Radionuclide diagnosis of inflammation

These methods are used to **locate inflammatory sites** in the patient's body. When diagnosing inflammation, proceed from the simplest methods. It begins with an anamnesis, clinical and laboratory examination, and then approaches imaging methods. In addition to nuclear medicine methods, it is also possible to use radiodiagnostic methods (UZ, CT, MR). For the principle of these methods, it is important to know the general pathophysiological conditions of inflammation. There is vasodilation, increased perfusion and capillary permeability. Furthermore, to the migration of leukocytes to the site of inflammation and an increase in their activity with the simultaneous increased consumption of glucose.

Radiopharmaceuticals

During the examination, the radiopharmaceutical accumulates in the patient's body based on the changes that occur during inflammation. Radiopharmaceuticals used include: Mezi užívaná radiofarmaka patří:

- **^{99m}Tc-nanocolloid, ^{99m}Tc-human immunoglobulin** accumulates in a place with increased capillary permeability;
- **labeled leukocytes, antigranulocyte antibodies** accumulate at the site of migrated leukocytes;
- **fluorodeoxyglucose** accumulates at the site of increased glucose metabolism;
- **Ga-citrate** combination of factors.

Autologous leukocytes

^{99m}Tc-HMPAO (partially excreted by the kidneys via the hepatobiliary tract) and ^{111}In-oxime are most often used to label leukocytes. The radiopharmaceutical is administered intravenously and physiologically accumulates in the liver, spleen and bone marrow.

- ^{99m}Tc-HMPAO is taken after 1 h, late images after 4 h and 24 h. [1]
- ^{111}In-oxime is scanned the second day after application.

Indication

- fever of unknown origin;
- osteomyelitis;
- inflammation of the intestines;
- inflammation of the kidneys and pelvic organs;
- infection of iatrogenic material (bone, vascular endoprosthesis).

Antigranulocytic antibodies labeled ^{99m}Tc

n current clinical practice, the mouse monoclonal antibody besilesomab is used. The application is iv. The radiopharmaceutical accumulates at the site of inflammation due to increased capillary permeability and binds to granulocytes. Physiologically, the radiopharmaceutical accumulates in the liver, spleen, and bone marrow. The disadvantage is the risk ofan anaphylactic reaction upon repeated administration. Scanning is performed 4 h after application. [1]

Indication

- fever of unclear etiology;
- osteomyelitis;
- infection of iatrogenic material, periprosthetic infection;
- intestinal inflammations.

^{18}F-fluorodeoxyglucose (FDG)

The radiopharmaceutical accumulates on the basis of increased glucose metabolism in activated leukocytes. Before the examination, patients must not eat or drink for 6 hours. Diabetics must not inject insulin on the day of the examination. Imaging is performed 1-2 h after application. Physiologically, the radiopharmaceutical accumulates in the brain, kidneys, myocardium, intestines, and skeletal muscle. In addition to inflammation, it also accumulates in tumors [1] Template:Methods of nuclear medicine in oncology

Indication

- fevers of unclear etiology;
- diagnosis of vascular inflammations and monitoring the effect of large vessel vasculitis therapy;
- chronic osteomyelitis;
- sarcoidosis;
- monitoring the development and response to therapy in case of vascular infection, possibly. joint replacements.

^{67}Ga-citrate

The radiopharmaceutical accumulates at the site of inflammation due to increased capillary permeability. It binds to lactoferrin, which is produced by activated leukocytes.

Indication

- fever of unclear etiology;
- intrathoracic inflammations;
- chronic osteomyelitis.

^{99m}Tc-diphosphonates

Use especially for **bone inflammation** during three-phase scintigraphy of the skeleton. In osteomyelitis, the accumulation of the radiopharmaceutical is increased in all three phases. Template:Radionuclide examinations of the skeleton

Indication

- objectification of osteomyelitis
- periprosthetic infection in joint replacements

^{99m}Tc-labeled nanocolloids, ^{99m}Tc-labeled polyclonal human immunoglobulin

They accumulate on the basis of increased capillary permeability. Currently, their use is rare.

Selected diagnoses and choice of radiopharmaceuticals

- **Intra-abdominal inflammations**- the method of choice is imaging methods US, CT. Among the methods of nuclear medicine, radiopharmaceuticals with labeled leukocytes and antigranulocyte antibodies are mainly used.
- **Bone inflammations**-three-phase scintigraphy of the skeleton is used to diagnose osteomyelitis. Antigranulocyte antibodies are used for differential diagnosis.
- **Intrathoracic inflammation** - nuclear medicine is used in cases where there are ambiguous findings on X-ray and CT, as well as in granulomatous inflammation (sarcoidosis) and in immunocompromised patients.
- **Fever of unclear etiology** - mainly PET/CT with FDG is used .
- **Rheumatology indications** - detection of synovitis.

Links

related articles

- Radiopharmaceuticals
- Scintigraphy

References

- KUPKA, Karel. *Nuclear medicine.* 2. edition. P3K, 2015. 160 pp. ISBN 978-80-87343-54-8.

Reference

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