

NEW PROCEDURES IN NUCLEAR MEDICINE

LESSON OBJECTIVES:

1. DISCUSS THE PURPOSE FOR PERFORMING EACH NEW DIAGNOSTIC/THERAPEUTIC PROCEDURE.
2. LIST THE MAJOR EQUIPMENT AND MATERIALS NEEDED TO PERFORM VARIOUS NEW DIAGNOSTIC/THERAPEUTIC PROCEDURES.
3. DESCRIBE IN GENERAL TERMS HOW THE NEW DIAGNOSTIC/THERAPEUTIC INFORMATION IS ATTAINED.

LYMPHOSCINTIGRAPHY

PURPOSE:

USED TO FOLLOW THE DRAINAGE
PATHWAYS OF PRIMARY CANCER SITES
AND TO DETERMINE THE NUMBER OF
LYMPH NODES INVOLVED

USED PRIOR TO SURGERY

A GAMMA PROBE OR DYE MAY BE USED
DURING SURGERY TO FURTHER IDENTIFY
SENTINEL NODES

PRIMARY CANCERS STUDIED:

MELANOMA (SKIN CANCER)

BREAST CANCER

EQUIPMENT REQUIRED:

LARGE FIELD OF VIEW

SCINTILLATION CAMERA

5-10 mCi OF ^{99m}Tc -SULFUR COLLOID

COBALT-57 DISK SOURCE

LYMPHOSCINTIGRAPHY

(continued)

PROCEDURE:

MELANOMA -

4 INTRADERMAL INJECTIONS MADE AT
3, 6, 9, & 12 O'CLOCK AROUND
THE LESION

BREAST CANCER -

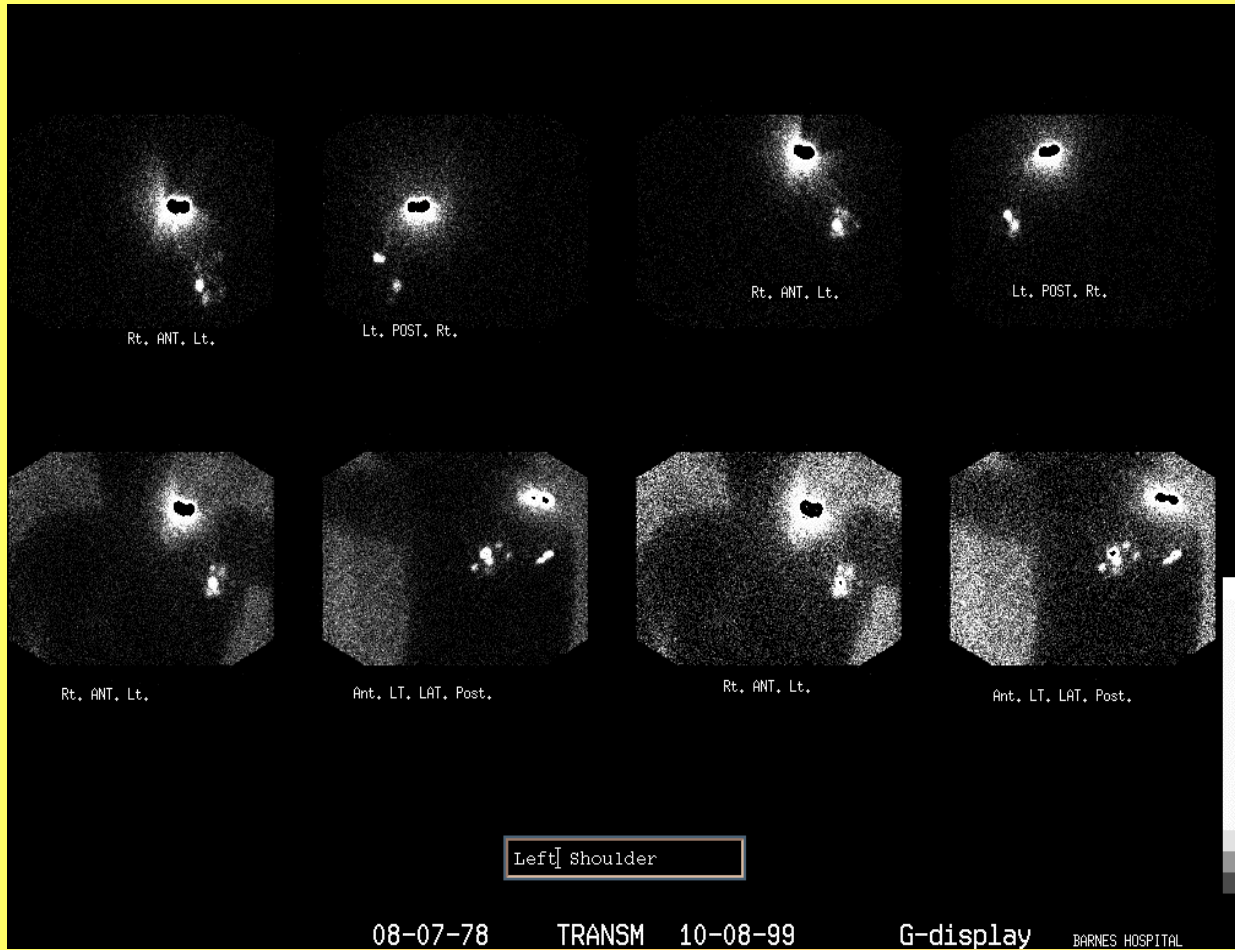
4 INJECTIONS 2-3 mm FROM THE TUMOR'S
EDGE USING A LONG BORE 25 GAUGE
NEEDLE AROUND THE TUMOR
COULD USE ULTRASOUND TO HELP
DIRECT THE INJECTIONS

