Case 3: 50 yr-old man with insular thyroid carcinoma

Giuliano Mariani
Regional Center of Nuclear Medicine, University of Pisa
Medical School, Pisa (Italy)
50-yr old man with insular thyroid carcinoma

- tumor of intermediate differentiation and high biological aggressiveness, accounting for 2% - 6% of all thyroid cancers.

Total thyroidectomy in 1995 because of suspected thyroid cancer on FNAC.

Histology: poorly differentiated thyroid cancer (insular type) with lymph node metastasis in the central compartment (pT3N1aMx)
Prior $^{131}$I-iodide ablation of thyroid residue (3.7 GBq, or 100 mCi).
Not available for follow-up until 1999: rise of serum thyroglobulin (Tg) off L-T4, with US evidence of jugular relapse.

$^{131}$I-iodide therapy (5.55 GBq, 150 mCi) followed by surgical debulking. Tg > 500 ng/mL (off L-T4)

Post-therapy $^{131}$I-WBS (1999)
2000: Further rise of serum Tg (169 ng/mL off L-T4). 
$^{131}$I-iodide WBS: negative. 
US: relapse in left parajugular region. 
December 2000: 3.7 GBq (100 mCi) $^{131}$I-iodide, with positive post-therapy scan at the site of relapse. 
May 2001: serum Tg 440 ng/mL (off L-T4), with negative $^{[18F]}$FDG PET

December 2001:  
2$^{\text{nd}}$ surgical debulking. 
April 2002: 
serum Tg 8 ng/mL (on L-T4)
The dilemma of insular thyroid carcinoma

- The insular histotype of follicular thyroid cancer has an important prognostic and therapeutic impact.
- The average incidence of loco-regional recurrence and/or distant metastases is as high as 64%.
- Surgical management of this entity is the main treatment approach.

75% of insular tumors concentrate radioiodine.
• What is the best treatment?
• Radioiodine?
• Surgery?
• Chemotherapy?
• Sequential treatments?
• Combined treatments?

The rarity of this tumor makes it difficult to draw conclusions as to the best treatment option.
July 2002: $^{131}$I therapy (3.7 GBq, 100 mCi).
Serum Tg 97 ng/mL (off L-T4).
Post-therapy WBS: negative (faint liver uptake).

October 2003: serum Tg 147 ng/mL.
Relapse in left paratracheal region.

$^{131}$I therapy (5.55 GBq, 150 mCi).
Serum Tg 1658 ng/mL (off L-T4).
Post-therapy WBS: negative (faint liver uptake).
July 2004: positive $^{18}$F FDG PET  

3rd surgical debulking

December 2004: relapse in right paralaryngeal region, with positive FNAC and negative $^{18}$F FDG PET.
Serum Tg off L-T4?, ng/mL
Serial monitoring of Tg can be helpful for detecting recurrences.

Progressive dedifferentiation of thyroid tumors leads to underexpression of the sodium-iodide symporter, decreasing the iodine concentrating ability and resulting in false-negative RAI scans. This occurs in up to 20% of all differentiated metastatic thyroid lesions.
Radioiodine WBS imaging, neck ultrasound, computed tomography scans, and magnetic resonance imaging are important in detecting and assessing the extent of disease and recurrences.
[¹⁸F]FDG-PET is especially indicated in patients with negative ¹³¹I-WBS associated with elevated serum Thyroglobulin during follow-up. PET scans localized occult disease in 71% of these patients, with a 92% positive predictive value of 92% and a 93% negative predictive value.

[¹⁸F]FDG-avid disease correlated with prognosis and was the strongest single risk factor predicting survival in pts with poorly differentiated thyroid carcinoma.
Teaching point

Management of poorly differentiated thyroid cancer

References