CASE REPORTS

Metastases in the sphenoidal sinus in a patient with papillary thyroid cancer

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Tumours that produce metastases in the paranasal sinuses or sphenoidal sinus are rare; the carcinomas of kidney and lung being the most frequent with this type of metastasis. Distant metastases from differentiated thyroid carcinoma are rare and, moreover, when they metastasize, they do so into lung and bone. We report a patient who had a papillary thyroid carcinoma with metastases into the sphenoidal sinus.

Key words: papillary thyroid carcinoma, metastases, sphenoidal sinus.

INTRODUCTION

Differentiated carcinoma of the thyroid (DCT) currently accounts for < 1% of the visceral neoplasias, with an annual incidence that varies between 0.5 and 10 cases/100,000 people\textsuperscript{1}. The risk increases with age and affects women more frequently than men in a ratio of 5:2. It is a neoplasia with good prognosis. Papillary carcinoma (PC) is the most frequent type and represents approximately 70% of thyroid cancers in the adult. The regional lymphatic ganglia that drain the thyroid are affected in 50% of the patients. Overall survival at 10 years is around 95% in the patients under 40 years of age and 75% in the patients above this age of 40. Despite the presence of distant metastases the patients frequently survive for several years without treatment\textsuperscript{2}.

Distant metastases in DCT are not usual, are present at the time of diagnosis in around 7%-15% of the patients, and the progress in follow-up is around 10%-15% (7% papillary, 19% follicular and 54% Hurthle cells). Lung metastases are more common (69%-70%) especially in young patients and in the papillary type\textsuperscript{3}, followed by bone metastases. Other sites of metastases that are less frequent are brain, liver and skin. Brain metastases which appear with a frequency of 1\%\textsuperscript{4}, are related to advanced age, have large-size primary tumours, have evidence of extra-glandular invasion, are more aggressive histologically\textsuperscript{5} and the cranium is the third-most frequent site of metastases\textsuperscript{6}. Clinically, DCT is responsible for 0.5% of all deaths from carcinoma. In autopsy material from adults it is observed in about 5% of cases and represents, generally, more an anatomical finding rather than clinical disease\textsuperscript{7}.

The case we present is of a patient with distant metastases of DCT in an unusual site, the sphenoidal sinus. The performance of a total body scan (TBS) with iodine-131 (\(^{131}\text{I}\)) was definitive in the diagnosis and enabled the successful therapeutic management of the patient.

CLINICAL CASE

A 55 year old woman, with a clinical history of hysterectomy with double anexectomy for leiomyoma, was referred to our Nuclear Medicine department for the ablative treatment of residual thyroid following a total thyroidectomy, in February 1999, for papillary thyroid carcinoma. Ablative dose of 100 mCi of \(^{131}\text{I}\) was administered. Subsequently, a TBS was performed and showed evidence of residual thyroid and metastases in the central region at the base of the cranium (fig. 1A). The patient presented a clinical picture of headache, paresthesia in the ciliaris region, eyelid and right eye and, sometimes, left monocular diplopia. A cerebral magnetic resonance (MR) was solicited (fig. 2) in which there appeared to be a lesion occupying the space of the sinuses with an extension into the posterior ethmoidal sinuses and upper extension to the hypophyseal gland with invasion of the region of the ophtalmic cisternae. Following the ablative treatment laevothyroxine as replacement therapy was...
prescribed. Clinically the patient was well, and the headaches ceased.

In August 1999, 200 mCi of $^{131}$I was administered, with good tolerance (TSH > 30 µIU/ml and thyroglobulin [TG] of 4975 ng/ml). In the TBS the metastases were identified (fig. 1B) as a heterogeneous lesion with a central zone suggestive of necrosis. However the MR did not show any significant changes. Clinically the patient was well, with the exception of a small cloudiness that appeared occasionally to cause right eye strain.

In December 1999, a follow-up MR was performed in which it was observed that the lesion occupying the sphenoidal sinus had not changed significantly and was homogenous. Sagittal as well as the coronal planes distinguished normal hypophyseal gland from the sphenoid lesion (fig. 2C). In the blood chemistry analyses, the TSH was undetectable, and the TG was 487.7 ng/ml. We proposed the option of alternative adjuvant therapy to the metabolic radiotherapy.

