Diagnosis of Port-A Catheter-Induced Thrombosis by Upper Extremities Radionuclide Venography

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Port-A catheters are used as the essential devices for chemo-drug administration through intravenous route in patients with malignancy. However, they were associated with some troublesome clinical complications, especially the thrombosis. We report a case of suspected upper extremity venous thrombosis after Port-A catheter implantation. Nuclear medicine flow studies demonstrated clearly the obstructed venous return from this patient. Therefore, venous thrombosis in his left subclavian vein was diagnosed. Follow up CT scan confirmed this diagnosis. This image finding suggests that radionuclide venography is easy-performed and showing valuable clinical benefit for investigation of upper venous condition.

Key words: Port-A catheter, venography, thrombosis, obstruction


Case Report

This 70-year-old male was a victim of colon cancer with liver metastases. Port-A catheter was implanted for long-term chemotherapy purpose. One month after insertion, he complained left arm swollenness. Upper extremities venography was performed for investigating his venous obstruction status. Truncated venous return to the left subclavian vein and reflux into the jugular veins was found in this patient (Figure 1). Therefore, venous obstruction was diagnosed. Follow-up CT scan further confirmed the formation of thrombus around patient’s tip of Port-A catheter (Figure 2), which had caused almost the total obstruction of venous
Figure 1. Venography to the upper venous system. Venous return from the right upper extremity shows rapid and smooth flow of the radiotracer (frame 1 to 13) to the right subclavian vein (frame 16), superior vena cava (frame 19), right heart (frame 28), pulmonary trunk (frame 31), and then distributed to both lung fields (frame 34 to 46). The left site, however, shows a major truncated lesion to the level of left subclavian vein (arrow head, frame 16). In addition, left internal and external jugular veins could also be clearly demonstrated caused by abnormal regurgitated flow of tracer (arrows, frame 31). In view of this image finding, venous obstruction to the left subclavian vein was impressed.

return. After removed the Port-A catheter, patient’s left upper arm swollenness was resolved. Thereafter, this patient tolerated the following chemotherapy from direct intravenous administration well.

Discussion

Upper extremity venous thrombosis (UEDVT) is a clinical entity with numerous etiologies. However, the chance of development of thrombotic complications after routine central venous line uses is proportional to its length of implantation. The major causes of UEDVT are extended by some risk factors, such as central venous line implantation, malignancy, and coagulation defects. The rest of other factors are originated either from spontaneous (effort-related) or miscellaneous (e.g., trauma, intravenous drug use) causes [4-6]. The clinical picture of UEDVT is characterized by the reaction site swelling, pain, and function impairment; importantly, it can be completely asymptomatic. The effects of UEDVT from previous knowledge were underestimated, but now it has become an important clinical issue that we need to reconsider. In fact, up to 36% of the patients develop pulmonary embolism (PE), which may be fatal [7]. Current diagnosis of PE is mainly based on patient’s clinical history and the results of either duplex ultrasonography or contrast venography.

Several types of devices for catheter implantation as venous access systems have been performed. Tunneled percutaneous placement of silicone rubber cuffed catheters via the subclavian vein approach is the technique that was used most common clinically. Catheter-related central venous thrombosis is a common but serious complication in these

Figure 2. Follow up contrast enhancement chest CT scan 2 days after venography for the confirmation of venous thrombosis. (A) Axial chest CT scans show a filling defect lesion around the catheter (arrow), which is indicated for a thrombus formatted around the tip of catheter (double arrow) in the left brachiocephalic vein. In addition, multiple collateral circulations were also found to the chest wall (arrow heads). (B) Coronal images reveal engorged left axillary, subclavian, and internal jugular veins (arrows). Regarded opacification and collateral circulations were also demonstrated (arrow heads). (C) 3-D reconstructed picture to the upper back projection. Multiple collateral circulations to the posterior aspect of left lower neck and upper chest wall were demonstrated. This is consistent with the obstruction of major venous return to the left venous system.
patients. The incidence of this event ranges from 2 to 40%. Potential risk factors associated with are catheter position, size of the catheter, and site of insertion [8]. The diagnosis of catheter-associated deep venous thrombosis may be difficult. Comparing with the diagnosis results of patients with symptomatic lower extremity venous thrombosis, doppler ultrasound has a lower accuracy in this situation. Even though CT and MRI studies are effective [9], but they cost too much to be a simple diagnosis tool for obstruction. Contrast venography is useful; however, a radionuclide venography will be safer to conduct for patients with lower potential risk or disability for extravasations of contrast medium [10].

Unlike nuclear medicine venography to lower extremities, upper extremities venography was performed and reported much less clinically. However, it has definite clinical advantage as a whole view evaluation of venous return to upper venous system [11,12]. In this case, we would like to conclude that radionuclide venography images for UEDVT can be a quick and useful diagnostic tool for patient’s obstructed venous status evaluation.

References
核子醫學上肢靜脈造影診斷 Port-A 導管引起之阻塞性血栓

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臨床上需要長期靜脈給藥的患者，如惡性腫瘤接受化學治療或腸道外營養給藥的情形，建立Port-A catheter做為中央靜脈給藥的途徑是廣泛且有效的作法。然而此方法常有合併症出現，其中尤以血栓形成最為嚴重，因此早期診斷並以抗凝血藥物治療相當重要。此案例中，患者因接受Port-A catheter置放後出現上肢腫脹等疑似血管栓塞的症狀而求診，其於靜脈血流造影下清楚呈現靜脈迴流受阻的影像，也由此建立出左鎖骨下靜脈栓塞之診斷，其後隨行的電腦斷層造影也確認此一診斷。由此發現，對於需要初步評估以排除或建立診斷的狀況下，核子醫學上肢靜脈造影除有其操作簡便的好處外，也是作爲快速判定靜脈阻塞的良好工具。

關鍵詞：Port-A catheter，靜脈造影，血栓，阻塞

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