ACQUIRE MOVING PICTURE AT 10 SECONDS/FRAME
FOR 5 MINUTES, THEN SWITCH TO 1 MINUTE
PICTURES EVERY 5 MINUTES FOR 8 IMAGES

IMAGING FIELD DEPENDS ON THE TYPE OF CANCER
INCLUDE ALL POSSIBLE DRAINAGE PATHWAYS

A TRANSMISSION IMAGE CAN BE ACQUIRED WITH A
COBALT-57 DISK SOURCE TO HELP LOCALIZE THE
TUMOR & DRAINAGE SITES BY PRODUCING A
SHADOW IMAGE OF THE PATIENT

PRIMARY TUMORS AND EFFECTED LYMPH NODES
WILL APPEAR "HOT"



BLOOD CLOT IMAGING

PURPOSE:

99mTc-APCITIDE (ACUTECH) USED TO IDENTIFY THE LOCATION OF BLOOD CLOT FORMATION

ACUTECH ATTACHES ITSELF TO PLATELETS SURFACE

EQUIPMENT REQUIRED:

LARGE FIELD OF VIEW SCINTILLATION CAMERA

20 mCi OF ACUTECH

PROCEDURE:

STANDARD INTRAVENOUS INJECTION

PELVIS AND LOWER EXTREMITIES TYPICALLY IMAGED (ANTERIOR & POSTERIOR PROJECTIONS)

EARLY IMAGES - 10 MINUTES POST INJECTION FOR 5 MINUTES EACH

DELAYED IMAGES - 60 MINUTES POST INJECTION FOR 5 MINUTES EACH

BLOOD CLOT FORMATION AREA WILL BE VISUALIZED

NEUROENDOCRINE TUMOR IMAGING

PURPOSE:

¹¹¹In-PENTETREOTIDE (OctreoScan) USED TO DETECT NEUROENDOCRINE TUMORS
TUMOR SITES COVERED WITH SOMATOSTATIN RECEPTORS (OCTREOSCAN IS A CHEMICAL ANALOG OF SOMATOSTATIN)

