotransferase of 139 units/L, CA125 of 233 units/mL, and alpha-fetoprotein of 3673 ng/mL. Carcinoembryonic antigen was within normal limits.

Contrast-enhanced computed tomography (CT) of the abdomen and pelvis during the delayed-phase showed a well-defined 1–2 cm hypodense lesion in hepatic segment IV [Figure 1] that was not conspicuous on either arterial- or venous-phase. Moderate amount of ascites, most notably in the right paracolic gutter, was also present. There was no evidence of gastric, splenic, or esophageal varices. There was no recanalization of the paraumbilical vein.

Figure 1: Coronal imaging of a contrast-enhanced abdomen and pelvis CT during the delayed-phase demonstrates subtle nodularity of the liver contour suggestive of cirrhosis. A nonspecific hypodense lesion in the medial portion of the left hepatic lobe, likely in hepatic segment IV, is seen on the delayed-phase that was not conspicuously present on either arterial- or venous-phase (red arrow). Moderate free fluid in the abdomen and pelvis was present and can be seen in the right subphrenic space and Morrison’s pouch in this image.

Figure 2: Transverse imaging of a contrast-enhanced CT chest demonstrates a well-marginated homogeneous soft-tissue density mass measuring 3.5 × 1.7 cm in the mediastinal fat anterior to the right ventricle and the region of the prepericardial lymph nodes (red arrow).

Figure 3: (a) Tumor cells showed strong positivity for low molecular weight cytokeratin CAM 5.2 (CAM 5.2 IHC stain, magnification = 10 ×). (b) Strong positive staining for glypican-3 (glypican-3 IHC stain, magnification = 10 ×). (c) Tumor cells also showed focal positivity for Hepar-1 (Hepar-1 IHC stain, magnification = 10 ×). The tumor cells are negative for vimentin, neuron-specific enolase, chromogranin, CD117, PLAP, HDL, HCG, CD30, desmin, TTF-1, and S100.
Intra-thoracic metastasis is thought to be due to lymphatic drainage of the liver through the bilateral triangular ligaments. To our knowledge, the first case of mediastinal lymph node metastases by HCC was reported in 1992. A limited number of cases of HCC metastasis with specifically substernal lymph node involvement have been reported, some of which occurred in the setting of recurrence, whereas in other cases, the primary was never found. Specifically, there was one report of small-sized HCC presenting with large mediastinal metastases. While more likely to be related to hematogenous spread, another case reported metastasis to the sternum bone that presented with life-threatening hemorrhage.

There is equivocal evidence on the optimal approach towards treating HCC with extra-hepatic lymph node metastasis. A multitude of treatment approaches have been previously reported, including surgical resection, video-assisted thoracic surgery (VATS), radiofrequency ablation, percutaneous ethanol injection, and transcatheter arterial chemoembolization (TACE). TACE of metastatic mediastinal lymph nodes provided tumor control and increased survival time in one study. Chemotherapy is another option with one patient who received 5-fluorouracil/cisplatin and did not demonstrate any detectable metastatic mediastinal lymph nodes following treatment. However, the limited number of studies, conflicting findings, and short duration of follow-up of the treatment modalities limit the ability to make substantially meaningful conclusions. Nevertheless, lymph node resection may be a viable option and beneficial in a selected number of cases. For example, a report of resection of metastatic mediastinal lymph nodes demonstrated survival of more than 41 months. Resection with VATS has been reported to be effective in the treatment of solitary mediastinal lymph node metastasis and cardiophrenic lymph node metastasis following liver resection. For example, one study reported four months of recurrence-free survival following resection of a solitary mediastinal lymph node metastasis.

Despite encouraging findings with resection, the presence of lymphatic spread nevertheless portends a poor prognosis. As seen in our case, even following resection of a solitary metastatic lymph node, the outcomes in patients with lymphatic spread tend to be relatively poor. In our case, this may be partly attributed to the poor liver function status of the patient at the time of presentation. The prognosis...
after treatment in patients with lymphatic spread is poorer compared to those with metastases to adrenal glands or the lungs. The cumulative survival rate for extra-hepatic metastasis was reported to be only 21.7% at one year and 7.1% at three years. Four variables were identified as significant independent determinants of survival after the initial diagnosis of extra-hepatic metastases: performance status, presence of portal venous invasion, treatment of extra-hepatic metastases, and Child-Pugh grade.

**CONCLUSION**

In summary, we report a case of primary HCC with a solitary mediastinal lymph node metastasis. Given the rare incidence of mediastinal lymph node metastases, the evidence on the most optimal treatment is limited and prognosis is often nevertheless poor.

**Disclosure**

The authors declared no conflicts of interest.

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