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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]

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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,

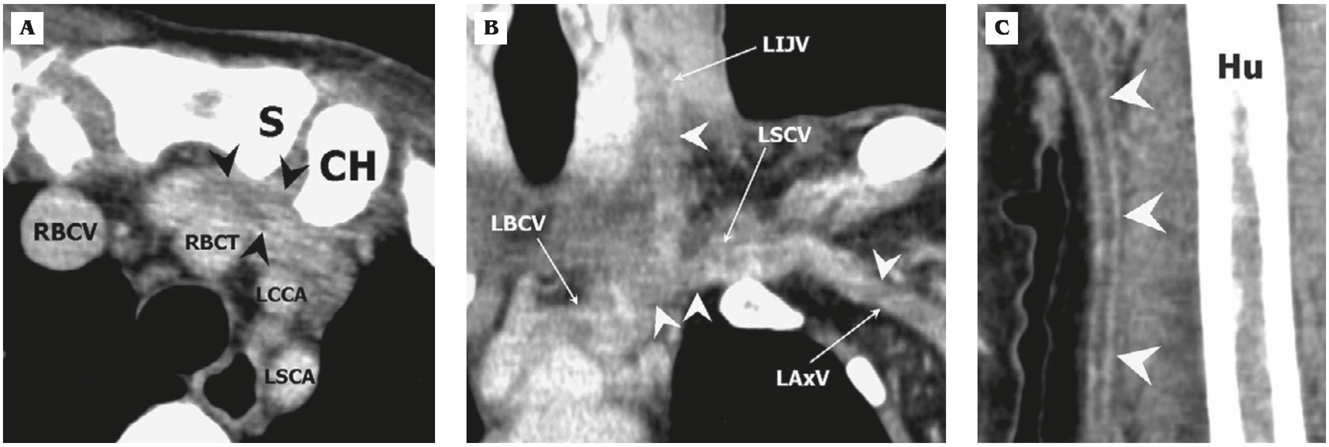

Fig. 1 — A 52-year-old man presented with progressive left arm swelling. Computed tomography (CT) venography of the upper mediastinum and left upper limb demonstrate innominate vein compression syndrome. (A) Axial CT venography shows that the left brachiocephalic vein (also called left innominate vein; arrowheads) is 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 (LIJV), subclavian vein (LSCV) and axillary vein (LAxV). (C) Coronal reformation of the left upper limb shows that the thrombus formation (arrowheads) extends to the basilic vein. Hu=humerus.

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 and right brachiocephalic trunk as well as between the left clavicle head and the left common carotid artery (Fig. 1). Subsequent venous thrombus formation was noted in the left internal jugular vein, and it extended from the left subclavian vein to the veins of the forearm. In addition, severe swelling and edema were also noted over the left upper limb. The platelet count and coagulation profiles, such as prothrombin time and activated partial thromboplastin time, were checked and were within reference ranges. According to these findings, innominate vein compression syndrome was diagnosed. After thrombolytic therapy, the symptoms subsided and the patient was discharged.

Two months after the initial presentation, he suffered from left lower limb swelling without local heat or erythematous changes. Under the impression of deep vein thrombosis over the left lower limb, we arranged for another CTVPA. The platelet count and coagulation profiles were checked and were within reference ranges. The contrast medium injection and scanning protocols were the same as previously described, except that the venous phase spiral scan was obtained from the lower segment of the inferior vena cava to the ankle, including all venous systems over the lower limb. This time, the results demonstrated that the left common iliac vein was compressed between the right common iliac artery and the vertebral body of the fifth lumbar spine (Fig. 2). Venous thrombosis was noted in the inferior vena cava, and it extended from the left common iliac vein to the left femoral vein with left lower limb swelling and edema. In addition, pulmonary embolism was found in the right lower lobar pulmonary artery (Fig. 2). Because recurrent venous thrombosis was noted, anticardiolipin antibodies and lupus anticoagulant were checked to rule out antiphospholipid syndrome. However, the final laboratory data did not support this diagnosis. Protein C and protein S were also checked and were within reference ranges. Therefore, May-Thurner syndrome with pulmonary embolism was diagnosed. After thrombolytic therapy, the patient's left leg swelling subsided and he was discharged soon thereafter.

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.

