Detection of Infections in Nuclear Medicine Practice using 99mTc Fab’ Antigranulocyte Fragments (Leukoscan). Our Experience

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Aim of the study

Aim of the study was to assess the diagnostic utility of Fab’ Antigranulocyte Fragments-99mTc (LeukoScan) for detection of suspected orthopaedic and vascular infections by means of triphasic scintigraphy in clinical practice.

Qualitative Composition of the LeukoScan

The active component of LeukoScan® is Sulesomab, a Fab’ fragment generated from IMMU-MN3, a murine IgG1, monoclonal antibody produced in murine ascites. Each vial contains 0.31 mg of the non radioactive materials, necessary to prepare one patient dose. The imaging agent, Tc99m Leukoscan is formed by reconstitution with 0.5 mL sodium chloride for injection i.v., followed by the addition of 1100 MBq of Tc99m in 1 mL of Sodium Chloride for injection. The antibody IMMU-MN3 recognizes an antigenic structure shared by a surface glycoprotein of granulocytes NCA-90.

Characteristics of the Radiopharmaceutical

• No significant induction of HAMA to antibody fragments has been observed nor has there been any elevation of HAMA levels to the fragment in patients with pre-existing HAMA.
• The distribution half-life is approximately one hour.
• The elimination half-life is approximately 20 hours.
• The route of excretion is essentially renal with 41% of the radiolabeled excreted in urine over the first 24 hours after administration.

Materials and Methods

• From December 2000 to August 2003, 44 patients (22 m, 22 f) suspected of orthopaedic or vascular infections underwent triphasic scintigraphy.
• After a 7 days antibiotic therapy interruption, a dose of LeukoScan was injected and scans were performed.

Procedure

• Dynamic Acquisition: 64x64, 80 frames, 5’
• Static Acquisition: 256x256, preset time 5’ at 1,2,3,4h
• Static Acquisition after 24h: 256x256, preset time 5’, (if required).
Left Knee Arthroprosthesis (Dynamic Acquisition)

Left Knee Prosthesis 3h (same patient)

Osteomyelitis in Right Femur Osteosynthesis (Dynamic Curve)

Osteomyelitis in Right Femur Osteosynthesis (15 min)
Osteomyelitis in Right Femur Osteosynthesis (3h)

Left Hip Arthroprosthesis (3h – 24h)

Chronic Osteomyelitis Left Femur (3h)

Acute Osteomyelitis of a Right Hand Finger

Acute Osteomyelitis Left Foot

Aorto-Femoral Vascular Prosthesis (Dynamic Acquisition)
Results

- **27/44** Pts. had **Positive** Scan at **3-4 h** after injection (22 orthopaedics and 5 vasculars).

- **11/22** Orthopaedic **Positive Scans** showed an increased vascular flow in the pathological areas during dynamic acquisition.

- In **8 Pts.** with Osteomyelitis a **soft tissue involvement** was detected.

Conclusions

- A **Positive Dynamic Acquisition** is strongly related to clinical evidence of infection.

- **Static Acquisition** obtained at **3-4 h** after injection showed an highest evidence of infections.

- Leukoscan revealed an easy, specific, safe and time-saving tool in detection of infections.