



Pediatric

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## MR Lymphangiography in Non-traumatic Lymphatic Disorder

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### What is lymphatics, and how can we see it

Lymph means the interstitial fluid that has entered the lymphatic system, and the lymphatic system is responsible for distributing about 3L of interstitial fluid to the circulatory system per day. Non-traumatic lymphatic disorders collectively refer to a heterogeneous group of diseases manifesting as lymphedema, chylothorax, or chylous ascites in the absence of identifiable injury to the lymphatic system. Intranodal dynamic contrast-enhanced magnetic resonance imaging (DCMRL) had introduced as a new imaging tool with easier access and better resolution.

It has excellent spatial and contrast resolution that allows physiological assessment of lymphatic flow in the central conducting lymphatics as well as identification of structural abnormalities of the lymphatic system

### How to obtain DCMRL

Baseline T2-weighted axial imaging to check for abnormal water location and soft tissue edema. The T1-weighted image used in the baseline and dynamic-contrast enhanced image scan was a T1-weighted volumetric interpolated breath-hold examination. A radiologist injected the MR contrast agent over approximately 3 minutes. T1-weighted axial images were acquired to view the distribution of the contrast agent. Using maximum intensity projection (MIP), the coronal T1-weighted images were reconstructed into the coronal and sagittal planes to show only the lymphatic vessels with the contrast agent.

### How to interpret DCMRL image

The radiologists should see check those findings:

- (1) What are the main clinical problems?
- (2) On T2-weighted axial images, where is the abnormal fluid?
- (3) On MIP images, are there typical central lymphatic structures? And where is the lymphatic reflux from the CCLs into lymphatic ducts, away from the expected direction
- (4) On post-contrast 3D GRE T1WI Radial VIBE axial images, what is the anatomical location of lymphatic abnormality?

The key points on the interpretation of DCMRL were as follows:

- (1) The MIP image of intranodal DCMRL can show the lymphatic flow direction, such as reflux flow.
- (2) Axial T1-weighted images can also show the contrast leakage with enhancement at the detailed anatomical images.
- (3) All coronal T1-weighted images should identify the lymph abnormality before MIP reconstruction.
- (4) We have to identify the central lymphatic structure carefully on MRL related to clinical and

laboratory findings.

(5) The radiologists should understand the limitation of intranodal DCMRL due to lymphatics flow direction on evaluating protein-losing enteropathy or chylous ascites.

(6) Alternatives for evaluating shaded areas due to lymphatic flow existed: balloon-occluded DCMRL or intramesenteric/intrahepatic DCMRL.

(7) Intranodal DCMRL can also assess the lymphatic flow in patients with chyluria or leg edema.

## Take Home Message

DCMRL has essential information for the lymph flow evaluation:

- Remember things of physiologic lymph flow for 10 minutes, not for 10 seconds, on MIP images.
- Check the coronal and axial T1-weighted images before MIP reconstruction.

Always consider the shaded area due to physiologic lymph flow direction.

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