EQUIPMENT REQUIRED:

LARGE FIELD OF VIEW
SCINTILLATION CAMERA
6 mCi OF OCTREOSCAN

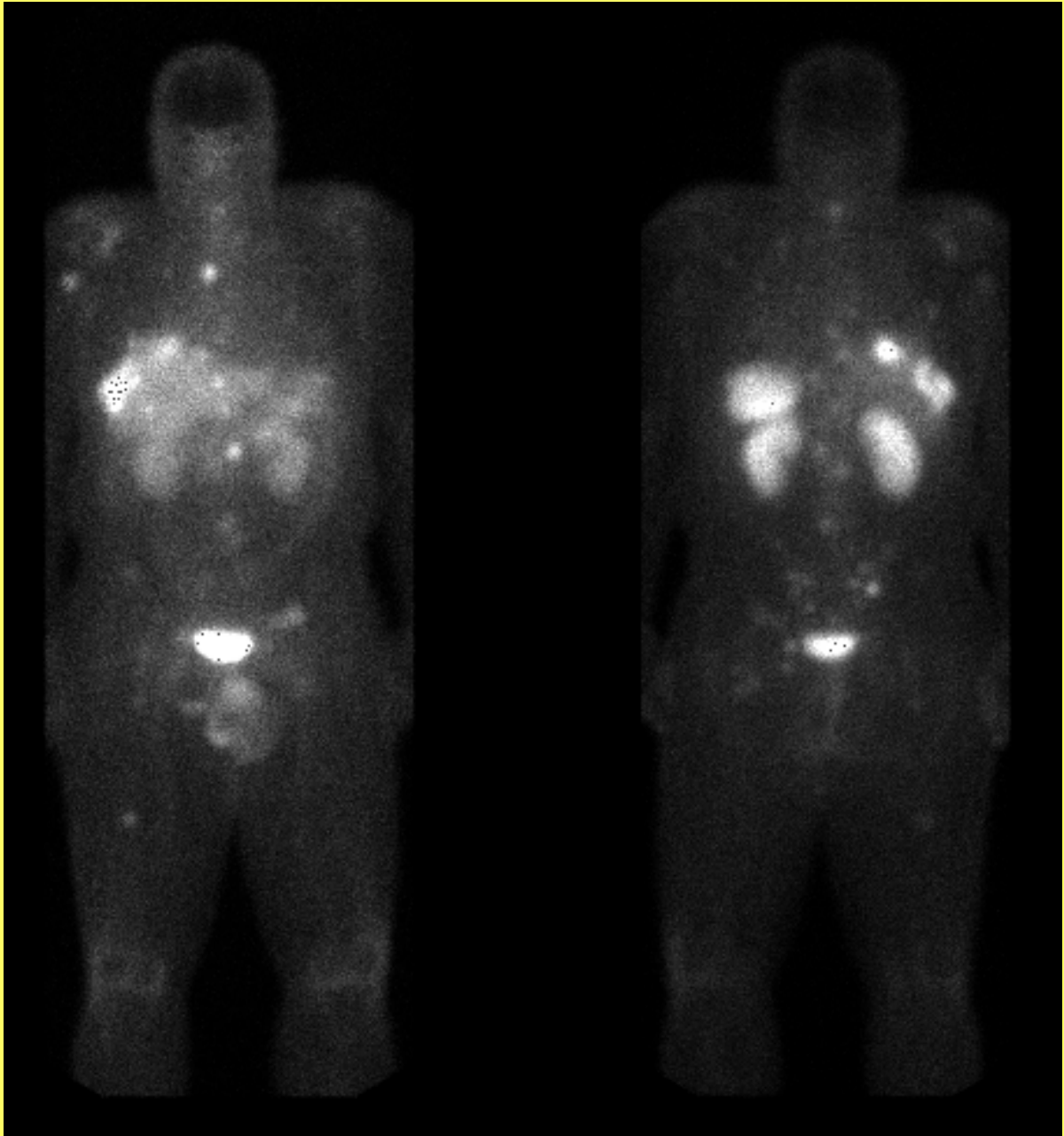
PROCEDURE:

