

Unusual Problem of Pulmonary Embolism Due To IVC Thrombosis Secondary to Hepato-Cellular Carcinoma Complicating Liver Cirrhosis

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Abstract:

Introduction: We wish to present a case of liver cirrhosis who was on regular follow up in our department who developed shortness of breath and was found to have pulmonary embolism. On follow up this patient was detected to have hepatocellular carcinoma (HCC) and long segment IVC thrombosis. USG abdomen also revealed a mobile clot just below the entry of IVC into right atrium.

Methods: A male patient aged about 58, on regular follow up in department of gastroenterology, presented with shortness of breath to the cardiology department in July this year. He was admitted and CT pulmonary angiography was done.

Results: CT angio was suggestive of left upper and lower lobar distal segmental, sub segmental pulmonary thromboembolism. He was treated for the same and discharged on anticoagulants. He was readmitted in our department 2 months later complaining of fatigue and mild loss of memory. At this point CT abdomen was done and was suggestive of IVC thrombosis and possible HCC in segment VIII of liver.

Conclusion: HCC complicating liver cirrhosis is usually manifested as decompensated liver disease. It is not common to present as pulmonary embolism. Intracardiac extension has a very poor prognosis. High index of suspicion is needed if a patient with liver cirrhosis presents with dyspnea of sudden onset.

Key words: liver cirrhosis, IVC thrombosis, HCC, pulmonary embolism.

I. The Clinical Problem

A 53 year old male patient diabetic, hypertensive who was under regular follow up in the department of gastroenterology for cirrhosis of liver presented to the emergency room with shortness of breath and heaviness of chest of recent onset in July this year. He did not report any unusual abdominal symptoms at that time. In view of dyspnea he was admitted to cardiology department for further management.

ECG was suggestive of left ventricular pattern (LVH). D-dimer test was positive. A CT angiogram was ordered and was suggestive of multiple filling defects within distal segmental and proximal sub segmental pulmonary arterial branches to the left and upper lobes. There was no evidence of central pulmonary emboli. (Fig 1) Venous Doppler study of both lower limbs was normal. In view of these findings was managed with low molecular weight heparin, oral anticoagulants and antiplatelets. He was stable at the time of discharge and was prescribed aspirin and acitrom (nicoumalone).

Two months later patient presented to the gastroenterology department with history of generalised weakness and pedal edema. He was admitted and necessary investigations were carried out. C X-ray was suggestive of bilateral shadowing in basal areas. Since alpha feto protein (AFP) was very high (6520 ng/ml {normal range up to 7.5ng/ml}), ultrasound abdomen was done in our department. This was suggestive of liver cirrhosis with a 2x1.5 cm lesion in the right lobe of liver (segment VIII). There was also sluggish flow noted in the portal vein with eddies suggesting a portal vein thrombosis. A clot in the IVC very close to the opening into the right atrium was noted and appeared to have some degree of mobility with blood flow.

In view of the above findings, CT scan of abdomen was ordered. This was suggestive of chronic liver disease with a 2.2x1.7 cm lesion in segment VIII of liver with arterial phase enhancement suggestive of HCC. Long segment IVC thrombosis, just after the origin of renal veins up to bifurcation was noted. Multiple nodules were noted in the lungs suggestive of bronchiolitis with a differential diagnosis of lung metastases.

II. Summary box

What is already known about cirrhosis complications?

- 1) Chronic liver disease has many complications. Infection and bleeding are most common.
- 2) Dyspnea can be due to ascites with compression effect on the lungs and pleural effusion.
- 3) Pulmonary embolism should be suspected when the cause of dyspnea is not evident.

What is new?

- 1) A high index of suspicion is needed to diagnose pulmonary embolism
- 2) If embolism is caused or complicated by HCC, then treatment modalities are limited
- 3) Infra renal IVC thrombosis is not common in liver cirrhosis.

III. Literature Review

Cirrhosis, which can be the final stage of any chronic liver disease, is a diffuse process characterized by fibrosis and conversion of normal architecture to structurally abnormal nodules. These “regenerative” nodules lack normal lobular organization and are surrounded by fibrous tissue. The process involves the whole liver and is essentially irreversible. (1)

Malignant hepatocellular carcinoma is the most common primary malignant tumor of liver usually occurring in the setting of liver cirrhosis. It constitutes approximately 1-2% of malignant tumors at autopsy in United States and Western Europe. (2) In India, the mean incidence of HCC in four population-based registries was 2.77% for males and 1.38% for females. The prevalence of HCC in India varies from 0.2% to 1.6 %.(3)

HCC is four times more common in men than in women. It is the third common cause of cancer related death worldwide. It commonly metastasizes to lungs, brain, bones and adrenals. Vascular invasion is known to occur in 30% of patients at presentation usually hepatic veins and inferior vena cava. The incidence of intra-atrial and intraventricular metastasis usually ranges from 1%-4% and as a whole heart metastases of tumor varies from 4%-18 %.(2)

