

Lymphography is also useful in detecting completeness of lymphadenectomies doing operations simply by checking opacified nodes on an abdominal x-ray film in the operating room. It is to be emphasized that the lymphatic drainage of the distal portion of the cloacogenic zone is to the superficial inguinal lymph nodes. These lymph nodes should be carefully examined in the lymphogram and they are to be included in the lymph node dissection at operation, along with the pelvic nodes. Case 1 is an example demonstrating failure to include inguinal lymph nodes in lymphadenectomy and the patient returned with tumor in the inguinal lymph nodes and wide spread metastasis. False positive changes in the lymph nodes in this region are common and the usual cautions also apply here when interpreting the inguinal lymph node metastases.

### References

- 1 Cullen, P.K., Jr., Pontius, E.E. and R.J. Sanders: Cloacogenic Anorectal Carcinoma. Dis. Colon and Rectum 9 (1966) 1-12
- 2 Glockman, M.G., A.R. Margulis: Cloacogenic Carcinoma. Amer. J. Roentgenol., Rad. Therapy and Nuclear Medicine. 107 (1969)175-180
- 3 Grinvalsky, H.T., E.B. Helwig: Carcinoma of Anorectal Junction. I Histological Considerations. Cander 1956, 480-488
- 4 Grodsky, L.: Cloacogenic Cancer of Anorectal Junction: report of seven cases. Dis. Colon and Rectum 6 (1963) 37-44
- 5 Kyaw, M.M., T. Gallagher, J.O. Haines: Cloacogenic Carcinoma of Anorectal Junction: Roentgenologic Diagnosis. Amer. J. Roentgenol., Rad. Therapy and Nuclear Med. 115 (1972) 384-391
- 6 Mainer, J., C. Bowerman: Cloacogenic Carcinoma of Anorectal Junction. Gastroenterology 49 (1965) 569-573

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## Thorotrast Granuloma of Periaortic Nodes

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Enlargement of periaortic nodes with multiple small filling defects on lymphangiography in a patient with history of low grade fever, weight loss, night sweats and general malaise, strongly suggests the possibility of retroperitoneal Hodgkin's disease if an infectious, chronic granulomatous disease can be excluded. In the patient reported here, the final histological diagnosis was a quite unusual one: thorotrast granuloma.

A 55-year-old male was admitted to Flushing Hospital because of low grade fever of six-

months' duration; he had lost 12 pounds and complained of general malaise, generalized aching in the joints and night sweats. Twenty-five years before he had been admitted for several weeks to another hospital and was surgically treated for a liver abscess, probably of amebic origin. On physical examination, the only positive findings were a scar on the right lower chest wall on the posterior axillary line and an enlarged liver palpable two to three fingers below the costal margin. No adenopathy was present.

On laboratory examination there was an increase in the prothrombin time of 16/12, a positive latex fixation test, an 18% retention of B.S.P. and an elevation of transaminases to 100 mg%; the other laboratory findings were in normal limits. The chest, upper G.I. series and barium enema radiological studies were normal. A lymphangiogram showed that the retroperitoneal nodes in the left chain at the level L-2, L-3 were enlarged and contained multiple small filling defects (Figs. 1,2). In all the abdominal films irregular opacities were seen in the liver area and a fine reticular stippling in the spleen (Fig. 3). This finding, associated with the history of liver abscess treated more than 25 years before, suggested the possibility that the patient might have received thorotrast, although he was not aware of it. The original records were obtained and confirmed that the patient had received 60 cc's of thorotrast intravenously for a hepatogram.

With the presumptive diagnosis of retroperitoneal Hodgkin's disease, an exploratory laparotomy was carried out. The liver was diffusely very hard and fibrotic; the spleen and the retroperitoneal nodes were enlarged. The remaining organs were within normal limits.

