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Case report

Nocardial adrenal abscess: CT and MR findings

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Abstract. To our knowledge, four bacterial adrenal abscesses in adults have already been reported in the international literature, but an adrenal Nocardia abscess has never been described previously. In this report the CT and MR imaging appearances and the differential diagnosis of the entity are discussed. The mass could resemble a malignancy. The observation of a rapid growth and colliquation of the mass helped in distinguishing it from a malignancy. The associated pulmonary infection provided a further clue to the diagnosis. The diagnosis was confirmed by surgery.

Key words: Adrenal Abscess – Nocardia – CT – MR imaging

Introduction

Nocardiosis is a granulomatous and suppurative infection. It may be localized or disseminated and usually results from the inhalation of the Nocardia asteroides soil spores and rarely from skin lesion contamination [1]. It usually affects immunocompromised hosts and manifests as a chronic pneumopathy. However, it may also affect healthy patients [2]. The central nervous system (CNS) is the most common extrapulmonary, metastatic site of involvement. Nevertheless, almost every organ can be involved as a secondary site of infection.

Incidental discovery of previously unsuspected adrenal masses has been reported in 0.6–1.0 % of patients undergoing abdominal CT for other reasons [3].

We report a case of a patient with a Nocardial adrenal abscess originating from a focus of pulmonary nocardiosis.

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Case report

A 49-year-old woman presented with fever (38 °C) and left flank plain. She had been affected by rheumatoid arthritis treated by corticosteroid therapy. Urine cultures were negative. Leukocytosis (18400/mm^3) and anemia (HgB 7.9 g/dl) were present. The following assays were normal: serum electrolytes, adrenocorticotropic hormone, cortisol, urinary 17-hydroxycorticosteroids, 17-ketosteroids, aldosterone, and vanillylmandelic acid. Dexamethasone suppression test was normal. A chest X-ray showed an inhomogeneous opacity with air bronchogram in the base of the right lung. Thoracic and abdominal CT confirmed the pulmonary lesion and demonstrated an oval left adrenal mass which displayed an inhomogeneous enhancement after the administration of contrast material, indicating necrosis. The spleen was also involved by the process because it showed two small hypodensities (Fig. 1). A CT-guided aspiration was performed unsuccessfully. Indeed, the histological examination revealed only some blood

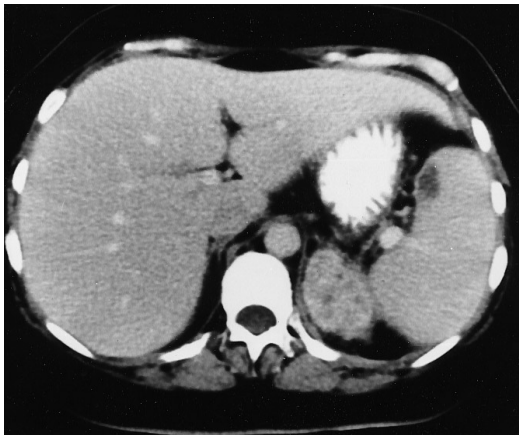

Fig. 1. Contrast-enhanced axial CT. Left adrenal mass with an inhomogeneous enhancement indicating necrosis. A small low attenuation area may also be seen in the spleen

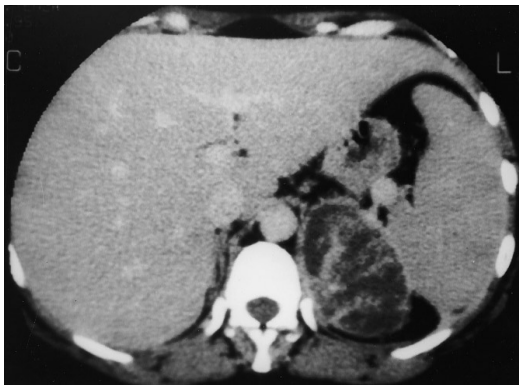

Fig. 2. Second CT examination. The left adrenal mass has become much bigger and more hypodense. Thick septations may be seen after the administration of contrast material. The renal fascia is slightly thickened

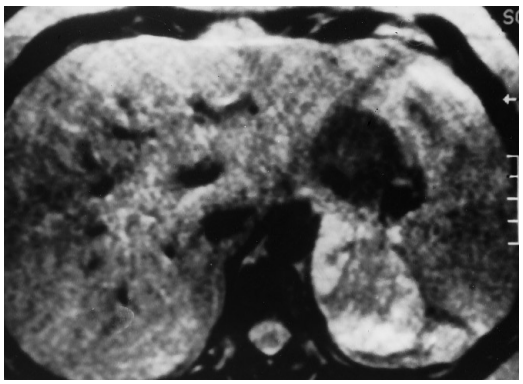

Fig. 3. Axial fast spin-echo T2-weighted MR image. The left adrenal mass has an inhomogeneous high signal intensity indicating a prevalently colliquative configuration

and inflammatory cells. Another CT exam was then performed 1 week after. The adrenal had become much bigger and more hypodense. Thick septations were seen within the mass after the administration of contrast material (Fig. 2). Moreover, an extensive involvement of the left kidney and a slight thickening of the fascia were seen.

Finally, MR imaging was performed, confirming the complex, prevalently colliquative configuration of the mass and the extensive involvement of the kidney (Fig. 3).

Diagnosis of suspicious adrenal abscess was made because of the rapid growth and colliquation of the mass, the association to a pulmonary infiltrate, and spleen involvement.

The patient underwent surgery. A left adrenalectomy and nephrectomy were performed. A necrotic–inflammatory tissue was seen in the pathological specimen of the adrenal mass. The abscess content was cultured and demonstrated the presence of Nocardia asteroides.

