

- Title** Alternative(s) to 99mTc-sestamibi preoperative scintigraphy for the localization of hypersecreting parathyroid glands in the event of complete shortage of 99mTechnetium (99mTc)
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Aim

Due to several periods of shortage of 99m-Technetium (Tc-99m) supply- a radioactive element needed to perform preoperative Tc-99m-sestamibi scintigraphy in certain cases of hyperparathyroidism (HPT)- the Directorate General for Health (DGS) asked HAS to determine if, in the event of complete shortage of Tc-99m, one (or more) test(s) could replace it without risk to patients.

The objective of this assessment is therefore not to call the reference strategy into question. Following laboratory confirmation of HPT, the preoperative first-line strategy provides for the combination of cervical ultrasonography (US) and 99mTc scintigraphy...

Currently, 99mTc scintigraphy in addition to US is used to:

- confirm the nature of a suspicious lesion seen on US;
- detect a eutopic or ectopic abnormal parathyroid gland not seen on US.

The imaging test(s) for the preoperative assessment are requested by the surgeon or endocrinologist, who always work together in collaboration, particularly with the nuclear medicine and radiology team.

Conclusions and results

Eleven guidelines were identified for the final analysis of the literature overview. No relevant Health technology assessment (HTA) reports were identified.

The analysis of guidelines cannot be used to conclude directly on the question asked - as the hypothesis of Tc-99m shortage was not foreseen in these recommendations. However, it was possible, based on current knowledge, to identify two additional tests performed in addition (and not as a substitute) to scintigraphy, (with the exception of US which is still necessary), i.e contrast-enhanced CT-scan and MRI, both of the cervical-mediastinal area. The latter two are used to localise pathological glands. It might be relevant, based on the guidelines, not to exclude the possibility of their use alone, in the absence of scintigraphy.

Other tests available to the clinicians are not suitable to replace preoperative scintigraphy:

- preoperative selective venous sampling of parathyroid hormone (too invasive);
- US-guided biopsy with in situ PTH assay (only indicated in special cases);

- Positron emission tomography (PET) with 18 F-choline (still within the domain of clinical research).

Based on all the collected data, (including stakeholders' points of view) the new preoperative first-line strategy in the event of complete shortage of 99mTc might be:

- cervical US which should be performed routinely in all patients to search for one (or several) parathyroid adenoma(s) and associated thyroid nodules;
- the possible substitution of preoperative scintigraphy by contrast-enhanced multislice CT scan (multiphase four-dimensional 4D imaging) of the cervical-mediastinal area, at best combined with a low radiation dose protocol;
- in the event of contraindication to the contrast-enhanced CT scan¹, a cervical-mediastinal MRI may be requested.

Within a context of complete shortage of 99mTc, the representative of the NPB² of endocrine surgeons advocates the temporary use of bilateral neck exploration for all patients until final validation of 4D CT-scan.

Recommendations

In the event of complete shortage of 99mTc, the HAS considers that the preoperative localization of abnormal parathyroid gland could also be based, in addition to systematic cervical US, on the use of a contrast-enhanced multi-slice CT scan (using a multiphase four-dimensional protocol) or an MRI if the latter is contraindicated.

If the contrast-enhanced multi-slice CT scan or MRI were not possible or non-contributory, either bilateral neck exploration or unilateral neck exploration (only when intraoperative rapid PTH assays could be envisaged) can be considered as options.

In the eventuality of such a shortage, this assessment should account for the clinical context of the HPT, the sophistication of the imaging platform available, intraoperative access to rapid PTH assay kits, the surgeon's level of expertise and the patient's preferences.

Methods

The method validated by the board consisted of:

- systematically identify all the guidelines and HTA reports published in English or French between January 2009 and March 2015 in order to carry out a consistency analysis;

¹ Relative contraindications to cervical contrast-enhanced CT-scan are young age, pregnancy, renal failure, iodine allergy

² National Professional Board

- collect the views of the stakeholders: representatives from the National Professional Boards (NPB) of endocrinology, endocrine surgery, nuclear medicine and radiology.

The conclusions of the assessment report are based on all the data collected and validated by the HAS Board.

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