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LETTER TO THE EDITOR

MAGNETIC RESONANCE IMAGING OF PERIPHERAL LYMPHEDEMA

We read with interest the recent report of Insua et al on "Magnetic Resonance Imaging (MRI) of Peripheral Lymphedema" (1) and would like to comment on the interpretation of the images. Insua confirms previous MRI findings (2-4) in peripheral lymphedema, especially when longstanding, showing thickening of the skin and subcutaneous tissue, with a characteristic trabecular or honeycombed pattern. In a clinical study of 87 patients with swollen legs, we uniformly found these structures in all patients with lymphedema (n=35) *(Fig. 1)* but neither in lipedema (n=26) nor in phlebedema (n=12). Although the trabecular pattern in the subcutis is highly sensitive for lymphedema, it is not specific. Fujii, for example, described it in two patients with the nephrotic syndrome (5).

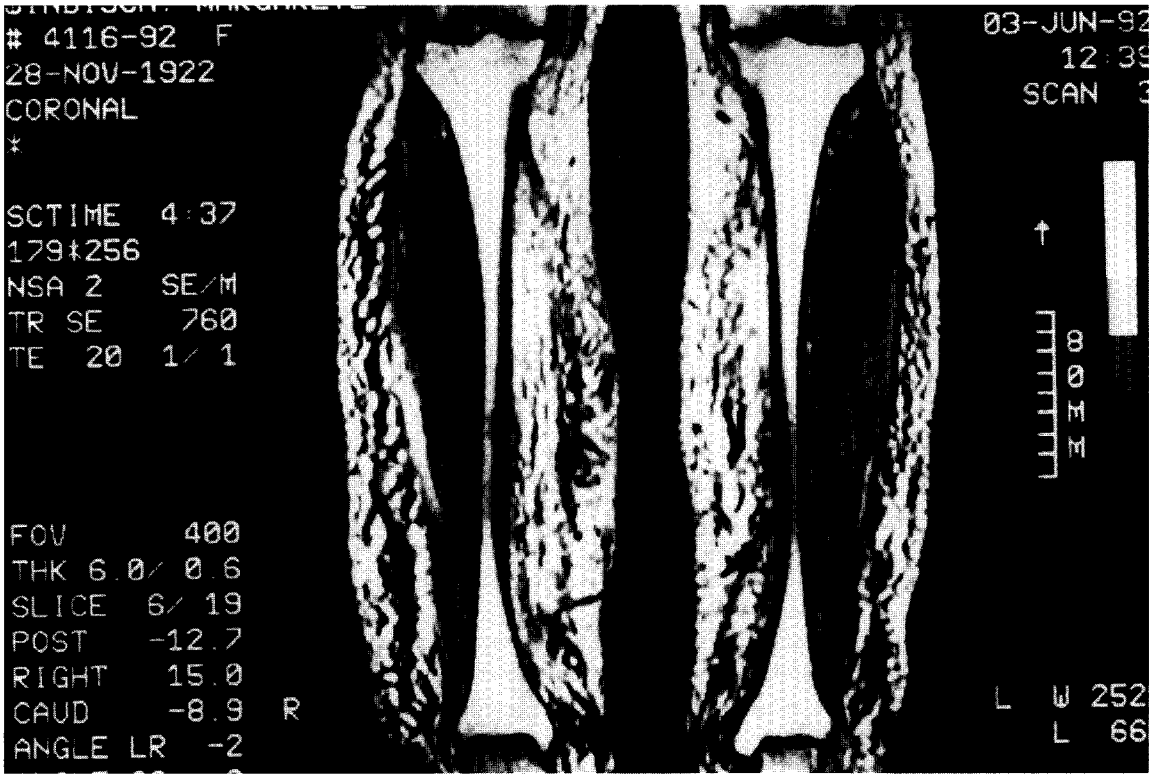

Fig. 1. Magnetic resonance image (T2-weighted sequence) of secondary lymphedema of both legs in a 55-year old woman. Note the trabecular or honeycombed pattern in the subcutaneous tissue (compare with Fig. 2).

Fig. 2. Artificial interstitial subcutaneous edema induced by infusion of a crystalloid solution into an amputated leg. Note that the MR image (T2-weighted sequence) shows a trabecular pattern throughout the subcutaneous tissue similar to that in Fig. 1. Histologically, no dilated lymphatics were seen.

There has been disagreement on the interpretation of these subcutaneous trabecular structures as they seem to contain fluid. Hadjis et al (6) concluded that they were fluid density but Case et al (6) and Fujii (5) considered them to be dilated collateral lymph vessels. To resolve this issue, we undertook a combined MRI and pathological-anatomical study. In a freshly amputated leg of a 74-year old man, we produced artificial skin edema. Using a method of Kubik (personal communication), a catheter was introduced into the femoral artery. After rinsing the leg with 20% sodium acetate solution, the blood vessels were filled by a means of an infusion pump with a 2.5% formalin solution. The venous return from the legs was restricted by means of a tourniquet. After three hours, the leg was maximally filled and leg weight had increased from 8.5 to 10.5 kg. Using a 1.5 Tesla Magnetom Siemens unit before and after producing the edema, T-1 and T-2 weighted images as well as high resolution 3D-GE-sequences were obtained. T-1 as well as T-2 sequences showed a typical MR trabecular pattern seen in the subcutis in patients with lymphedema *(Fig. 2)*.

Gross examination showed edematous enlargement of the subcutis predominantly superficial to the fascia around the blood vessels. Histologically, interstitial edema was

seen in the subcutaneous tissue and, to a lesser extent, within the skeletal muscle. There was marked separation of the collagen fibers. No enlarged lymph vessels were detected.

The trabecular or honeycombed pattern as seen in MRI should not be attributed to dilated lymphatic vessels. It corresponds most likely to the lacunae or "deep hydraulic chambers" described in anatomical studies of lymphedema (7).

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