Idiopathic retroperitoneal fibrosis is a rare disease of unknown etiology characterized by fibrous mass or plaque in the retroperitoneal area that envelops the paravertebral structures. Occlusion of inferior vena cava (IVC) and deep veins of the lower leg causes deep vein thrombosis (DVT), but is a rare complication. High speed multidetector computed tomography (MDCT) has the potential to replace traditional venography and conventional computed tomography in the evaluation of IVC occlusion, especially in the demonstration of collateral circulation of the lower trunk. It provides near-isotropic data, superior spatial resolution, corona and sagittal reconstruction, and 3 dimensional volumetric rendering information which would be helpful for the therapeutic intervention.

CASE REPORT

A 55-year-old male was admitted via out patient department (OPD) due to numbness and swelling of the right lower limb for 8 days. He had a history of retroperitoneal fibrosis with bilateral obstructive uropathy S/P double-J (D-J) stenting for 3 years and regular OPD follow ups. He received cardiac catheterization at medical center due to malignant hypertension and revealed 40% stenosis Lt. anterior descending (LAD), circumflex (CX), Rt. coronary artery (RCA) and orifice stenosis of renal arteries, bilateral 40%. He came to our OPD due to numbness and swelling of right lower limb after insertion of D-J for 8 days. At OPD, a physical examination showed swelling, tenderness, and redness of the right lower leg. The patient was admitted for further evaluation and management under the impression of deep vein thrombosis (DVT). Laboratory data revealed data to be within normal limits, except BUN 38 mg/dl and creatinine 1.9 mg/dl, further operation such as peritonization was refused by the patient. Radiologic study including chest and plain abdomen showed no significant abnormality. The right lower leg venogram revealed bland thrombus in the deep vein and patency of the superficial vein (Fig. 1). Sixty-four multi-slice detector computed tomography revealed lack of opacification of midportion of inferior vena cava (IVC) and strands of linear soft tissue density around the abdominal aorta and IVC associated with extensive collaterals bypassing the occluded segment (Fig. 2, 3, 4). The patient was treated with intravenous urokinase therapy for 2 days and changed to oral coumadin then patient was discharged and followed up at OPD in satisfactory condition.

DISCUSSION

Retroperitoneal fibrosis present as a fibro-inflammatory reaction around the abdominal aorta and iliac arteries. Secondary cause of this disease such as drug (methysergide, ergot derivatives, phenacetin, cyclosporine), malignant disease, infection,
surgery, trauma, radiotherapy, and atherosclerosis was not identified in our patient so idiopathic retroperitoneal fibrosis was highly suspect [1]. However, the clinical manifestation depends on the segment which is being involved, including dull back and abdominal pain (the most common symptom), lower leg edema (deep vein thrombosis), scrotal swelling (hydrocele, varicocele), oliguria, and dysuria [2]. Physical examinations and laboratory tests are unremarkable. The nonspecific clinical presentation and lack of physical findings usually make an early diagnosis impossible [3]. Image study presents the most important role in the diagnosis of retroperitoneal fibrosis. Conventional radiography (Chest PA, KUB) has limited diagnostic value usually present in abnormal findings in the late stage of diseases such as abdominal mass or pulmonary edema [4]. Excretory urographic diagnostic triad consists of: 1. Delayed excretion of contrast medium with either unilateral (20%) or bilateral (68%). 2. Medial deviation of mid 1/3 ureter which is present in 20% of normal population [5]. 3. Tapering of ureteral lumen at L4, L5 vertebral level. Sonography usually reveals anechoic or hypoechoic pericaval or paraortic mass [4]. Magnetic resonance image (MRI) can evaluate retroperitoneal structures and the degree of inflammation depending on hyper or hyposignal intensity on T2 weighted image (T2WI) [6]. It could assess the therapeutic response especially in azotemic patients. Multidetector computed tomography (MDCT) can provide more information about the disease process which affects the retroperitoneal organs. Collection of near-isotropic data, superior special resolution combined with high quality sagittal and coronal reconstruction and 3-dimentional volumetric rendering could obtain normal and abnormal structures, either artery or venous structures can be depicted. Besides, high speed MDCT also provides computed tomography angiography (CTA) function which is superior to other examining tools and provides more information for clinical therapeutic intervention [7].

The IVC is the widest vein in the body. As it ascends in the retroperitoneum to the Rt. of the abdominal aorta, the IVC drains blood from lower limbs, most of the abdominal wall, the urogenital system and adrenal glands, and hepatic vein. The azygos venous system connects to IVC either directly or through the renal veins.

There are three collateral routes available for venous blood to pass to the right side of heart if the IVC becomes obstructed. [8]

1. Via various anastomosis in the pelvis and abdomen that enable blood to reach the superficial and inferior epigastric veins then draining to the thoracoepigastric and superior epigastric vein and the superior vena cava.
2. Via the vertebral system of veins.
3. Via the lateral thoracic vein connecting the circumflex iliac vein with the axillary vein.

Traditionally, we perform CT exams through

![Figure 1: Bland thrombus in the deep vein of right lower leg (arrow).](image1)

![Figure 2: Paravertebral veins (arrow) through route 2 and superficial epigastric vein (curved arrow) through route 1. Enveloped midportion of IVC.(arrow head).](image2)
an IV injection of contrast mediums through the antecubital vein with a delay of 70-90 seconds to have a better visualization of the suprarenal IVC. The visualization of infrarenal and its collateral tributaries are usually difficult due to admixture of the lower extremity blood. We provide an alternative way to solve the problem. A simultaneous injection of both lower thigh superficial veins with a total volume 100 cc. Iopamidol 370 and 1:3 dilution, injection rate of 4cc./sec with a 40 second delay, which could clearly demonstrate the three collateral routes of circulation during IVC occlusion. It has replaced the traditional venogram in the evaluation of IVC occlusion. Besides, the venous phase and arterial phase could be demonstrated at the same time; the relationship between artery and vein could be well evaluated. The time of delay is the time which need for injection minus total scan time (pelvic floor to the dome of diaphragm).

In conclusion, IVC occlusion by idiopathic retroperitoneal fibrosis is well demonstrated by CT venography in this patient. Therefore, we recommend CT venography to evaluate retroperitoneal fibrosis and IVC occlusion.

REFERENCE

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後腹腔纖維化合併下腔靜脈阻塞：病例報告

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後腹腔纖維化是一種不明原因之罕見疾病，其特徵為纖維化腫塊包圍脊椎周圍之結構。
下腔靜脈阻塞引起下肢深部靜脈栓塞是一罕見之併發症。下腔靜脈阻塞合併下肢旁系循環之診斷，高轉速之電腦斷層已取代傳統之下腔靜脈攝影，因其近乎等向的資料取得及高解析度之冠狀及矢狀切面，容積再現技術對治療病人方式的選擇有很大的幫助。