Hepatic Pseudolesion in SVC obstruction - $^{99}$mTc-Technetium Sulfur Colloid Scan Equivalent of Quadrate Lobe Hot Spot Sign on Computerized Tomography

Abstract
An area of increased activity in segment IV of liver (quadrate lobe) on $^{99}$mTc-sulfur colloid (TSC) scans has been well documented in patients with superior vena cava obstruction. Similarly intense enhancement of the quadrate lobe in the arterial phase may be seen on computed tomography in patients of superior vena cava syndrome. We present this imaging finding in a case of malignant thymoma causing superior vena cava syndrome and discuss the physiological cause and importance of this sign.

Key words: $^{99}$mTc-sulfur colloid scans, computed tomography, malignant thymoma, pseudolesion, quadrate lobe hotspot, superior vena cava obstruction

Introduction
Historically described in technetium $^{99}$m sulfur colloid (TSC) scan, the liver “hot-spot” is a focal increased uptake of radiocolloid associated with superior vena cava (SVC) obstruction. The computed tomography (CT) scan counterpart of this sign appears as an intense wedge-shaped enhancement of the quadrate lobe of the liver in arterial phase. “Hot Quadrate” physiology is specifically caused by collateral veins preferentially draining into the left portal vein via a recanalized paraumbilical vein. Here, we present this imaging finding in a case of malignant thymoma causing superior vena cava syndrome.

Case report
A 26-year-old lady with complaints of fever, breathlessness, and orthopnoea since 1 month, and 1 week history of swollen, plethoric face, and marked superficial venous distension over the chest presented to the emergency department. On clinical examination, the patient had tachycardia and tachypnoea. Chest radiography showed a lobulated mediastinal mass lesion with moderate right pleural effusion and basal consolidation. Multidetector contrast-enhanced computed tomography (CECT) of the chest and abdomen was subsequently done and the multiplanar reformatted (MPR) images were interpreted in various planes. Imaging revealed an inhomogeneously enhancing lobulated mass lesion in the anterosuperior mediastinum causing invasion and tumoral expansion of the SVC with extension into the right atrium [Figure 1]. Dilatation of the azygos and hemiazygos veins was evident. Multiple anterior abdominal wall and rectus sheath collaterals suggested SVC obstruction [Figure 2]. CECT abdomen revealed a wedge shaped area of intense arterial phase enhancement that represented the CT “Quadrate lobe hot spot” sign [Figure 3]. This area of enhancement showed partial washout and appeared slightly hyperdense in the venous phase and complete washout in the delayed phase imaging. Ultrasound showed no focal liver lesions.

Discussion
Invasive malignant thymoma, bronchogenic carcinoma, lymphoma, and metastatic lymphadenopathy are some common conditions associated with SVC syndrome due to extrinsic compression.[1] In SVC obstruction, there is preferential drainage of the umbilical and paraumbilical veins into the left branch of the portal vein leading to...
portosystemic shunting and is an attempt to bypass central venous obstruction.\(^{[2]}\) Resultant increased blood flow in the arterial phase in the part of the liver supplied by the left branch of the portal vein forms the physiological basis of “Quadrant lobe hot spot” sign. Quadrant lobe hot-spot sign is intense arterial phase enhancement noted on CECT due to the development of cavoportal collaterals.\(^{[3]}\) This is an equivalent of a similar sign described initially for radionuclide liver scans.\(^{[4]}\)

Other causes of focal hot spots on CECT scans are Budd-Chiari syndrome (caudate lobe), liver abscess, hemangioma, FNH - Focal nodular hyperplasia, and HCC - Hepatocellular carcinoma.\(^{[5]}\) However, the characteristic location, the wedge shape, arterial and venous phase characteristics, and associated findings of collateral vessels make this lesion highly specific as an indicator of SVC syndrome.

**Conclusion**

Quadrant lobe hot-spot sign helps in the diagnosis of thoracic central venous obstruction and when performed in patients with clinically unapparent obstruction of SVC, is highly specific for the diagnosis of SVC obstruction. As CECT is being performed frequently as a part of PET/CT, one needs to be aware of this radiological sign.

**Financial support and sponsorship**

Nil

**Conflicts of interest**

There are no conflicts of interest

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