PATIENT IMAGED 4 & 24 HOURS POST TRACER INJECTION (POSSIBLY AT 48 HOURS TO DIFFERENTIATE BOWEL ACTIVITY FROM NEUROENDOCRINE TUMORS)

AREAS IMAGED - CHEST, ABDOMEN, PELVIS, & OCCASIONALLY HEAD

STATIC, WHOLE BODY, AND/OR SPECT IMAGES ACQUIRED

NEUROENDOCRINE TUMORS TAKE UP TRACER



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PROSTATE CANCER IMAGING

PURPOSE:

¹¹¹In-CAPROMAB PENDETIDE (ProstaScint) IS USED TO SHOW RECURRENT CANCER IN THE RETROPERITONEAL NODES OF THE ABDOMEN AND PELVIS.

PROSTASCINT IS A RADIOLABELED MONOCLONAL ANTIBODY

ATTACHES TO PROSTATE SPECIFIC ANTIGEN FOUND IN PROSTATE CANCER

EQUIPMENT REQUIRED:

LARGE FIELD OF VIEW

SCINTILLATION CAMERA

5 mCi OF PROSTASCINT

PROSTATE CANCER IMAGING

(continued)

PROCEDURE:

HAS PATIENT BEEN PREVIOUSLY INJECTED WITH MOUSE ANTIBODIES (COULD BE HYPERSENSITIVE)

IF PATIENT HAD A PREVIOUS REACTION, NUCLEAR MEDICINE PHYSICIAN WILL DETERMINE IF STUDY CAN BE PERFORMED
5% CHANCE OF MILD REACTION, SEVERE REACTIONS RARE

