

Superior vena cava obstruction caused by a primary mediastinal large B-cell lymphoma

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History

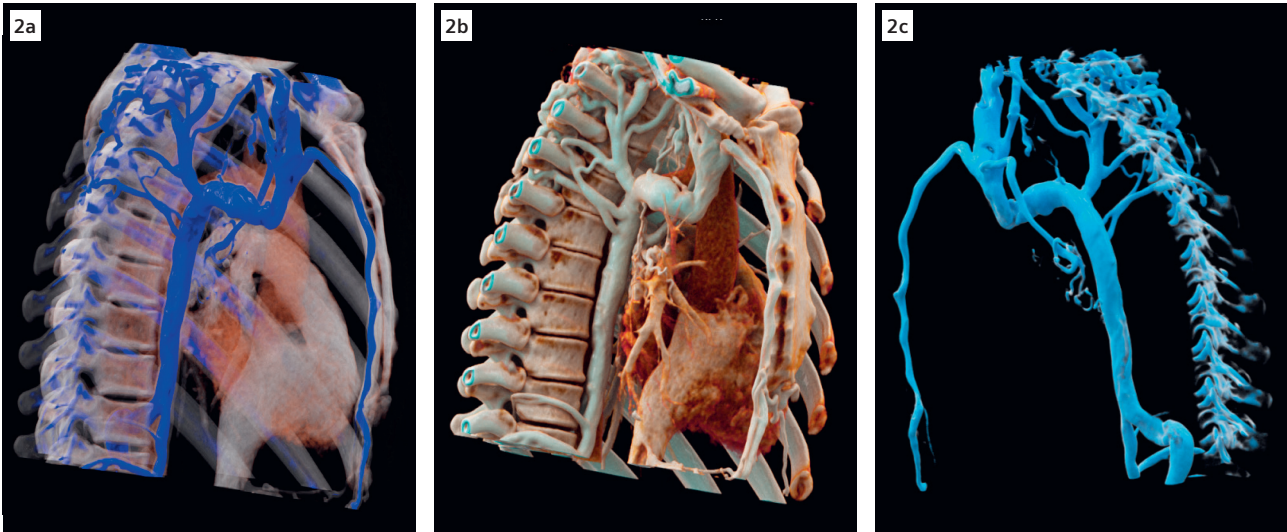
A 25-year-old male patient, suffering from chest congestion, recurrent coughing and facial edema, was admitted to the hospital. CT examination revealed a non-enhanced right para-mediastinal soft tissue mass in the superior mediastinum, invading the superior vena cava (SVC) and the right atrium. A tumor biopsy revealed a primary mediastinal large B-cell lymphoma. A three-phase chemotherapy was effectively carried out and the tumor had shrunk. The symptoms, however, persisted. A dynamic 4D spiral CT scanning was requested for further evaluation.

Diagnosis

In the CT, the segment of the SVC below the azygos arch was not seen, suggesting an obstruction. The azygos vein, the inferior hemiazygos vein, the right internal thoracic vein and the right posterior intercostal veins (1–6, 9–10) were significantly dilated, presumably draining blood into the inferior vena cava (IVC). The upper segment of the IVC drained into the right atrium. The small residual tumor and a large amount of right-sided pleural effusion were also observed.

Comments

SVC obstruction is mostly caused by malignancies, such as mediastinal lymphomas.[1] Multiple collateral venous pathways develop to bypass the obstruction. The location and severity of the SVC obstruction, superimposed thrombosis, a mediastinal mass or lymphadenopathy, collateral vessels, associated lung masses and pleural effusion can be exquisitely displayed by contrast enhanced CT. In this case, a low dose Dynamic 4D CTA is performed using Adaptive 4D Spiral scanning to acquire images at multiple time points with defined intervals. This facilitates a time-resolved inspection