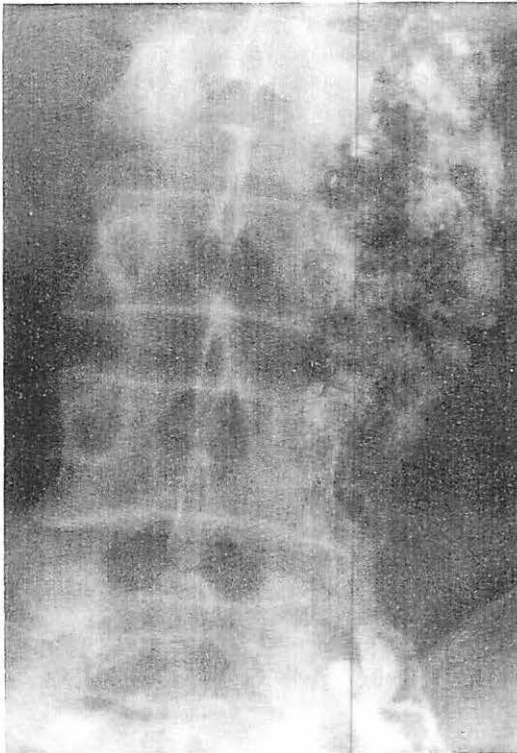
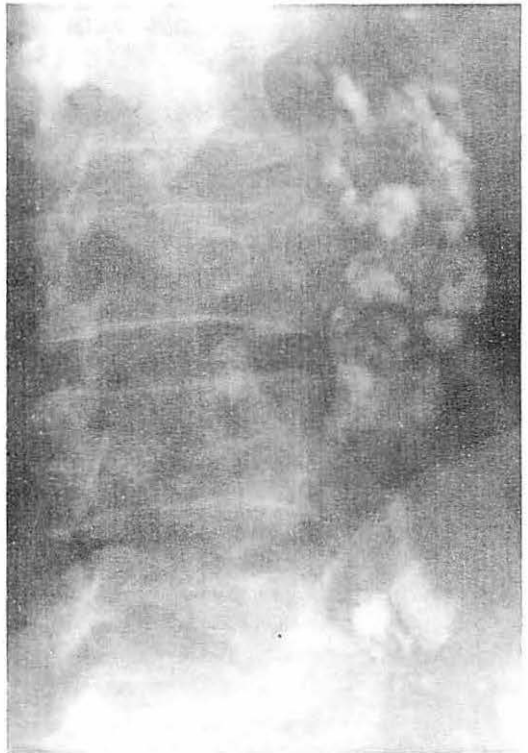


Fig. 1

Generous liver biopsies were performed and several nodes from the retroperitoneal area were removed. The histological examination revealed inter-lobular fibrosis with collection of thorotrast particles in the liver. The preaortic lymph nodes contained collection of thorotrast with chronic inflammation and foreign body granuloma. No evidence of malignancy was found. The patient was discharged unimproved and with a guarded prognosis. He continued to deteriorate and one year after he sought admission to another hospital where again an exploratory laparotomy was carried out. This time a cholangiocarcinoma was found and a right hepatectomy was performed. The patient expired in the postoperative period. An autopsy, unfortunately, was not obtained.

### *Comments*

Thorotrast is a colloidal solution containing approximately 200 mg of thorium dioxide in a ml. Thorium has a very low radioactivity but its physical half life is calculated in millions of years and its biological turnover very slow (1). The radiation consists of 90% alpha, 9% beta and 1% gamma rays. This preparation was introduced for hepatosplenography about 45 years ago (2), and became popular because of its excellent resolution and low immediate toxicity; its use was extended to angiography and fistulography. Twenty years after its introduction into clinical use, the first cases of tumor of the liver were reported (3) and the use of the product was discouraged (4). The suspicions of its carcinogenic potential were confirmed; besides carcinoma and sarcomas of the liver, other neoplastic diseases



Figs. 1 and 2 AP and lateral views of the high periaortic nodes which appear enlarged with irregular contour and small filling defects

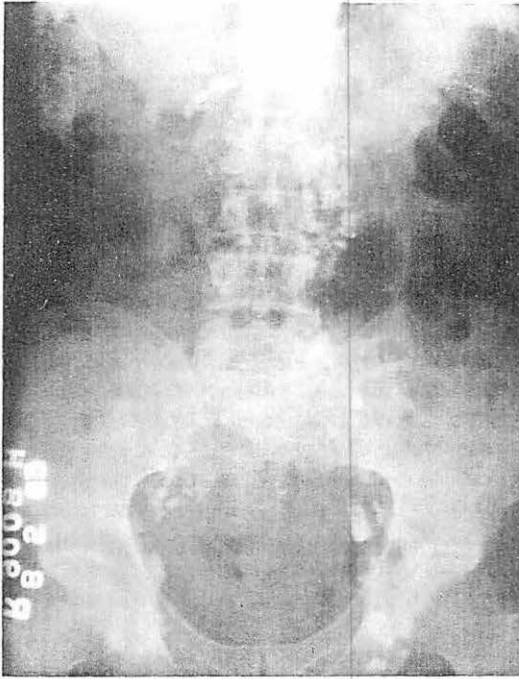


Fig. 3 Irregular opacities are seen in the liver and fine reticular stippling in the spleen.

have developed in patients usually at 15 to 25-year intervals after the injection of thorotrast: leukemia, carcinoma of the bronchus, stomach, esophagus, uterus, rectum, breast and soft tissue sarcomata (5, 6, 7, 8, 9).

