Radiology & Imaging Sciences

GRAND ROUNDS

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Landmarks in Lymphatic Systemomics: Making the Invisible, Visible

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Abstract

Landmark discoveries about the lymphatic system led up to the founding of the discipline of lymphology and the International Society of Lymphology (ISL) 60 years ago. For the first time in the living human, the lymphatic vasculature with interposed lymph nodes (both normal and disordered) was visualized dynamically in continuity, from peripheral to central, through conventional oil contrast lymphography (LAG). These pioneers (led by radiologists Manual Viamonte and Alois Ruttimann) envisioned a heretofore unrecognized "system" - that encompassed "lymphatics, lymph, lymph nodes and lymphocytes in health and disease". Endowed with distinctive structural and functional features, the lymph circulation ("blood-lymph loop") returns excess tissue fluid that has leaked out of the blood vasculature and coordinates the central network of the immune system. When the lymph load exceeds lymphatic capacity, edema results, either due to excessive load ("high output failure" as in ascites from portal hypertension in hepatic cirrhosis or in right heart congestive failure) or lymphatic capacity is impaired (low output failure - lymphedema); treatment (whether by drugs, surgery, or interventional imaging) is aimed at restoring the balance between lymph formation and lymph absorption by either reducing the former or enhancing the latter. Lymphedema is either primary (congenital, varied ages of onset, including due to specific gene mutations - hypoplastic or hyperplastic refluxing forms) or secondary (acquired, afflicting hundreds of millions worldwide and largely due to tropical infections such as filariasis or cancer treatments), both types occasionally complicated by chylous reflux.

Bio

Dr. Marlys Witte is a world-recognized pioneer in clinical and basic lymphology – the study of lymphatics, lymph, lymphocytes, and lymph nodes in health and disease. She received her medical education with honors at NYU School of Medicine, and post-graduate residency training at The University of North Carolina-North Carolina Memorial Hospital, NYU-Bellevue Medical Center, and NIH fellowship and American Heart Association Established Investigator at Washington University in St. Louis/Barnes Hospital. Her translational interests and contributions together with her late husband, also Professor of Surgery, Dr. Charles Witte, have ranged from blood/lymphatic vascular endothelial cell biology and pathobiology in vitro and in vivo, hepatosplanchnic lymphatic/microcirculatory physiology, small animal models, in vivo lymphatic imaging (most recently in collaboration with her son, Professor of Medical Imaging, Russel Witte, PhD) thoracic duct lymph drainage, lymphogenous cancer spread, and genomics/proteomics of lymphedema-angiodysplasia syndromes, defects, and overexpression of lymphangiogenesis genes VEGFR3. She maintains an interest in a variety of infectious diseases and immune disorders. Author of more than 400 peer-reviewed publications, recipient of numerous international honors, she has received continuous funding from NIH (as well as other government, AMA, and non-profit agency grants) since she was a medical resident. She has served as Program Director of UA's only NIH General Clinical Research Center and she has mentored thousands of diverse, multilevel (medical, high-school, undergraduate and graduate) students (many from disadvantaged backgrounds) in her career with a special interest in teaching "medical ignorance" – "what we know we don't know, don't know we don't know, and think we know but don't".

Objectives

- Provide a background on the history, the structure, and function of the lymphatic system.
- Highlight the spectrum of primary and secondary lymphedema in children and adults
- Feature clinical examples, including characteristic images, of peripheral and central lymphatic disorders and describe the role of multimodal lymphatic imaging in the diagnosis and treatment of these lymphatic disorders

Zoom : https://arizona.zoom.us/j/891764747575

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