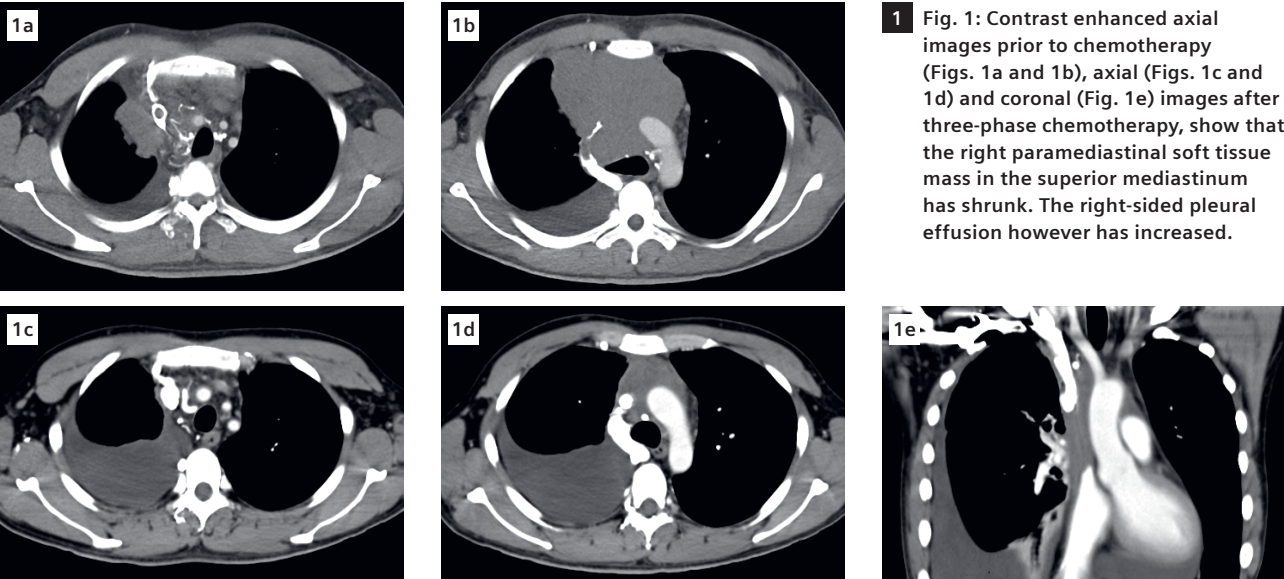


2 Fig. 2: Different views of cinematic rendering VRT images, using different presets, show significantly dilated azygos vein, inferior hemiazygos vein, right internal thoracic vein and right posterior intercostal veins (1–6, 9–10). The segment of the superior vena cava (SVC) below the azygos arch is not shown, suggesting an obstruction. The upper segment of IVC drains into the right atrium.

Reference
[1] Sheth et al. Superior Vena Cava Obstruction Evaluation With MDCT. AJR 2010; 194:336–346

The outcomes by Siemens Healthineers customers described herein are based on results that were achieved in the customer’s unique setting. Since there is no “typical” hospital and many variables exist (e.g., hospital size, case mix, level of IT adoption) there can be no guarantee that other customers will achieve the same results.

of the thoracic vascular system and makes suboptimal bolus timing highly unlikely. Lower kV and mAs settings (80 kV, 60 mAs) for each time point acquisition are applied to improve contrast-to-noise ratio (CNR) and to reduce radiation dose. Although only 40 mL of contrast agent are used, the venous collaterals are clearly demonstrated in the fused temporal maximum intensity projections (tMIP). The isotropic resolution provided by the Dual Source CT scanner, SOMATOM Force, grants optimal image quality, improves diagnostic confidence and aids in planning the necessary therapy. ●



1 Fig. 1: Contrast enhanced axial images prior to chemotherapy (Figs. 1a and 1b), axial (Figs. 1c and 1d) and coronal (Fig. 1e) images after three-phase chemotherapy, show that the right paramediastinal soft tissue mass in the superior mediastinum has shrunk. The right-sided pleural effusion however has increased.

Examination Protocol

Scanner	SOMATOM Force		
Scan area	Thorax	Rotation time	0.25 s
Scan mode	Adaptive 4D Spiral	Slice collimation	48 x 1.2 mm
Scan length	222 mm	Slice width	1.5 mm
Scan direction	Shuttle	Reconstruction increment	1.0 mm
Scan time	37.5 s	Reconstruction kernel	Br36
Tube voltage	80 kV	Contrast	350 mg/mL
Effective mAs	60 mAs	Volume	40 mL + 40 mL saline
Dose modulation	CARE Dose4D™	Flow rate	5 mL/s
CTDI _{vol}	35.1 mGy	Start delay	4 s
DLP	722.7 mGy cm		