Besides these neoplastic complications, other benign conditions have been attributed to thorotrast; among these mainly, severe fibrotic reaction at the site of injection or extravasation, liver fibrosis, and aplastic anemia; impairment of liver function as reflected by elevated B.S.P. retention and alkaline phosphatase elevation and also chromosome aberrations (8-10) are a frequent finding.

Two cases of Hodgkin's have also been reported (8, 11); in both cases the disease developed in the high periaortic nodes. Lymph nodes retain very small amounts of circulating thorotrast; however, the high periaortic nodes drain the liver and the spleen and the thorotrast might reach them selectively over a longer period through the lymphatic pathways.

Fibrosis and epithelioid nodules in these lymph nodes is a more frequent finding and here, as in other regions, it might constitute the first stage toward a neoplastic evolution (12). To our knowledge, this is the first patient in whom these granulomata have been documented on lymphangiography.

This case is presented also to illustrate how late thorotrast induced pathology may be suspected even when a history of thorium dioxide administration is not readily available on the basis of the characteristic radiological appearance of the liver and the spleen.

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### References

- 1 *Cohn, S.H. E.A. Gusmano, J.S. Robertson:* Calculation of Radiation Dose from Thorotrast using Whole Body Gamma-ray Spectral Data. *Ann. N.Y. Academy Sci.* 145 (1967) 608-622
- 2 *Radt, P.:* Eine Methode zur röntgenologischen Kontrastdarstellung von Milz und Leber. *Klin. Wschr.* 8 (1929) 2128-2129
- 3 *McMahon, H.E., A.S. Murphy, M.I. Bates:* Endothelial Cell Sarcoma of Liver Following Thorotrast Injections. *Amer. J.Path.* 23 (1947) 585-612
- 4 *Budin, E., G. Gerson;Cohen:* Danger from Thorotrast as Diagnostic Medium. *Amer. J. Roentgen.* 75 (1956) 1188-1193
- 5 *MacKay, J.S., R.L. Ross:* Hepatoma Induced by Thorium Dioxide. *Canad. Med. Assoc. J.* 94 (1966) 1298-1303
- 6 *Baserga, R., H. Yokoo, G.C. Henegar:* Thorotrast Induced Cancer in Man. *Cancer* 13 (1960) 1021-1031
- 7 *Gardner, D.', R.F. Ogilvie:* The Late Results of Injection of Thorotrast: Two Cases of Neoplastic Disease Following Contrast Angiography. *J. Path. Bact.* 78 (1959) 78-133
- 8 *Da Silva-Horta, J., J.D. Abbott, L.C. Da Motta, M.L. Roriz:* Malignancy and Other Late Effects Following Administration of Thorotrast. *Lancet* 1965/2, 201-215
- 9 *Ahmed, M.Y., H.D. Steele:* Breast Carcinoma 30 Years After Thorotrast Mammography. *Canad. J. Surgery* 15 (1972) 45-49
- 10 *Janover, M.L., O.S. Miettinen, M.J. Flynn:* Effects of Long-Term Thorotrast Exposure. *Radiology* 103 (1972) 13-20
- 11 *Verner, J.V., A.G. Smith:* Hodgkin's Disease Following Administration of Thorotrast. *Southern Med. J.* 56 (1963) 524-528
- 12 *Da Silva-Horta, J.:* Late Effects of Thorotrast on the Liver and Spleen and their Efferent Lymph Nodes. *Ann. N.Y. Academy of Sci.* 145 (1967) 676-699

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## Acute Bacterial Endocarditis in Dogs After Constriction of the Inferior Vena Cava and Ligation of the Thoracic Duct

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Acute bacterial endocarditis in dogs is relatively rare. In a previous study we demonstrated that surgically produced impairment of cardiac lymph flow predisposed to the development of acute bacterial endocarditis after the intravenous injection of suspensions of staphylococci (1). More recently we have observed the development of endocarditis in dogs in which no bacteria were injected, but in which the thoracic duct lymph flow was obstructed and the inferior vena cava had been constricted in its thoracic portion. We believe that these observations may define additional factors important in the pathogenesis of valvular endocarditis.

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