Case Report

Coexisting Innominate Vein Compression Syndrome and May-Thurner Syndrome

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Abstract
Innominate vein compression syndrome and May-Thurner syndrome (also called iliac vein compression syndrome) are venous compression syndromes caused by normal anatomic structures. Here, we present a case in which these two conditions were found in the same patient using multidetector row computed tomography. This case is significant for two reasons: (1) it is, to the best of our knowledge, the first case study in the literature to report coexisting innominate vein compression syndrome and May-Thurner syndrome; and (2) it shows that multidetector row computed tomography has powerful diagnostic ability for venous diseases. [Tzu Chi Med J 2009; 21(4):355–358]

1. Introduction
Normal anatomic structure with abnormal arrangement can cause diseases like innominate vein compression syndrome and May-Thurner syndrome. Here, we describe a case in which these two syndromes occurred in the same patient. Multidetector row computed tomography (MDCT) served as a one-stop diagnostic modality in this special case.

2. Case report
A 52-year-old man had suffered from progressive left arm swelling for 10 days and came to our outpatient department for help. With no symptoms or signs of infection, cellulitis was considered unlikely. The patient was referred for MDCT to exclude deep vein thrombosis.

Computed tomography pulmonary arteriography with indirect venography (CTVPA) (1) was arranged for the evaluation of pulmonary embolism and deep vein thrombosis over the left upper limb, using a 40-slice CT scanner (Brilliance 40; Philips Medical Systems, Best, The Netherlands). During the examination, contrast medium was administrated (2 mL/kg body weight) through an intravenous catheter at 3 mL/sec. After the contrast bolus reached the pulmonary artery, CT pulmonary angiography was done under breath hold using 120 kVp, 250 mAs/slice,
rotation time of 0.5 seconds, and pitch of 0.876. Four minutes after the injection of contrast, another spiral scan was done from the left internal jugular vein to the left hand, including the venous systems over the left upper limb. The scan parameters were 120 kVp, 200 mAs/slice, rotation time of 0.5 seconds, and pitch of 1.026. After scanning, the source thin-section axial imaging data were reviewed for diagnosis. The imaging data revealed that the left brachiocephalic vein was severely compressed between the sternum (S) and the right brachiocephalic trunk (RBCT), and between the left clavicle head (CH) and the left common carotid artery (LCCA). Thrombus formation (arrowheads) is also noted over the most stenotic segment. RBCV = right brachiocephalic vein; LSCA = left subclavian vein. (B) Oblique coronal reformation of the left thoracic outlet shows extensive thrombus formation (arrowheads) in the left brachiocephalic vein (LBCV), internal jugular vein (IJV), subclavian vein (LSV) and axillary vein (LAV). (C) Coronal reformation of the left upper limb shows that the thrombus formation (arrowheads) extends to the basilic vein. Hu = humerus.

![Fig. 1](image)

In this case, using MDCT, we clearly identified deep vein thrombosis in the patient’s left upper and lower limbs. Furthermore, the adjacent structures surrounding the veins were also visualized to establish the diagnosis: innominate compression syndrome and May-Thurner syndrome. With the powerful diagnostic capabilities of MDCT, the patient received adequate treatment and recovered well.
3. Discussion

This is the first case reported in the literature in which innominate vein compression syndrome and May-Thurner syndrome were found in the same patient. Apart from the rare incidence and unique clinical manifestations, the greatest significance in this case is that MDCT played a very important role in the diagnosis. In addition to the diagnosis of deep vein thrombosis, MDCT also showed that the formation of venous thrombus was secondary to the proximal extrinsic compression. The structures causing venous compression could be clearly identified.

May-Thurner syndrome, which is also known as iliac vein compression syndrome, was first reported by May and Thurner in 1957 (2). They found that in some patients, the left common iliac vein, which passes between the right common iliac artery and the lumbar spine, was compressed. Hence, thrombus formed in the left common iliac vein. Catheter-directed endovascular treatment for deep vein thrombosis has been in vogue recently. Endovascular reconstruction of the stenotic vein, including angioplasty and stent placement, has been applied and appears to be safe and effective (3).

Innominate vein compression syndrome, also called unilateral superior vena cava syndrome, was first
reported by Wurtz et al in 1989 (4). This disorder results from the external compression of the left innominate vein, also called the left brachiocephalic vein, by the origins of the aortic arch vessels and the sternum. With the same pathogenesis as May-Thurner syndrome, patients with innominate vein compression syndrome display swelling over the left side of the neck, left side of the face or left upper limb clinically. MDCT is a valuable tool in diagnosis due to its ability to visualize both venous and extravenous structures.

In the past, invasive angiography was thought to be the gold standard in the diagnosis of many diseases, but the role of invasive angiography is now gradually being replaced by MDCT. For example, MDCT has played important roles in the diagnosis of congenital heart disease (5), pulmonary embolism (6), and coronary artery stenosis (7). Even in whole-body arterial disease, it can be used as a one-stop diagnostic modality (8). Our case demonstrates that MDCT can also be used as a definitive diagnostic modality for whole-body venous evaluation.

In addition to innominate vein compression syndrome and May-Thurner syndrome, MDCT has also been used to evaluate other venous conditions. For example, MDCT can provide three-dimensional hepatic venography to visualize peripheral hepatic venous branches in detail, which is useful for determining operative strategies in living-donor liver transplantation (9). In patients with suggested deep vein thrombosis, MDCT has great diagnostic accuracy compared with venous compression sonography. Not only intravenous conditions (10), but also extravenous conditions, especially those with underlying anatomic abnormalities, can be evaluated. In our case, we found that the venous thrombosis caused swelling of the limb and using MDCT helped us to understand the actual pathogenesis of venous thrombus formation.

In summary, we presented a case of combined innominate vein compression syndrome and May-Thurner syndrome. Using MDCT as a diagnostic modality, the etiology of the left upper and lower limb edema and neighboring anatomic structures was determined. According to the results of our case, MDCT can be used as a one-stop diagnostic modality for comprehensive evaluation in patients with venous diseases.

References