Diabetes insipidus and panhypopituitarism revealing pituitary metastasis of small cell lung carcinoma: a case report

L. Harzallah(1), H. Migaw(2), F. Harzallah(3), Ch. Kraiem(1)

(1) Department of Medical imaging, Farhat Hached Hospital, Sousse 4000, Tunisie.
(2) Department of medical imaging, European Hospital Georges Pompidou, Paris, France.
(3) Department of Endocrinology, Larabta Hospital Tunis, Tunisie.

e-mail : latifa_harzalla@yahoo.fr

INTRODUCTION

Hypophyseal metastatic localisations are uncommon and are rarely the first expression of a primary cancer. They are recognized event in some forms of systemic cancer, usually discovered incidently at autopsy. The advent of MRI had permit the detection of pituitary metastasis when some patients were investigated even for diabetes insipidus. We report an exceptional case revealed by diabetes insipidus and panhypopituitarism.

CASE REPORT

A 40-year-old man was admitted with rapidly progressive polyuria and polydipsia which had started three months before admission. The patient interrogation and exam showed a loss of appetite and weight (10 kg), a decreased sexual desire and diplopia for 3 weeks without any cranial nerve palsy. A heavy smoking history (40 pack years) was present. Central diabetes insipidus was suggested by the results of a water deprivation test. Endocrine investigations showed a low thyroxine level in combination with low thyrotropin level and low basal level cortisol (Table I). These results are consistent with the presence
of central hypothyroidism and hypocorticism. A magnetic resonance imaging (MRI) revealed an approximate 20 x 16 x 14 mm intra-sellar mass that was isointense to brain on precontrast T1 weighted and T2 weighted images and demonstrated predominately rim enhancement with isointense signal centrally. In addition the entire pituitary infundibulum was enlarged, measuring 8 mm in the transverse dimension and was similar in signal characteristics to that of the intra-sellar mass (fig. 1). The bright spot of the posterior lobe was absent, the optic chiasm was elevated, the sphenoid bone was invased and an erosin of the sellar turcica floor was present. The cavernous sinus were unremarkable. Subsequently, a biopsy of the pituitary lesion was performed, using trans-sphenoidal approach, revealing metastatic small cell lung carcinoma. A chest X-Ray showed an irregular mass in the apex of the right upper lobe (fig. 2). Diagnosis of small-

Table I
Hormones evaluation showing ACTH and gonadotropin deficiencies. The TSH level before and after TRH associated with moderate hyperprolactinemia confirm the hypothalamic dysfunction.

Tableau I
Évaluation hormonale montrant un déficit en ACTH et en gonadotropine. Le taux de TSH avant et après la stimulation à la TRH associé à une hyperprolactinémie modérée confirme le dysfonctionnement hypothalamique.

<table>
<thead>
<tr>
<th></th>
<th>base</th>
<th>Normal value</th>
<th>After stimulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>FT4</td>
<td>3.1</td>
<td>7-20 ng/l</td>
<td></td>
</tr>
<tr>
<td>TSH</td>
<td>6.9</td>
<td>0.12-3.4 mUI/l</td>
<td>9.2</td>
</tr>
<tr>
<td>PRL</td>
<td>52.3</td>
<td>5-25 µg/l</td>
<td></td>
</tr>
<tr>
<td>Cortisol</td>
<td>14</td>
<td>100-230 µg/l</td>
<td>14</td>
</tr>
<tr>
<td>Testostérone</td>
<td>0.23</td>
<td>3.5-11 µg/l</td>
<td></td>
</tr>
<tr>
<td>FSH</td>
<td>&lt;1.0</td>
<td>1.5-12 UI/l</td>
<td></td>
</tr>
<tr>
<td>LH</td>
<td>&lt;1.0</td>
<td>1.5-8.5 UI/l</td>
<td></td>
</tr>
</tbody>
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Figure 1: Coronal T2 (a), sagittal T1 pre-gadolinium (b) and post-gadolinium (c) weighted magnetic resonance images showing a pituitary mass with stalk thickening and sphenoidal invasion. The optic chiasma was elevated and the bright spot of the posterior lobe.