In a retrospective chart review of 246 patients with HCC it was found that underlying cirrhosis was seen in 60% cases. Hepatitis B was the most common etiologic agent. Developing HCC presented as new onset ascites or as recent worsening of liver function in patients who already had ascites. Vascular invasion was seen in half the patients by the time they presented with extrahepatic spread of tumor. Vascular invasion of either a major branch of splenoportal axis, inferior vena cava (IVC) or hepatic veins (HV) was seen in more than half of the patients. It was also noted that hepatocellular carcinoma with cardiac extension may present with features of right sided heart failure, dyspnea on exertion, syncope, edema of lower extremities and shock. (3) HCC also has a tendency to invade vascular structures and may primarily present with massive venous thrombosis as a first manifestation (4). Patient may also present with tumor extension into right atrium and pulmonary embolism. Hepatocellular carcinoma presenting as macroscopic pulmonary tumor embolism (5, 6) and microscopic tumor embolism has been reported and is not very common. (7, 8). Symptoms relating to the pulmonary system must be given due weightage and an all-out attempt must be made to ascertain the cause of same. (9).

A review of IVC thrombosis

Inferior vena cava (IVC) thrombosis is related to the pathological and clinical spectrum of deep venous thrombosis (DVT). IVC thrombosis remains under-recognized, as it is not commonly pursued or identified. Vena cava thrombosis is frequently associated with neoplastic disease. (10)

Stein et al. reported carcinomas in 37,000 of 99,000 (37.4%) patients diagnosed with a vena cava thrombosis. (11) Renal, tracheal and bronchopulmonary carcinomas were the most frequently observed. Carcinomas were diagnosed significantly less frequently in patients with identified isolated lower limb DVT compared with vena cava thrombosis patients. Despite the neoplastic association, vena cava thrombosis still remains rare and is identified in only 0.07% of hospitalized patients with neoplasms.

Clinical features of acute IVC thrombosis:-

Acute IVC thrombosis

An acute IVC thrombosis may appear spontaneously as a result of an identifiable risk factor such as a chronic debilitating illness, or as a consequence of pre-existing chronic IVC obstruction. (12)

Clinical presentation of IVC thrombosis may vary according to the level of thrombosis (from the iliac confluence to the right atrium) and degree of occlusion of the cava. Patients present with bilateral lower extremity swelling and dilatation of superficial abdominal vessels. Ascites may be present. Non-tender, pitting oedema associated with blue discoloration can occur in the lower limbs within 6–12 hours if the thrombus occludes the IVC. IVC thrombosis extending to the pelvic and femoral veins can cause phlegmasia cerulea dolens (PCD) and venous gangrene. Patients complain of low back and buttock pain. Sciatica-type pain and cauda equina symptoms have been described secondary to IVC thrombosis. Renal vein involvement may result in loin pain and haematuria, while bilateral renal vein thrombosis can lead to renal failure. (12)

Spontaneous IVC thrombosis associated with malignancy is due to the prothrombotic potential of the tumor. A primary IVC tumor and secondary malignancies such as renal cell carcinomas may also infiltrate or adhere to the IVC wall, leading to endothelial damage and subsequent thrombosis. Intravascular tumor/thrombus invasion may extend intraluminally along the renal vein into the IVC and can propagate as far as the heart, resulting in an occluding thrombosis or tumor emboli (12, 13, 14, 15).

IV. Investigations

Hematological

Patients with IVC thrombosis can have elevated d-dimer levels, increased white cell count and high CRP levels (C-reactive protein).

Imaging

Doppler US provides an accurate non-invasive method of diagnosing IVC thrombosis and is the first investigation of choice. Contrast venography remains the historical standard for the diagnosis of IVC thrombosis. Computerized tomography (CT) imaging is an excellent modality for diagnosis of IVC thrombosis. Benign distal 'bland' thrombus may coexist with upstream malignant thrombus more superiorly in the IVC. Malignant thrombus can be differentiated from bland thrombus on CT through the presence of a contiguous adjacent mass and enhancement of a filling defect. Magnetic resonance imaging is replacing CT as the optimal non-invasive imaging tool. MRI avoids radiation and provides more accurate delineation of thrombus, including proximal and distal extent and its age, as well as any IVC anomaly. (10)

What is the treatment?

Acute pulmonary emboli as a first manifestation of hepatocellular carcinoma complicated with tumor thrombi in the inferior vena cava has a very poor prognosis. Treatment dilemma persists with very limited options of either chemotherapy or surgery. (17)

V. Conclusion

This index case was presented to highlight the fact that HCC can present as a case of acute pulmonary embolism. It is also unusual that this patient had infra-renal thrombosis coexisting with a mobile clot in IVC just next to the right atrium. Hepatocellular carcinoma with extension into hepatic and inferior vena cava has usually poor prognosis especially in patient with advanced staging. It is vital to screen for both HCC and IVC thrombosis in these patients as early detection may offer some hope to the patient, in an otherwise grim scenario.

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Figure1 shows emboli in the left pulmonary circulation