

## Technetium-99m DTPA Splenic Uptake

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**Splenic uptake of technetium-99m DTPA was observed during the performance of a diuresis renogram in a 52-year-old male with an active infection of the upper urinary tract. The exact mechanism of uptake is uncertain, but we postulate that it is secondary to a contiguous splenic inflammatory process with its concomitant increase in capillary permeability and breakdown of blood/tissue barriers.**

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Technetium-99m diethylenetriamine penta-acetic acid has been widely used for routine brain and kidney imaging. Recently it has been utilized in conjunction with Lasix to differentiate functional from true obstructive uropathies (1). During the performance of a Lasix diuresis renogram, we noted localization of Tc-99m DTPA within the spleen of a man with left flank pain and laboratory indices consistent with infection of the upper urinary tract. We postulated contiguous splenic inflammation, with its concomitant increase in tissue permeability and increase in extravascular fluid space, as the underlying mechanism of tracer accumulation. We feel that recognition of splenic uptake of DTPA is important to avoid confusion in renal scan interpretation.

### CASE REPORT

A 52-year-old white male had a past history of a radical cystectomy with ileal loop diversion, a left hydronephrosis requiring reimplantation, and recurrent urinary tract infections. He came to the hospital with severe left flank pain radiating to the testicle. As this pain was similar to that associated with a prior episode of hydronephrosis, a radionuclide diuresis renogram was performed. A normal renogram was observed, but increased activity was seen in the left upper quadrant within the region of the splenic bed. This activity persisted on delayed 45-min images (Fig. 1A). It was felt to represent Tc-99m DTPA splenic uptake, and this was confirmed on the same day by the performance of a Tc-99m sulfur colloid scan (Fig. 1B).

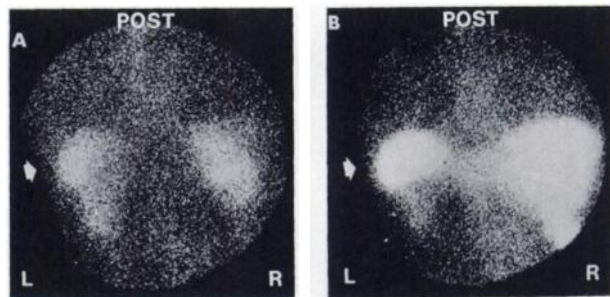
Appropriate antibiotic therapy was instituted following the demonstration of 100,000 colonies of both enterococcus and *Klebsiella pneumoniae*. The patient responded well, with resolution

of the infection and referred pain. In a second attempt to confirm splenic DTPA accumulation, and after obtaining informed consent, a follow-up Tc-99m DTPA renogram was performed. Again a normal renogram was observed but, most importantly, no persistent accumulation of activity was seen in the spleen area (Figs. 2A and B). Note that this latter study was performed in the supine position rather than the upright position of the diuresis renogram, which accounts for the slight difference in organ location in the scintigrams.

Chromatograms of each tracer preparation did not deviate from the norm and demonstrated a 95 and 97% tagging efficiency.

### DISCUSSION

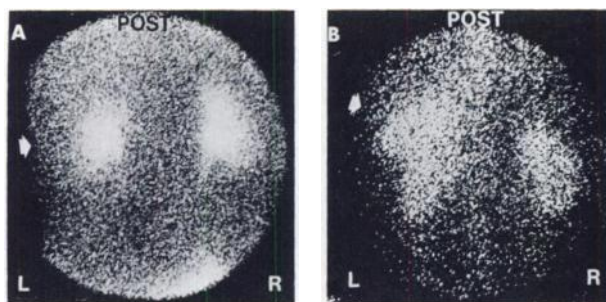
Technetium-99m DTPA is a chelate excreted primarily by glomerular filtration. It has a half-time in blood of ~25 min, with a clearance of 36.1 ml/min per 1.73 m<sup>2</sup> of body surface area. It is uniformly distributed throughout the extracellular space and normally does not cross the blood/tissue barrier. Until recently,



**FIG. 1.** (A) Diuresis renal scintigram, delayed 45 min, demonstrating uptake within region of the spleen (arrow). (B) Tc-99m sulfur colloid liver-spleen scan performed immediately after Fig. 1A, confirming splenic uptake.

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**FIG. 2.** (A) Posttreatment 45-min delayed renal scan, showing no uptake within splenic region (arrow). (B) Renal flow study demonstrating presence of splenic tissue.

it was not known to concentrate in any organ and was retained only if in conjunction with renal disease (obstruction and/or failure), or in CNS abnormalities if associated with a blood/brain barrier defect; i.e., only in the absence of an intact capillary endothelium, which condition allows either passive, mediated, or active transport of the radionuclide into brain tissue (5). Kadir and Strauss have demonstrated its uptake in inflammatory bowel disease and have hypothesized that the accumulation is secondary to changes in the

blood/tissue barriers (altered capillary-bed permeability, edema) associated with inflammatory disease. This case demonstrates another organ that may, under similar circumstances, accumulate Tc-99m DTPA. We hypothesize that our patient's urinary tract infection caused a contiguous inflammation of splenic tissue, which in turn resulted in its accumulating the DTPA. This was further confirmed in its failure to accumulate this agent in the absence of clinical infection or source of inflammation.

#### REFERENCES

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### ANNOUNCEMENT

The Education and Research Foundation of the Society of Nuclear Medicine welcomes applications for Student Fellowships and Pilot Research grants. These awards are made possible through donations from SNM members as well as from various commercial firms whose products are used in the practice of Nuclear Medicine. Applications received prior to December 15 of any year will be evaluated by the ERF Board on a competitive basis. Awards will be announced on or about February 15 of the following year.

#### STUDENT FELLOWSHIP GRANTS

These awards are designed to stimulate interest among students in the United States and Canada in the field of Nuclear Medicine. The awards are intended to provide an opportunity to spend elective quarters and/or summers in active departments working and associating with experts in the field. Maximum grant: \$1,500. Letters of application should be submitted in duplicate and should contain the following: applicant's name, address, birth date, period for which support is requested, name and institution of sponsor, previous education, previous research, and brief summary of the proposed project, including an appropriate bibliography.

#### PILOT RESEARCH GRANTS

The goal of this research support is to provide money to young scientists working in Nuclear Medicine who desire support for a research project. Priority will be given to those proposals that are of a pilot nature in either clinical or basic research. The grants are not intended to support salaries, purchase major equipment, or for travel, but are designed to provide essential materials so that innovative ideas can be quickly tested. Maximum grant: \$3,000.

#### SPECIAL ANNOUNCEMENT: SECOND TETELMAN MEMORIAL AWARD

A fund has been established in the ERF by friends of Marc Tetelman, M.D., who was a tragic homicide victim while attending the SNM meeting in Atlanta in June, 1979. This fund will permit an award of \$3,000 to be made in June, 1982 to a young investigator (35 years of age or younger) who is pursuing a career in Nuclear Medicine. This award is to be repeated annually. It is possible that additional contributions to our fund will permit the stipend to be increased in future years. Applicants should submit prior to March 1, 1982 a curriculum vitae together with data supporting current research efforts.

All letters and applications should be addressed to:

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