Trimethoprin–sulfamethoxazole therapy was instituted. The patient recovered after therapy of 3 months.

Discussion

Nocardia is often mistakenly classified as a fungus; instead, it is an aerobic, gram-positive, weakly acid fast bacterium, which grows as a fine, beaded, branching filament. It is similar to actinomyces. It is ubiquitous and lives as a saprophyte in the soil, but it is not part of the human microbic flore. Nocardiosis usually occurs in immunocompromised patients. However, it may also occur in patients with chronic disorders and rarely in the absence of any predisposing factor. Thus, nocardiosis is reported in association to kidney, heart, and liver transplantations, malignant neoplasms, systemic lupus erythematosus, tuberculosis, sarcoidosis, alveolar proteinosis, chronic obstructive pulmonary disease, asthma, bronchiectasis, diabetes mellitus, malnutrition, chronic alcoholism, and drug addiction [1, 4–6].

The lungs are usually involved with a chronic pneumopathy in 60–80 % of cases. However, nocardiosis may cause a fulminant pulmonary infection especially in immunocompromised hosts [2]. The CNS is the most common extrapulmonary metastatic site of involvement (15–44 %). Nevertheless, the brain may be a primary site of infection [7]. The skin is involved in 15–31 % of cases, the pleura and the chest wall in 8 %, the eye in 3 %, the liver in 3 %, the lymph nodes in 3 %, and practically every organ may be secondarily involved by the infection.

The disease is often lethal in the immunocompromised hosts unless early diagnosis is made and specific sulfonamide therapy is instituted [8, 9]. The overall mortality rate ranges from 30 to 56 % [1].

The diagnosis of nocardiosis is based on the demonstration of the micro-organism on the microscopic examination and the use of a peculiar culture medium is often required. Unfortunately, the growth of the cultures of Nocardia may take from 4 days to 4 weeks and can substantially delay the diagnosis and the institution of therapy. These features may explain the reason why the CT-guided aspiration was unsuccessful in our case. Furthermore, cytological specimens, obtained by fine-needle aspiration, are often clinically useful only if they reveal malignant cells. The diagnosis may remain equivocal in the absence of positive cytology especially if the lesion appears to grow rapidly or invade adjacent organs [10].

The occurrence of an adrenal abscess is very rare especially among adults [11]. Indeed, it has been mainly reported among newborns as a complication of an adrenal hemorrhage [10]. The adrenal abscess is also a possible complication of a fine-needle aspiration [12]. Nevertheless, in our experience the bioptic procedure caused only a slight thickening of the renal fascia.

In our case the patient had suffered rheumatoid arthritis for 10 years and was treated with corticosteroids. This might have lowered her immune defense and caused a following Nocardia infection.

The patient underwent the nephrectomy because of the extensive involvement of the left kidney from the abscess. Instead, the splenectomy was not performed because the two lesions of the spleen were small and the surgeon decided to treat them conservatively.

Although four bacterial abscesses affecting adult patients have already been reported in the international literature, a Nocardial adrenal abscess has never been described previously.

The mass was as hypodense as the other adrenal abscesses, but it had thick septations after the administration of contrast material, which suggested the presence of viable tissue.

Magnetic resonance imaging confirmed the complex, prevalently liquid configuration of the mass; its multiplanar capability allowed a better demonstration of renal involvement; however, MR imaging was not helpful in the differentiation of the mass from a malignancy.

The two lesions of the spleen were considered abscesses because they were next to the adrenal abscess and clinically healed after the antibiotic therapy.

In conclusion, the Nocardial abscess should be considered in the differential diagnosis of an adrenal mass in a patient with fever and immune system disorders. The observation of a rapid growth and colliquation of the mass was critical in the diagnosis of abscess and may represent a useful criterion for the differentiation from a malignancy. An associated pulmonary infection may provide a further clue to the diagnosis.

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Book review

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McCartney, J.P., Thomas-Lukes, K.M., Gomez, C.R.: Handbook of Transcranial Doppler. Berlin, Heidelberg, New York: Springer, 1997. 92 pp., 88 illustrations, (ISBN 0-387-94693-4), DM 58.00.

The first clinical application of transcranial Doppler (TCD) was the detection of vasospasm in victims of aneurysmal subarachnoid hemorrhage. Since then, the technique has been able to show aspects of other clinical disorders: detection of stenotic lesions of the arteries at the base of the brain and assessment of the patterns of collateral circulation in patients with obstructive lesions in extracranial arteries, assessment of flow velocity changes in suspected brain death, study of major supply arteries and flow patterns to large arteriovenous malformations. A new subject of intense investigation – one with potentially significant impact on the care of patients who have suffered ischemic brain events – is the capability of TCD to detect embolic arteries as they traverse the cerebral blood vessels, e. g. during carotid surgery or other interventions.

This *Handbook of Transcranial Doppler* is introduced as the only practical 'how-to' book specifically designed for the new ultrasonographer. 'Only' probably relates to the American market; similar booklets are available in Europe, albeit possibly in other languages. The simplistic progressive approach aims to aid understanding of the fundamentals of TCD.

The first chapters address the classical basics: vascular anatomy of the brain, Doppler basics and cerebral hemodynamics. These chapters are extremely well illustrated in their step-by-step approach. The bulk of the booklet (one third of the volume) is devoted to examination techniques. This part is again well illustrated and shows multiple examples of typical curves. Reading through it may leave a false impression of an easy-to-learn technique. The final part, on the interpretation process, is too short as an in-depth discussion to be of potential interest to doctors responsible for patients with cerebrovascular disorders.

The text is short and not referenced. Selected further reading is given at the end of each chapter, the majority of which dates from the late 1980s and early 1990s. This book is first and foremost a practical aid in learning and performing TCD.

R. Verhaeghe, Leuven