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## An Experiment in the Teaching of Lymphology to Medical Students

Internal Medicine A-108: Lymphovascular System

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In the fall of 1967, the five charter members of the Greater St. Louis Lymph Club (*P. Ruben Koehler* and *E. James Potchen*, Department of Radiology, *Marlys Hearst Witte*, Department of Medicine, *Charles L. Witte* and *William R. Cole*, Department of Surgery, Washington University School of Medicine), local chapter of the International Society of Lymphology, met in the downstairs room of a local pub. Out of this meeting arose the idea of an elective course in Lymphology as part of the new fourth-year medical curriculum at the School of Medicine. The course was to provide a multidisciplinary approach to the newly born field of experimental and clinical lymphology and was to consist of seminars, laboratory experiments, and clinical demonstrations. Nine seniors elected the 12-week course (one 2-3 hour session per week), which was taught twice during the 1968-1969 academic year.

*Syllabus:*

1. Historical background and development of the lymphatic system (Phylogeny and ontogeny). Laboratory: Appearance of thoracic duct, liver and intestinal lymphatics after a fat meal.
2. Anatomy of the lymphatic system – Electron microscopy, light microscopy, gross anatomy. Laboratory: Injection of India ink particles into foot pad and peritoneum of mouse.
3. Origin of lymph – filtration, secretion, and absorption. Laboratory: Effect of saline infusion, venous hypertension and arterial hypotension on lymph flow.
4. Function of the lymphatic system – drainage and transport.
5. Insufficiency of the lymph circulation – mechanical and dynamic. Laboratory: Intestinal edema from sclerosis of mesenteric lymphatics. Ascites from chronic thoracic caval constriction.
6. Liver – Anatomy and physiology of the lymph system – Role in disease – heart failure, hepatic cirrhosis. Laboratory: Effect of acute thoracic caval constriction and acute portal vein constriction on flow and protein content of thoracic duct lymph. Presentation of patients with cirrhosis.
7. Heart – Anatomy and physiology of the lymph system – Role in disease – heart failure, myocardial fibrosis, endocarditis. Laboratory: Effect of acute right heart failure from tricuspid insufficiency and pulmonary stenosis on thoracic duct lymph flow and pressure. Visualization of cardiac lymphatic drainage with vital dye.
8. Lung – Anatomy and physiology – Role in disease – pulmonary edema, interstitial fibrosis, pneumoconiosis, infection.
9. Gastrointestinal tract and biliary system – Anatomy and physiology – Role in disease – malabsorption, inflammatory diseases, lymphangiectasia, tumor, obstructive jaundice. Laboratory: Effect of acute and chronic common bile duct ligation on biliary constituents in thoracic duct and liver lymph.
10. Kidneys – Anatomy and physiology – Role in disease – obstructive uropathy, pyelonephritis, nephrotic syndrome, chyluria, transplantation. Presentation of patients and lymphangiograms.
11. Primary disorders of the lymphatic system – Congenital, neoplastic, inflammatory disorders – Therapeutic considerations. Presentation of patients and lymphangiograms.
12. Summary – Direction of future investigations.

This course in Lymphology has been an exciting and unique experience for all of us. We have had the time to lay the anatomic, physiologic and biochemical groundwork as a prelude to understanding the normal functioning of the lymphatic system and the derangements that occur in disease states. The student response has been enthusiastic, "Highly praised are the exceptional quality of the teaching, the thoroughness and depth

of subject coverage, the thought-provoking individual assignments of problems, the superb organization, the provision of reading material, the small group-oriented discussions." At the conclusion of the course each disciple was presented with a Doctor of Lymphology degree and honorary membership in the Greater St. Louis Lymph Club.

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## TECHNICAL NOTE

### Improvement of Surgical Procedures in Lymphography by Using a Tissue Adhesive

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A method to secure the needle in the lymphatics by using a tissue adhesive instead of ligatures or clamps is being described in this publication.

The technique is carried out as follows: The skin is incised; a lymph vessel is identified and isolated. The vessel caliber is increased by compressing on the proximal end of the visualized vessel. After haemostasis and absorption of the blood by tampons, N-butyl-alphacyanoacrylate (Histoacryl N®) is applied to the punctured vessel so that it covers

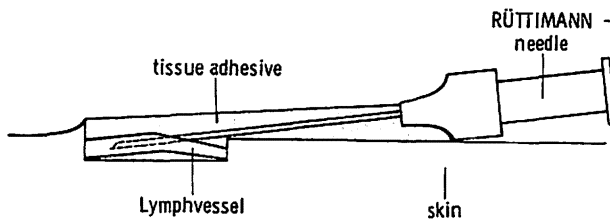


Fig. 1 Schematic drawing of cannulated lymph vessel surrounded by tissue adhesive.

part of the needle. This substance polymerizes within 10 seconds and forms a strong adhesive which binds together lymph vessel, needle and the distal border of the wound (Fig. 1). No further attachment is needed. The needle is then connected to a polyethelene tube and to the injector. It is important that the blood and tissue fluid are absorbed prior to the use of the tissue adhesive. If this is not done, the oily contrast medium will extravasate. Repositioning of the needle can be done by cleansing of the wound and adding a drop of tissue adhesive to a point where oil is extravasated. The infusion can then be continued.