

Tc-99m diethylenetriamine pentaacetic acid (DTPA)-human serum albumin (HSA) radionuclide lymphography for detecting the location of chyluria

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The cause of chyluria cannot be easily detected by CT scan or other imaging methods, except conventional lymphography, but Tc-99m diethylenetriamine pentaacetic acid radionuclide lymphography clearly revealed the location of chyluria in the left renal pelvic area. Radionuclide lymphography is one of the choices in investigating chyluria due to its noninvasive and simple technique.

Key words: chyluria, Tc-99m DTPA-HSA, radionuclide lymphography

INTRODUCTION

CHYLE IN THE URINE is easy to diagnose but its cause is difficult to detect by a conventional imaging method such as CT.¹ Lymphography which was introduced by Kinmonth in 1953 and modified by Wallace in 1961, is used to diagnose lymphatic system abnormality.^{2,3} Lymphography by intralymphatic injection of an opaque medium has demonstrated abnormal lymphatic channels and occasionally shown retrograde flow of contrast material from para-aortic lymphatics into the kidney and calyces.² The advantages of lymphography are 1) detection of the site of lymphatico-urinary communication, 2) identification of the level of lymphatic obstruction, 3) determination of the extent of the disease process, and 4) the ability to obtain useful information for surgical treatment and prognosis.³ Nevertheless, the technique of lymphography is very difficult to perform and is invasive.

Radionuclide lymphography was reported as a non-invasive and simple procedure to diagnose abnormality of lymphatic flow,⁴⁻¹⁰ and this method was applied to detect the location of lymphatico-urinary communication in patients with chyluria.^{11,12}

Patients presenting with chyluria are very rare in our hospital, and computed tomography and abdominal

angiography failed to detect the cause of chyluria, but radionuclide lymphography clearly demonstrated its location. We describe the procedure and findings in this case.

CASE REPORT

A 68-year-old man complained of intermittent claudication of the left leg since 1993 and the pain had gradually increased. In August, 1996 he could not walk even 100 meters and consulted our hospital. As angiographic examination revealed arteriosclerosis obliterans, left external iliofemoral and femoropopliteal bypass surgery was performed in December, 1996, but six months later the patient presented with milk-like urine.

At that time, hematological examination and blood chemistry findings were within normal limits. Urinalysis revealed milky urine with proteinuria (3⁺). Filarial blood smear was negative. Intravenous pyelography and cystoscopy were normal.

CT images with and without contrast enhancement showed arteriosclerotic change in the abdominal aorta (Fig. 1). There were no abnormal vessels, no soft tissue lesions such as tumors, fibrosis, or infection. CT imaging could not identify the cause of the chyluria.

Abdominal angiography showed moderate stenosis of both renal arteries caused by arteriosclerosis (Fig. 2).

Radionuclide lymphography was performed by subcutaneously injecting 185 MBq of Technetium-99m-diethylenetriamine pentaacetic acid (DTPA)-human

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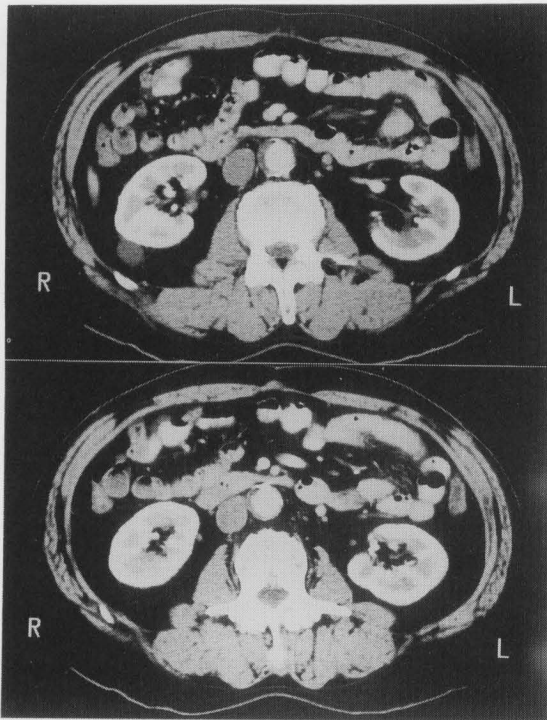


Fig. 1 CT image did not show any abnormal lesion.

