MRI in long-term follow-up of differentiated thyroid carcinoma-preliminary results

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Introduction:

Differentiated thyroid carcinomas (DTC) are the most common thyroid malignancies and they are usually indolent. Although DTC is among the most curable neoplasm it often metastasizes to the regional lymph nodes with an incidence of 40%-75% (1, 2), while distant metastases appear from 10% to 50%, predominantly in lungs and less frequently in bones (3). Most DTC metastases are successfully monitored with neck ultrasound and radioiodine (^{131}I) whole body scan (WBS). However, there is a subset of patients with metastatic lymph nodes not localized by WBS in whom magnetic resonance imaging (MRI) is warranted (4). Lymph node chains are frequent and normal MR findings in DTC follow-up, particularly when they are less than 10 mm. They should be clearly differentiated from malignant lymph nodes, which represent a form of metastatic spread or relapse of DTC (5). MRI, a non-invasive and elegant technique, is the best option for localizing and detecting cervical and mediastinal lymph node metastases (4). The aim of the study was to investigate the importance of MRI in long-term follow-up of DTC after the initial therapy.

Methods:

Magnetic resonance imaging of the neck and mediastinum was performed in follow-up of 14 DTC patients, 7 men and 7 women, aged from 21 to 65 years (mean=44.8 years). Histopathologically, papillary thyroid carcinoma (PTC) was found in 13 patients and Hurthle cell carcinoma (HCC) in one patient. The initial therapy included "near" total thyreoidectomy (combined with modified radical neck dissection in 4 patients), followed by ^{131}I therapy, or chemotherapy combined with external beam therapy . Afterwards, they were followed up on a long-term basis with routine analyses such as: determination of thyroglobulin (TG) serum level, examination of the neck by palpation, and whole body scan (WBS). In unclear findings of performed tests MRI was done at 1.5 T imaging system using Hemholtz coil. We have done precontrast T_1-weighted (TR/TE=450/15ms), and T_2-weighted (TR/TE=2000/80ms) spin echo images, in axial and coronal planes, with scanning parameters such as: slice thickness=4mm with no gap between slices, matrix size=256x256, and imaging field of view (FOV)=230mm. After the application of contrast agent, Gd-DTPA, postcontrast T_1-weighted images were done in all patients.

Results:

MRI detected enlarged cervical and/or mediastinal lymph nodes in 5 patients, all with positive WBS and elevated TG serum level; 2 of them had palpable cervical lymph nodes too. The regional metastases were excluded by MRI in 9 patients: WBS and TG level showed no abnormality in 3 of them (one patient had palpable cervical lymph node); 5 patients had equivocal or positive WBS (TG serum level was elevated in one patient because of liver metastases, and negative in 4 patients, with enlarged cervical lymph nodes in 2 of them); negative WBS and elevated TG serum level were found in one patient.

Conclusions:

The magnetic resonance imaging has a complementary role in the long-term follow-up of DTC patients. It is especially important in the evaluation of invasive malignant process spreading into the cervical and/or mediastinal lymph nodes when the standard procedures (WBC, TG serum level, neck palpation, ultrasound) are questionable.

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