LETTERS TO THE EDITOR

Evaluation of Peritoneo-venous Shunt

The shunting procedure introduced by LeVeen in 1974 provides for direct return of ascitic fluid to the vascular system through a shunt, passing from the peritoneal cavity through the jugular vein into the superior vena cava (*1*). Reflux of blood into the shunt is prevented by a one-way valve. Fluctuations in the pressure difference between thorax and abdomen serve as a pumping mechanism.

Intraperitoneal technetium sulfur colloid has been used by Gorten (*2*) and by Kirchmer and Hart (*3*) to assess the patency of such shunts. Each report describes one case in which the agent cleared from the abdomen and appeared in the liver, indicating proper shunt function. This is surprising behavior for a colloid, since colloids introduced into the peritoneal cavity for therapeutic purposes are known to leave the fluid quickly and be bound to the peritoneal surface (*4*). Our own experience, in the two cases described below, raises some questions about this technique.

Case 1. A 53-year-old alcoholic with Laennec's cirrhosis and portal vein thrombosis developed massive ascites 3 mo after undergoing construction of an umbilical-caval shunt for recurrent variceal bleeding. When the ascites proved refractory to medical management, a LeVeen shunt was emplaced. Satisfactory response was shown by a 19-lb. weight loss over 10 days, and the patient was discharged. One month later the patient was readmitted because of confusion and was found to have regained ten pounds since discharge. The patency of the shunt was evaluated by injection of 10 mCi of technetium sulfur colloid into the peritoneal cavity and subsequent imaging with the gamma camera at 5 hr postinjection. The shunt was seen, and there was considerable activity in mediastinal lymph nodes as well (Fig. 1). Re-examination at 18 hr, however, showed that most of the activity was still confined to the abdomen (Fig. 2). Unlike the cases described previously, the liver outline could not be seen amidst the general abdominal activity. Though the shunt was shown to fill, indicating that the valve was at least partially patent, only three pounds of fluid were lost in the 5-day hospital course. The patient's mental status improved on dietary management and the patient was discharged.

FIG. 1. (Left) Case 1. Anterior view showing activity in upper mediastinal and supraclavicular lymph nodes 3 hr after intraperitoneal Tc-sulfur colloid. (Right) Case 1. Anterior view showing activity in LeVeen shunt and mediastinal nodes 5 hr after injection. (Part of the field of view has been masked with lead.)

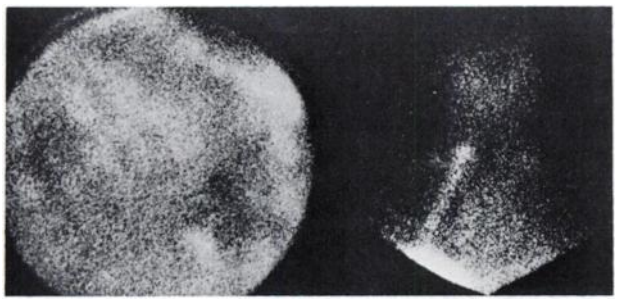

FIG. 2. (Left) Case 1. Anterior view of abdomen 18 hr after intraperitoneal injection of technetium sulfur colloid, showing uneven activity throughout peritoneal cavity and no identifiable liver image. (Right) Case 2. Anterior view of thorax showing activity in LeVeen shunt, blood pool, and peritoneum 30 min after intraperitoneal administration of Tc-albumin.

Case 2. A 55-year-old man was admitted because of massive painless hematemesis. He gave a history of alcohol abuse and had undergone a portacaval shunt procedure 2 years earlier for bleeding esophageal varices secondary to cirrhosis. He was treated for 12 days with i.v. vasopressin and a Blakemore-Sengstaken tube, but bleeding could not be controlled. A splenoportagram showed portal vein thrombosis with occlusion of the shunt. Gastric devascularization, fundectomy, and splenectomy were performed and a LeVeen shunt emplaced. On the ninth postoperative day, 10 mCi of technetium human serum albumin were injected into the peritoneal cavity to assess the patency of the shunt. The gamma camera image taken approximately 30 min later demonstrated activity throughout the extent of the shunt, as well as some blood pool activity (Fig. 2). Delayed imaging at 24 hr showed that most of the activity remained in the abdomen, as in the previous case, although there was no clinical evidence of shunt occlusion. The patient continued to lose weight until his discharge 2 days later. Four days after his discharge he was readmitted because of pain and redness over the site of the shunt in the right upper quadrant, associated with fever and leukocytosis. The surgical wound was healing poorly and threatened to dehisce. The patient's condition deteriorated with recurrence of gastro-intestinal bleeding and evidence of sepsis, and he died 17 days later. Permission for postmortem examination was denied.

We have used both technetium sulfur colloid and technetium albumin to assess the patency of LeVeen shunts by demonstrating that the shunt filled with tracer. In neither case, however, did activity clear from the abdomen as in the two previously reported cases. Did this indicate incomplete occlusion? Further experience is needed with this technique to establish reliable criteria for interpretation. Perhaps a quantitative test would be more useful, such as the determination of blood activity after intraperitoneal injection of radioiodinated albumin.

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FDA IND Approval for Zn-DTPA, New Clinical Agent for Decorporation Therapy of Actinides

The U. S. Food and Drug Administration has recently approved an Investigative New Drug (IND) application for the clinical use of zinc trisodium diethylenetriaminepentaacetate (Zn-DTPA), an experimental drug for decorporation of plutonium and other actinides. The Medical and Health Sciences Division of Oak Ridge Associated Universities (ORAU) will manage the IND for the Division of Human Health Studies, Office of Environmental Research, U.S. Department of Energy.

Physicians having a potential need for such a drug in their practice may apply for coinvestigator status to C. C. Lushbaugh, M.D., principal investigator for the study of the clinical effectiveness of Zn-DTPA. A similar trial has been conducted by AEC/ERDA/DOE contractors over the past 10 years to determine the decorporation efficiency of the analogous calcium compound, Ca-DTPA.

Both Zn-DTPA and Ca-DTPA have characteristics that make their use appropriate for decorporation therapy of actinides. Calcium-DTPA is more effective than Zn-DTPA for early treatment (particularly within 2 hr after incorporation); after approximately 24 hr, however, Zn-DTPA is for all practical purposes as effective as Ca-DTPA. This comparable efficiency, coupled with its lesser toxicity, makes Zn-DTPA the preferred agent for protracted therapy. Calcium-DTPA is contraindicated for minors, pregnant women, nephrotics, and persons with bone marrow depression, whereas Zn-DTPA is not. Apparently Ca-DTPA can interfere with necessary mitotic cellular processes by depleting essential trace metals.

Qualified physicians needing further information about these studies or how to obtain these drugs should contact one of us.

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