Table 3. Causes of bilateral adrenal masses.

**Malignant tumors**
- Metastatic
  - Lung carcinoma
  - Breast carcinoma
  - Renal malignant tumor
  - Melanoma
  - Gastrointestinal tract

**Primary**
- Lymphoma
- Pheochromocytoma
- Adrenocortical carcinoma
- Neuroblastoma

**Endocrinopathy**
- ACTH-dependent Cushing’s syndrome.
- Macronodular adrenal hyperplasia
- Congenital adrenal hyperplasia
- Benign pheochromocytoma

**Infections**
- Tuberculosis
- Fungal infections
  - Histoplasmosis
  - Blastomycosis
  - Cryptococcosis
  - Coccioidoidomycosis

**Miscellaneous**
- Incidentaloma
- Myelolipoma
- Hemorrhage
- Amyloidosis

...to those of adrenal insufficiency reported in the present case.

Congenital adrenal hyperplasia, another condition that causes enlargement of adrenals, is usually presented in childhood. Primary endocrine lymphomas are rare clinical entities accounting for less than 3% of extranodal lymphomas and most of them involve the thyroid gland. In particular, primary adrenal lymphoma is an extremely rare condition with fewer than a hundred cases reported worldwide (83 cases up to April 2003), as opposed to secondary adrenal lymphomas which occur in about 25% of cases of B-cell lymphoma on post-mortem examination. They usually present with bilateral adrenal masses (73%) with moderate to severe adrenal enlargement (sizes ranging from 3 to 17 cm). There is a male to female ratio of about 2.2-7:1 and the mean age of appearance is 68 years.

Additionally to the classical clinical symptomatology of lymphomas, the clinical picture of adrenal insufficiency may predominate or precede the other manifestations. Patients present with fever, weight loss, abdominal pain and the symptoms of primary adrenal insufficiency fatigue, nausea, vomiting, anorexia and orthostatic hypotension. Very often a firm, non-tender mass is palpable on abdominal examination.

More than 90 percent of the adrenal tissue must be destroyed before adrenal insufficiency occurs. This is the reason that, although adrenal metastases from solid tumors are common, they rarely manifest adrenal insufficiency. However, a latent adrenal insufficiency demonstrated by an inadequate response to a cosyntropin stimulation test has been reported in 33 percent of the patients.

On the other hand, clinically apparent adrenal insufficiency is reported in about two thirds of the patients with bilateral PAL and can be present even in cases with only mild enlargement of the adrenal glands. The diffuse type of infiltration, and the complete destruction of the architecture of the adrenal glands by the lymphoma may be responsible for the increased incidence of adrenal insufficiency in PAL cases.

PAL usually appears on CT as a heterogeneous mass with areas of cystic degeneration due to necrosis or hemorrhage, in contrast to secondary adrenal lymphomas that usually appear as homogeneous solid masses.

Image guided FNA biopsy of the adrenal is the procedure of choice to establish the diagnosis, although it may sometimes be non-diagnostic due to necrotic areas, as was the case in this patient.

Histologically, 90% of primary adrenal lymphomas are of B-cells, usually large, that diffusely infiltrate the tissue.

Chemotherapy, surgery and radiation have been used in the treatment of PAL with poor results. Radiation seems to be ineffective in these cases. Chemotherapy (usually CHOP) has occasionally resulted