PROSTASCINT INJECTED OVER 5 MINUTES
PATIENT IMAGED 3-5 DAYS POST TRACER INJECTION

AREAS IMAGED - CHEST, ABDOMEN, & PELVIS

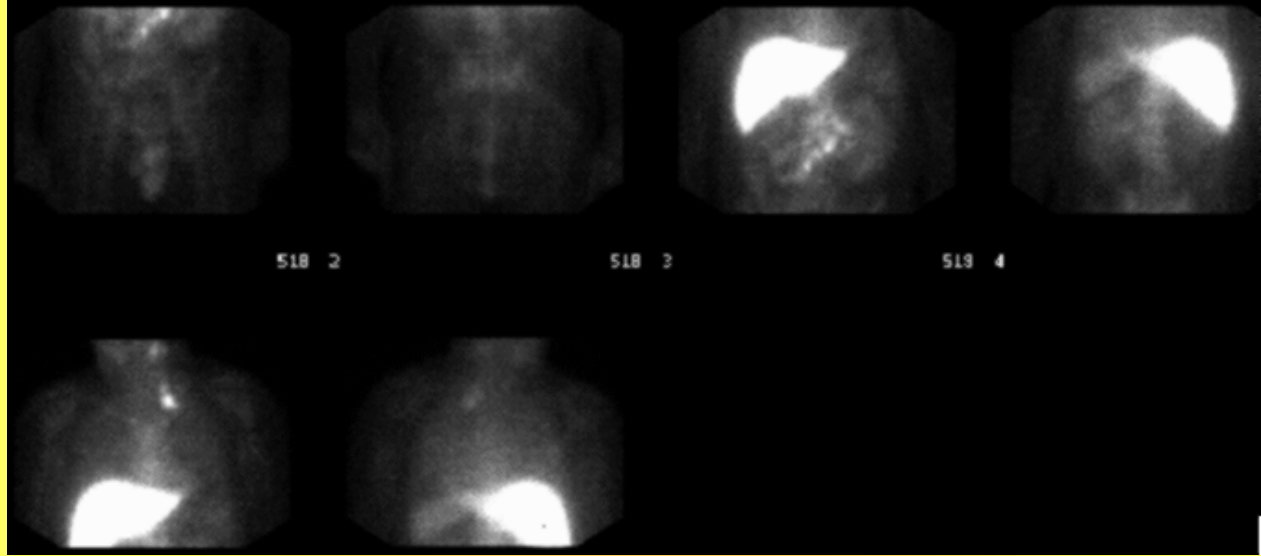
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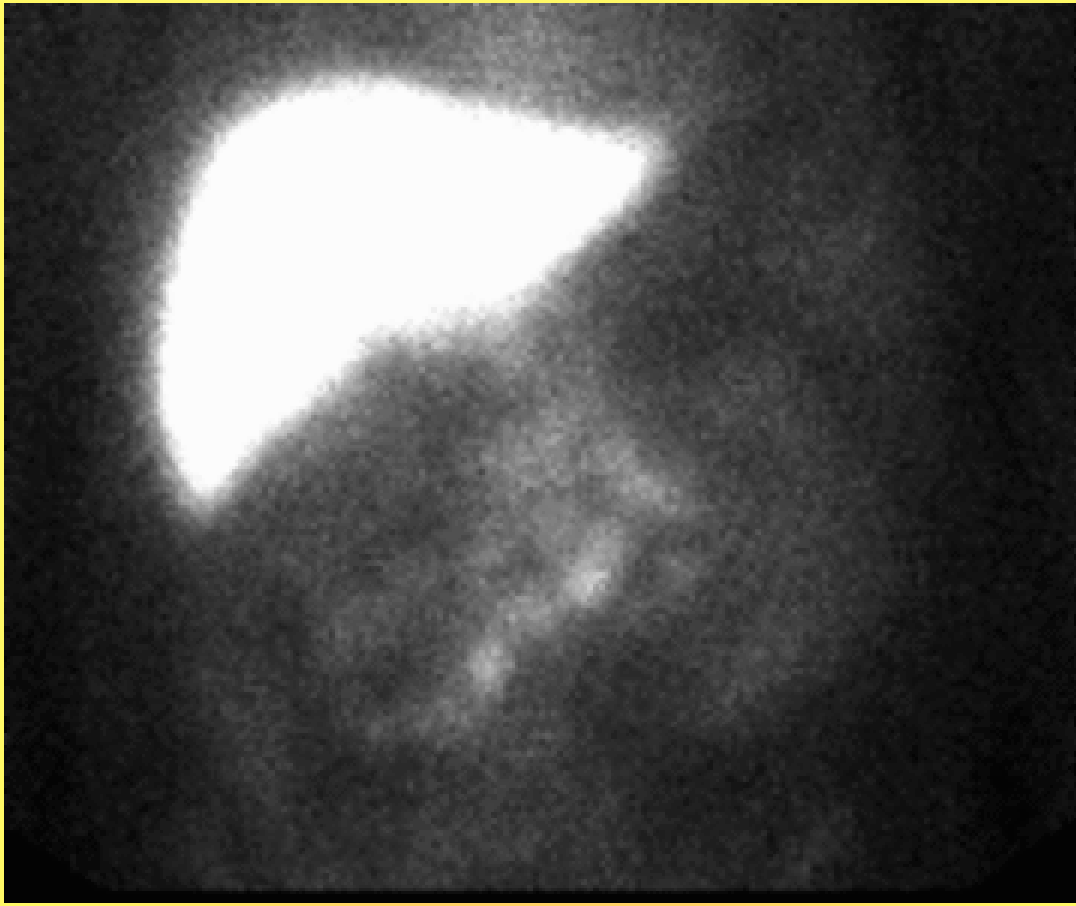
STATIC IMAGES