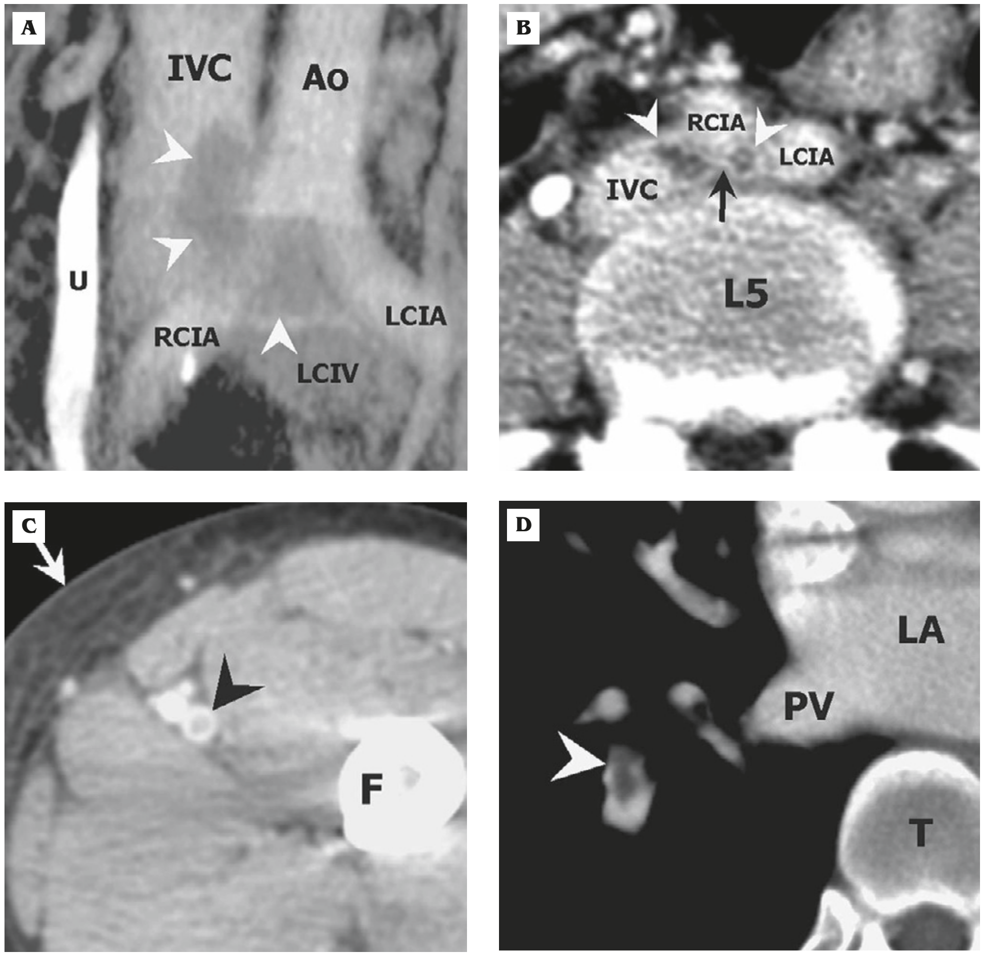

Fig. 2 — Two months after the initial presentation, the patient suffered from left lower limb swelling. Computed tomography pulmonary arteriography with indirect venography (CTVPA) demonstrates May-Thurner syndrome with deep vein thrombosis and pulmonary embolism. (A) Coronal reformation of CT venography of the lower abdomen shows that the left common iliac vein (LCIV) is compressed between the traversing right common iliac artery (RCIA) and the underlying vertebral body of the fifth lumbar spine, causing thrombus formation (arrowheads). (B) Axial CT venography of the lower abdomen shows that the LCIV (arrow) is severely compressed between the traversing RCIA and underlying vertebral body of the fifth lumbar spine (L5), causing stenosis (arrow) and thrombus formation (arrowheads). (C) Axial CT venography of the left thigh shows thrombus in the left femoral vein (arrowhead). Subcutaneous edema and swelling caused by venous stasis is also noted (arrow). (D) Axial CT pulmonary arteriography shows pulmonary embolism over the right lower lobar branch of the pulmonary artery (arrowhead). IVC=inferior vena cava; Ao=aorta; U=ureter; LCIA=left common iliac artery; F=femur; PV=pulmonary vein; LA=left atrium; T=thoracic spine.

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.

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