Tuberculosis and adrenal insufficiency: the duo continues to reveal secrets!

Abstract

Introduction: Isolated adrenal tuberculosis is rare, particularly in countries where tuberculosis remains endemic. The advent of modern imaging has made it possible to identify atypical radiological forms that can mimic tumour lesions. This clinical case illustrates the importance of a complete aetiological investigation in all cases of bilateral adrenal involvement, particularly in countries where tuberculosis is endemic.

Case study: A 75-year-old patient with no history of tuberculosis presented with symptoms of adrenal insufficiency that had been developing over a period of six months. Clinical examination revealed an asthenic, hypotensive patient with no melanoderma. Laboratory tests confirmed primary adrenal insufficiency with an 8-hour cortisol level of 52 µg/l (normal range 62 to 194 µg/dL), adrenocorticotropic hormone (ACTH) of 148 pg/ml (normal range 9-60 pg/ml), hyponatraemia of 130 mmol/l and hyperkalaemia of 7.8 mmol/l. Adrenal computed tomography (CT) revealed atypical radiological features combining nodular, calcified and pseudotumoral lesions. The diagnosis was confirmed by bacteriological testing. Treatment with hydrocortisone and anti-tuberculosis drugs led to an improvement in symptoms.

Conclusion: The combination of adrenal insufficiency and bilateral CT scan lesions, even if atypical, should raise suspicion of tuberculosis, especially in endemic areas. An integrated clinical, hormonal, radiological and microbiological approach is essential.

Keywords: Addison's disease; multifocal tuberculosis; diagnostic imaging; atypical imaging

Introduction

Isolated adrenal tuberculosis is rare, particularly in countries where tuberculosis remains endemic. Adrenal tuberculosis is the leading cause of Addison's disease, especially in developing countries [1,2].

It is essential to obtain a rapid aetiological diagnosis of Addison's disease in order to prevent patients from developing a potentially fatal adrenal crisis. Imaging methods are the cornerstone of the initial diagnosis of adrenal tuberculosis. Computed tomography plays an important role in diagnosis and follow-up [2,3].

Multifocal forms combining pulmonary, adrenal and sometimes lymph node lesions remain rare, accounting for less than 5% of cases in some series [4].

We report a clinical case of an elderly patient with adrenal insufficiency revealing multifocal tuberculosis with an atypical CT scan appearance.

Observation

This is a 75-year-old patient with a history of hypertension and diabetes, no history of tuberculosis or tuberculosis infection, a former smoker and alcoholic who quit 20 years ago.

The patient arrived at the emergency department with digestive symptoms including abdominal pain, vomiting and diarrhoea, associated with severe asthenia. He was admitted to the nephrology department for acute renal failure and underwent three haemodialysis sessions, with good improvement in renal function.

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Our opinion was sought due to the progressive worsening of generalised physical and mental asthenia in the context of a deterioration in his general condition.

The interview revealed chronic asthenia for six months, hypoglycaemic and hypotensive discomfort, polyuropolydipsic syndrome, constipation, disabling arthralgia of the lower limbs and a negative infectious history.

The clinical examination revealed a conscious patient who was pale, asthenic, hypotensive, with no signs of melanoderma or dehydration, hypoglycaemia at 0.60g/l and a body mass index of 27kg/m2.

Laboratory tests confirmed primary adrenal insufficiency with an 8-hour cortisol level of 52 µg/l (normal range 62 to 194 µg/dL), adrenocorticotropic hormone (ACTH) at 148 pg/ml (normal range 9-60 pg/mL), hyponatraemia at 130 mmol/l and hyperkalaemia at 7.8 mmol/l. The rest of the assessment noted a CRP of 26 mg/l and a glomerular filtration rate of 51 ml/min.

Adrenal CT scan revealed a heterogeneous nodular mass measuring 36x22mm on the right side, with a spontaneous density of 27 Hounsfield units (HU) and an absolute washout of 28.5%. On the left side, calcifications and an 11x12mm nodular lesion with a spontaneous density of 25 HU and an absolute washout of 12.5% were observed, leading to a diagnosis of suspicious nodular lesions (Figure 1).