Figure 1 : Coupe IRM coronale pondérée T2 (a), sagittale pondérée T1 avant (b) et après (c) gadolinium montrant une masse hypophysaire avec un épaississement de la tige et un envahissement sphénoïdal. Le chiasma optique est surélevé et l’hypersignal T1 spontané du lobe postérieur est absent.
cell lung cancer was made on core biopsy under CT guidance. After biopsy, and receiving radiotherapy for his pituitary lesion the patient's vision improved and he remained symptom-free for 6 months. However, eight months after onset the clinical signs, the patient died, despite radiotherapy, surgery and chemotherapy.

**DISCUSSION**

According to post-mortem studies pituitary metastases are uncommon and occurred only in 2 to 5% of all patients with cancer [3]. Lung and breast cancers are the most common primary sites, in men and women respectively, which metastasise to the pituitary gland [8]. Especially, Small-cell pulmonary carcinomas metastasise to the pituitary gland [6]. Rarely pituitary metastasis is the first manifestation of the cancer [7]. Diabetes insipidus is the most common presentation due to the predilection of metastases to posterior pituitary. This may be due to the fact that the neural portion has a blood supply directly from the systemic circulation, while the anterior lobe is supplied by the hypothalarnus-hypophyseal portal system [2-4]. Anterior pituitary dysfunction, headache, visual-field abnormalities, fatigue, nausea, vomiting, and cognitive deficits have also been reported [5]. In our case the tumor has involved both lobes attested clinically by the diabetes insipidus and hypopituitarism and the results of MRI. A review of 201 reported cases showed that the frequency of involvement within both lobes was estimated to 33.8% [4]. Imaging features of the sellar region is very variable. Radiographic study of the pituitary area may show sellar erosion but is not as reliable as CT scanning or MRI of the pituitary. MRI shows, even an intrasellar and suprasellar dumbbell shaped masses with a clear indentation at the level of the diaphragm sellae, which may differ morphologically from pituitary adenoma that usually expands the diaphragm. A thickened pituitary stalk as well as the absence of a bright signal was seen but non specific because of the presence in other pathologies like sarcoïdosis, tuberculosis, langerhans cell histiocytoisis... Invasion of the cavernous sinus, and extension to the sphenoid sinus are common. Compression of the optic nerve, and concomitant brain lesions may also be seen [9]. In our case the lesion was involving the entire gland and the pituitary stalk with extension to the cavernous sinus and sphenoidal bone. In the clinical known cancer patient presenting with a pituitary dysfunction and a pathologic MRI of the hypophyseal region, the diagnosis of pituitary metastasis is easy. However, it's very difficult to belong these imaging features to a metastatic origin when the primary cancer is unknown and it was revealed by the pituitary symptoms like our case. In this case it’s very important to review the clinical patient context and we think that in this case the lack of respiratory symptom can be explained by the peripheral site of the lung lesion. However, the loss of weight and the heavy smoking history had to evoke the diagnosis and so to practice a chest X-Ray. Metastases to the pituitary gland are associated with a poor prognosis; the median period of survival is about 12 months [1]. Surgery to control or limit the growth of tumor may increase the period of survival to more than a year in some patients. Radiation therapy may also be used in such cases. High-dose corticosteroid therapy may help to reduce associated oedema.

**CONCLUSION**

An isolated pituitary metastasis can closely mimic a pituitary adenoma, which is far more common. Pituitary dysfunction may be the prime manifestation of a cancer. Metastasis should, thus be entertained as a possibility in patients with a hypothalamo-hypophyseal tumour, particularly after the age of 50, in order to hasten diagnosis and provide early treatment.
REFERENCES


INFORMATION

Seventh International Workshop on Resistance to Thyroid Hormone (IW-RTH)
Lyon (France)
September 19-21, 2005

A forum for the presentation and discussion of the most recent basic and clinical advances related to RTH.

For information contact: Jacques.samarut@ens-lyon.fr