In January 2000, surgery was performed along the trans-nasal sub-labial border. There was a partial resection of lesion that had a hard consistency, was highly vascularised and had a reddish colour. The resection was of all the intra-nasal tumour tissue up to the walls of the sinus. The walls of the bone had been destroyed and the tumour had infiltrated to occupy all of this space and, as such, complete resection was not possible. The anatomo-pathology was metastases of the DCT, follicular variant of PC. In the post-operative period the patient was treated with external radiotherapy (57 Gy) and the treatment concluded in April 2000. At this time the level of TG was 245 ng/ml. Subsequently, two further treatments with $^{131}$I were performed; one of 300 mCi (Nov. 2000) and the other 200 mCi (November 2001) following which the TBS showed a significant decrease in the uptake of the isotope by the metastatic lesion (fig. 1C).

Over these past three years the patient continues to be clinically well, with laevothyroxine as replacement therapy and maintaining a suppressed TSH level with 150 mg/day. The levels of TG maintained around 30 ng/ml. In the MR, the volume of the cranial lesion appeared to be stabilised.

**DISCUSSION**

The majority of malignant thyroid tumours that are diagnosed within our ambit correspond to PC (between approximately 80% and 85%) and which have the best prognosis$^8$. Papillary thyroid carcinoma originates in the follicular cells of the thyroid and, usually, grows very slowly. Mostly, one lobe of the thyroid is affected but between 10% and 20% of the time, both lobes are affected. Histologically, several different variants (sub-types) of papillary carcinoma have
been described: follicular, cylindrical cells, tall cells and diffuse sclerotic. Of these, the last two sub-types disseminate quickly and have poor prognoses.

PC is frequently disseminated via the lymphatic system, propagating quickly into the lymphatic ganglia in the neck. Vascular dissemination is rare but when it does occur, metastases occur in bone, brain, lung and soft tissue. It seems that advances in immunohistochemistry and molecular biology have not, as yet, produced reliable prognostic criteria; the most efficient indicator to-date has been the presence of metastases at the moment of diagnosis. Other prognostic criteria in PC are tumor size, involvement of the thyroid capsule, injury to the ganglia capsule by the metastases, vascular involvement, infiltrative-type growth, presence of thyroiditis, gender, and age of the patient.

The case we presented is that of a 55-year-old female diagnosed as having PC which, following a TBS post-ablation with $^{131}$I, had metastases in the sphenoid sinus with extension to the posterior ethmoidal sinus and extension above the hypophysis with invasion of the region of the optochiasmatic cisternae. Metastases to the paranasal sinuses of the DCT are extremely rare, especially in diagnosis. In 1997, Altman et al reviewed all cases of cancer of the thyroid with metastases of the paranasal sinuses described in the literature to-date. Only 11 cases had been published and they affirmed the poor prognosis implied by the distant metastases of the DCT. Four years later, Prescher and Brors reviewed 169 cases of metastases of the paranasal sinus. The most frequent primary tumours were carcinoma of the renal cells and bronchogenic carcinoma. DCT in 4th place after breast cancer was responsible for metastases in 15 of the patients studied. The most frequently affected was the maxilla responsible for metastases in 13 of the patients. The most frequently affected was the maxilla responsible for metastases in 13 of the patients. Of these, the last two sub-types disseminate quickly and have poor prognoses.

The treatment with $^{131}$I following the total thyroidectomy needs to be performed 4–7 weeks later, and with a TSH > 30 µU/ml; the standard ablative dose being 80–100 mCi so as to eliminate the possible residual thyroid cells. In our case if we had known the existence of distant metastases the initial dose of $^{131}$I would have been higher. The patient had received a total of 900 mCi de $^{131}$I.

With respect to the surgery, the majority of cases reported in the literature were observed to have cranial metastases of DCT with a clinical evolution of between 1 and 2 years, before undergoing surgical resection. In our case, surgery was performed 6 months following the treatment of the cranial metastases with 200 mCi de $^{131}$I. Given the danger of haemorrhage and the site, the objective was to allow time for the radio-iodine to reduce the tumour and to extirpate it.

In relation to the treatment of the metastases with radiotherapy, currently there are no data that can demonstrate improvement in survival but, confronted with single metastasis, it would be prudent to use all therapeutic options available.

To conclude, our patient highlights the importance of ablative treatment with $^{131}$I following thyroidectomy, of TBS post-ablation so as to locate possible distant metastases and, as well, of surgical treatment at the earliest time possible so as to access the metastases. Of note as well is that the doses of metabolic radiotherapy administered contribute significantly towards decreasing the TG levels.

References

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