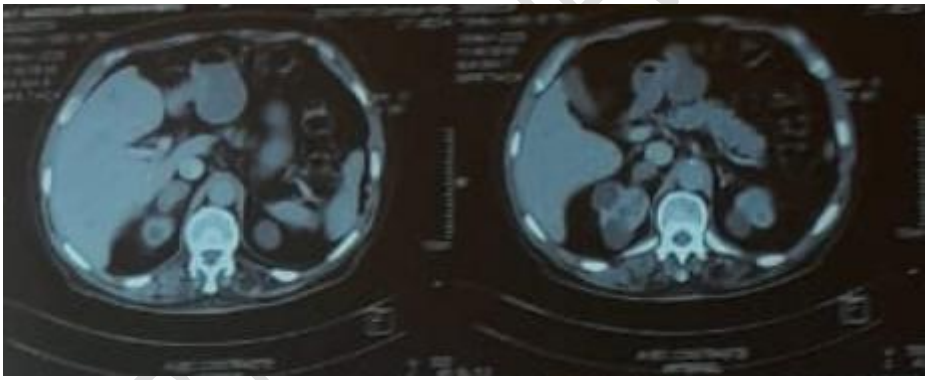


Figure 1: Adrenal CT scan showing:
On the right, a heterogeneous nodular mass measuring 36x22mm, with a spontaneous density of 27 HU and an absolute washout of 28.5%.
On the left, calcifications and an 11x12mm nodular lesion with spontaneous density at 25 HU and absolute washout of 12.5%.

Magnetic resonance imaging (MRI) of the adrenal gland refines the diagnosis, revealing a nodular formation occupying the entire right adrenal gland, with low T2 signal intensity, T1 isosignal, with signal drop on phase opposition sequences, site of peripheral diffusion restriction with progressive peripheral enhancement, measuring 21x36mm.

Left adrenal thickening with a maximum thickness of 7.5 mm, showing low signal intensity on all sequences and calcifications; conclusion: low-fat right adrenal adenoma against a background of bilateral adrenal granulomatosis (Figure 2).

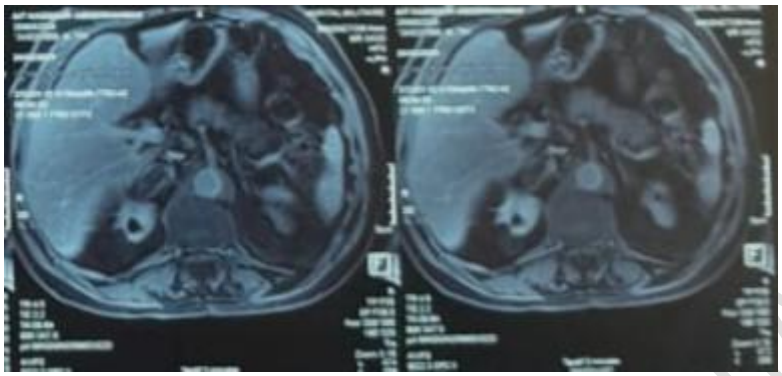
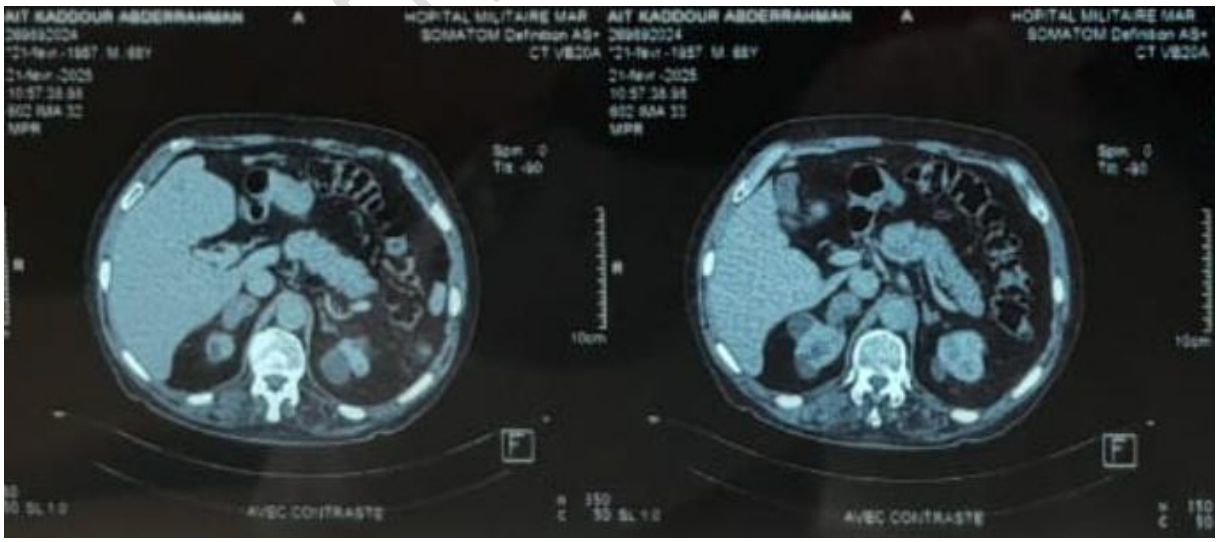


Figure 2:Adrenal MRI showing a nodular formation occupying the entire right adrenal gland, with low T2 signal, T1 isosignal, measuring 21x36mm, and left adrenal thickening with a maximum thickness of 7.5mm with low signal intensity on all sequences, showing calcifications and concluding a low-fat right adrenal adenoma against a background of bilateral adrenal granulomatosis.

