99mTc sodium pertechnetate

1. Indications

99mTc sodium pertechnetate is approved for several indications:
Thyroid scintigraphy, salivary gland scintigraphy, location of ectopic gastric mucosa, lacrimal duct scintigraphy and shunt scintigraphy.

2. Preparation

Approved product, see summary of product characteristics (SmPC).

3. Quality control

Approved product, see summary of product characteristics (SmPC) and the European Pharmacopeia.

4. Interactions

Shunt scintigraphy

Methotrexate: Increased uptake of 99mTc-pertechnetate in the walls of the cerebral ventricles has been reported as a result of methotrexate-induced ventriculitis in cerebral shunt scintigraphy.

Aluminium containing drugs

Notably antacids (Maalox®, Algeldraat, Regla pH®) may lead to an increase of activity. Also, a change in biodistrubution can be seen in the abdomen.

Thyroid scintigraphy

Antithyroid medication (carbimazol, propylthiouracil), iodine-containing medication (amiodarone, contrast agents) and sulfonamides can lead to a reduced uptake in the thyroid.

Abdominal imaging

Atropine, isoprenaline and analgesics like morphine may cause a delay of gastric emptying and thereby cause a redistribution of 99mTc pertechnetate.
Administration of laxatives should be withheld since they irritate the gastrointestinal tract.

5. Adverse reactions

Anaphylactic reactions (e.g. dyspnoea, urticaria, erythema, rash, pruritis, face oedema) have been reported following intravenous injection of sodium pertechnetate.

Single clases of vegetative reactions have been reported, however, most of the reported vegetative reactions include gastrointestinal reactions like nausea and vomiting. Other reports include vasovagal reactions like headache or dizziness. Vegetative reactions are

rather considered to be related to the examinational setting than to the ^{99m}Tc, especially in anxious patients.

Local injection site reactions have been reported.

6. Biodistribution & pharmacokinetics

The pertechnetate ion has similar biological distribution terms to iodide and perchlorate ions, concentrating temporarily in salivary glands, choroid plexus, stomach (gastric mucosa) and in the thyroid gland, from which it is released unchanged.
The pertechnetate ion also tends to concentrate in regions of increased vascularization or with abnormal vascular permeability. ^{99m}Tc is selectively excluded from the cerebrospinal fluid.
The accumulation by the salivary glands lies in the magnitude of 0,5% of the applied activity with the maximum reached after 20 min.

The plasma clearance has a half-life of approximately 3 h. Secretion during the first 24 h after administration is primarily via the urine (about 25%) with fecal excretion occurring over the next 48 h. About 50% of the administered activity is excreted within the first 50 h.

7. Stability

^{99m}Tc sodium pertechnetate has to be used within 8h after production. It has to be stored below 25°C, do not freeze.

8. Literature

- SmPC UltraTechnekow FM. Mallinckrodt Medical BV. Petten, via www.cbg-meb.nl.
- SmPC Pertector 2,3-57,1 GBq radionuclide generator.
- KNMP kennisbank natriumpertechnetaat Tc 99m.
- Lentle B et al. Drug-Induced Changes of Radiopharmaceutical Biodistributions. University of new Mexico Health Sciences Center. Alburqueque NM.