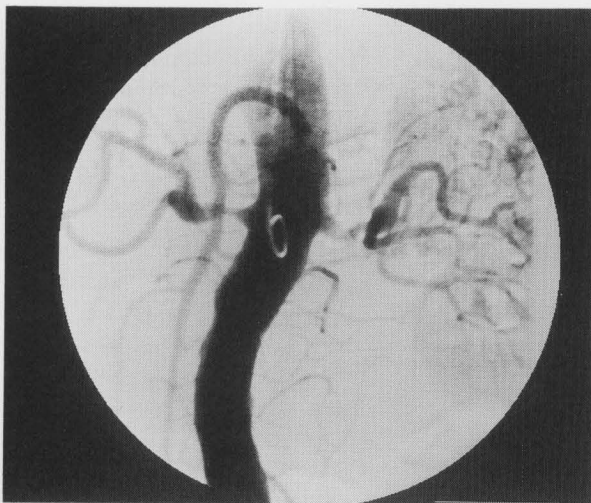


Fig. 2 Angiography showed moderate stenosis of both renal arteries.

serum albumin (HSA) into the feet. A Siemens 7500, Digitrac Orbiter Gamma camera equipped with a high resolution-low energy collimator was used. A radionuclide lymphogram showed the thoracic duct clearly. Lymphatic flow was normal in both legs and the pelvic areas. Intense tracer accumulation was observed in the left renal pelvic area (Fig. 3). This finding indicated the location of the chyluria. Because this patient had aortic regurgitation (grade 3) but no weight loss, surgical treatment for chyluria was not performed.

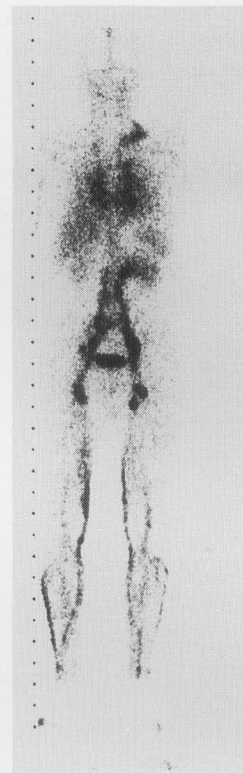


Fig. 3 DTPA-HSA lymphogram showed intense tracer accumulation in left renal pelvic area.

DISCUSSION

Chyluria is the passage of chyle in the urine. In 1863, Ackerman first described chyluria due to blockage in the lymphatic vessels between the bowel and thoracic duct.³ Lymphatic duct obstruction produces an increase in intralymphatic pressure, lymphangiectasia, subsequent development of valvular incompetency and abnormal retrograde flow of chyle, resulting in lymphatico-urinary shunt at the level of the kidney, bladder or ureter.^{3,12,14} The kidney has been reported to be a favorable site of exit for chyle from ruptured lymphatic vessels because of its fragility and susceptibility to rupture, associated with inadequate collateral vessels.³ The paper by Akisada clearly demonstrated reflux into renal collectors by conventional lymphography.¹⁴

Radionuclide lymphography is a noninvasive, safe and simple technique compared to conventional lymphography, and imaged normal lymph node accumulation, obstruction of lymphatic flow, collateral flow and intradermal reflux by obstruction in cases of lympho-edema, lymphoma, lymphocyte leukemia and various cancers.³⁻¹⁰ Two case reports mentioned detection of the site of chyluria.^{11,12} One paper indicated that radionuclide lymphography was as accurate as conventional lymphography in the detection of lymphatic urinary communication in two patients with chyluria.¹² One patient showed

moderately dilated lymphatic channels around the bladder extending para-aortically to the level of the kidneys without direct communication to the kidneys, and lymphaticourinary shunt might be produced at the level of the bladder and ureter. Another patient had large dilated renal pelvic lymphatics along with para-aortic lymphatics and abnormal lymphatics around the bladder,¹² but another paper failed to demonstrate the site of chyluria on radionuclide lymphography probably because the small diameter incompetent ectatic lymphatic vessels were not depicted due to the limited spatial resolution of scintigraphy and normal excretion of tracer by the kidneys.¹¹ In our case, the site of chylous leakage was observed clearly as intense tracer accumulation in the left renal pelvic area, and lymphatic ectasia might be medium size as in the two previous case reports, but this direct lymphatic communication to the kidney was thought to be the cause of chyluria.

The etiology of chyluria is classified as tropical and non-tropical. Tropical causes are filaria, echinococcus, cysticercus cellulosae, ascaris, malariae and tinea.¹³ Usually tropical chyluria is caused by filariasis which is endemic in some Asian countries, including Kyushu and Okinawa prefecture in Japan. Non tropical causes are trauma, tuberculosis, abscess, neoplasm, malformation and aneurysm.¹³ The cause of chyluria in this case was not considered due to postoperative complications because it did not involve a surgical site. So the exact cause was not elucidated, but it may have been due to a parasite because the patient had visited Kyushu prefecture. Although chyluria usually follows clinical infection by several years, parasites are not found as a rule.

Chyluria is not a life threatening disease, but it may be associated with severe weight loss and painful voiding episodes due to the passage of chylus clots. A low-fat, high-fiber diet is the initial treatment, but surgical correction may be performed when severe weight loss or symptoms are persistent.¹² In this case, conventional lymphography was not performed because of contraindications, but radionuclide lymphography was very useful in

determining the location of the chyluria.

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