The thoraco-abdominal-pelvic CT scan shows, in addition to adrenal involvement, a retractile focus of condensation in the right posterior basal pleural space associated with scattered pulmonary nodules and micronodules (Figure 3).
The hypothalamic-pituitary MRI shows no abnormalities.



. Figure 3:Thoraco-abdominal-pelvic CT scan shows, in addition to adrenal involvement, a retractile focus of condensation in the right posterior basal pleural space associated with nodules and

After these images pointed to an inflammatory and infectious process, suggestive of

granulomatosis, a GeneXpert test was performed on sputum samples and came back positive for Mycobacterium tuberculosis, leading to a diagnosis of pulmonary tuberculosis.

Treatment consisted of substitution with injectable and then oral hydrocortisone, fludrocortisone and anti-tuberculosis therapy, with favourable results: clinical improvement (good general condition and normal blood pressure) and biological improvement (correction of hydroelectrolytic disorders: sodium level at 136 mmol/l and potassium level at 3.80 mm/l).

Discussion

Addison's disease was first described by Thomas Addison in 1855. He demonstrated the destruction of the bilateral adrenal glands by tuberculosis [5]. The disease often develops over several years after an initial active or latent tuberculosis infection, predominantly in adults [3].

Classically, adrenal tuberculosis manifests as signs of slow adrenal insufficiency after destruction of more than 90% of the cortex. The advent of modern imaging has made it possible to identify atypical radiological forms with pseudotumour masses that may suggest metastases, low-fat adenomas, or other rare neoplasms. [2,3]

In our case, the absence of known infection and initial pulmonary signs illustrates the characteristic clinical latency of tuberculous adrenal disease.

Dissemination occurs via the bloodstream, and adrenal destruction is due to granulomatous infiltration followed by fibrosis and calcification [6].

Radiologically, the natural history of adrenal tuberculosis has three stages of progression [7] (Table 1).

Phase	CT scan appearance	Significance
1. Acute	Homogeneous bilateral adrenal hypertrophy, hypodense, sometimes with peripheral enhancement	Active inflammation
2. Subacute	Heterogeneous nodular masses, sometimes pseudotumoral, with necrotic foci	Parenchymal destruction
3. Chronic	Calcifications, atrophy or fibrous masses	Sequelae scars

Table 1: The three radiological stages of adrenal tuberculosis

Atypical forms combine nodular, calcified and pseudotumoral lesions, making differential diagnosis difficult with bilateral metastases, adrenal lymphoma and atypical adenomas or low-fat myelolipomas [8].

The classic features of adrenal MRI are illustrated in Table 2 [7, 9].

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Phase	MRI / Imaging	Interpretation / Appearance
Acute	Hyposignal T1 / Hypersignal T2	Caseous necrosis
Chronic	Hyposignal T2, Atrophy, Calcifications	Fibrosis, sequelae

Table 2: Classic MRI features of the different phases of adrenal tuberculosis.

The radiological features described in our observation, particularly the bilateral, heterogeneous lesions, low washout and calcifications, correspond to a subacute or chronic form, but atypical due to the presence of a pseudo-tumoural nodular appearance.

Recent studies confirm that the pseudo-tumoural phase of adrenal tuberculosis is often confused with metastasis or a low-fat adenoma:

In 2012, Yang et al. compared 25 cases of adrenal tuberculosis and 30 metastases: the tuberculous lesions had a significantly lower absolute washout (<50%) and a heterogeneous T2 signal, similar to our case. [3]

In 2014, Guo et al. showed that the presence of bilateral calcifications is highly suggestive, but late. Our patient already had a calcified left adrenal gland, indicating an advanced stage. [10]

The originality of our case lies in several factors: the patient's advanced age, atypical adrenal imaging simulating an adenoma, and microbiological confirmation of pulmonary tuberculosis. It demonstrates the need to maintain tuberculosis as a differential diagnosis for adrenal masses, even in the absence of a history of tuberculosis.

Conclusion

Adrenal tuberculosis, although rare, remains a cause to consider in any case of adrenal insufficiency associated with heterogeneous bilateral lesions, particularly in countries where tuberculosis is endemic.

Computed tomography and MRI play an important role in the diagnosis of adrenal tuberculosis. Understanding the imaging characteristics of adrenal tuberculosis is essential for guiding diagnosis and initiating prompt and essential treatment of Addison's disease secondary to adrenal tuberculosis.

An integrated clinical, hormonal, radiological and microbiological approach is essential. The prognosis depends on rapid diagnosis, appropriate hormone replacement therapy and appropriate anti-tuberculosis treatment.

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