WHOLE BODY IMAGES

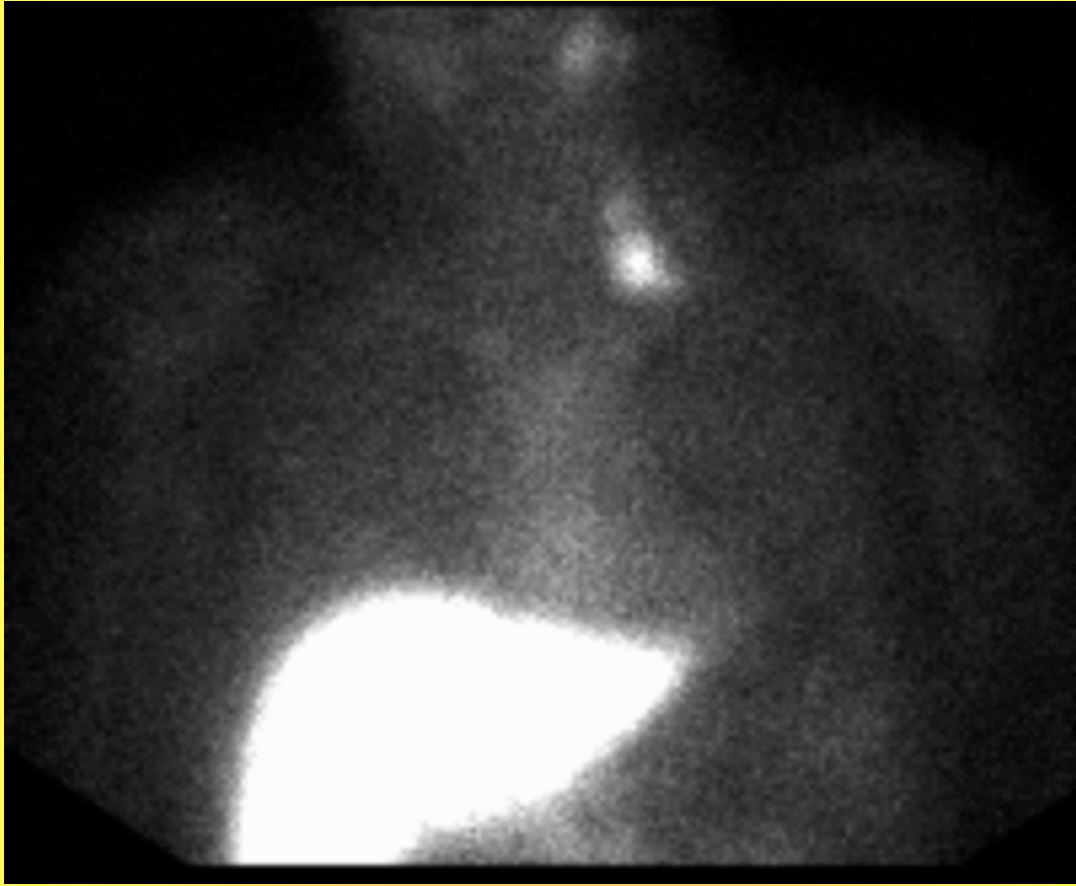
SPECT IMAGES

PROSTATE CANCER SITES TAKE UP TRACER





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THERAPY FOR NON-HODGKIN'S LYMPHOMA

RADIOLABELED MONOCLONAL ANTIBODIES USED:

⁹⁰Y-IBRITUMOMAB TIUXETAN (ZEVALIN)

¹³¹I-TOSITUMOMAB (BEXXAR)

B-CELL LYMPHOMAS TAKE UP THE TRACERS

BOTH AGENTS KILL TUMOR CELLS

STEM CELLS AND PRE-B-CELLS NOT TARGETED

B-CELLS CAN BE REGENERATED AFTER
THERAPY