Abscess of adrenal gland caused by disseminated subacute Nocardia farcinata pneumonia. A case report and mini-review of the literature

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Abstract

We present one of the first cases of an adrenal gland abscess caused by subacute disseminated *Nocardia farcinata* pneumonia.

Infections caused by *N. farcinata* are uncommon and have a wide variety of clinical manifestations in immunocompetent and immunocompromised patients. Because of its unspecific symptoms and tendency to disseminate it may mimic the clinical symptoms and radiologic findings of a tumour disease and the diagnosis of nocardiosis can easily be missed because there are no characteristic symptoms.

An infection with *N. farcinica* is potentially lethal because of the aggressiveness of the bacteria, its tendency to disseminate -particularly in the brain- and its high resistance to antibiotics. Awareness of this differential diagnosis allows early and appropriate treatment to be administered.

Case presentation

Initial reason for hospitalisation of the 71 year old female patient in the department of internal medicine was an atypical pneumonia with the symptoms of low-grade fever and a cough without expectoration in combination with a progredient adynamia, a decreasing general condition, a subtile nausea and a beginning lack of concentration in the last four weeks. Relevant ancillary diagnoses were hypertension, cardiac insufficiency (NYHA II) and previous alcohol addiction.

Physical examination revealed basal crackles on both lungs, low fever (37,8°C) and a decreased general condition. Neurologic status had been without pathologic findings. Pathologic findings in basic diagnostic investigations were elevated leucocytes and C-reactive Proteine, as well as an atypical infiltration in chest x-ray (Fig. 1).

A diagnosis of atypical pneumonia was established and an empiric antibiotic treatment with Gentamycine and Ceftriaxon was initiated. Under the therapy the febril temperature and the abnormal laboratory values decreased.
First examination included an abdominal ultrasound, which showed a suspicious right-sided retrohepatic, suprarenal incidentaloma.

The computed tomography (CT) of abdomen and thorax showed a 6 cm large, central septed tumour in the right adrenal gland with infiltration of the Vena cava inferior and a 3-4 cm long intravenous thrombus inside. In addition an infiltration of the hepatic and renal capsula as well as the diaphragm was described (Fig. 2). These morphologic findings were highly suspicious of a malignant tumour.

Furthermore, CT supported the diagnosis atypical pneumonia with parenchymal infiltrations in the whole lung and partial nodular changes of the parenchyma with reactive effusion. It showed enlarged bronchopulmonary, hilar and mediastinal lymphnodes, which were interpreted as pneumonic effects.

Because of the undoubtful diagnosis of a malignant tumour the patient was transferred to our surgical clinic after recovery from pneumonia.

We excluded a systemic endocrine activity of the tumour and performed a radical in toto resection of the right adrenal gland. The intraoperative finding showed a dense adrenal mass infiltrating the surrounding tissues so that a tangential resection of the Vena cava inferior, diaphragm, retroperitoneum and Gerota’s fascia was performed. The specimen were sent for pathological analysis.

A routine chest x-ray on the ICU just after the operation showed recurrent pneumonic infiltrations, endotracheal aspirates were purulent and the material was sent for microbiological analysis. An antibiotic treatment was started with piperacillin/sulbactam.

On the third postoperative day the patient developed a distal focussed hemiparesis of the left arm, without sensitive deficiencies. On the very same day the first results of microbiological analysis of the bronchioalveolar lavage were reported. *Nocardia farcinata* had been identified.

Those findings established the diagnosis of a dissiminated Nocardia infection.

We administered an intravenous antibiotic therapy with imipenem/cilastatin and amikacin for three weeks, later we added trimethoprim-sulfamethoxazole, later for six months further just oral trimethoprim-sulfamethoxazole.

To rule out the neurological deficite a cMRI was performed which indeed showed an abscess suspicious lesions supratentorial on both sides of the brain and even more lesions occipital and left frontal, which matched with to the clinical symptoms (Fig. 3).
An aspiration or drainage were discussed, but because of the size and multiplicity of cerebral abscesses neurosurgeons favoured a non-invasive therapy.

Histology of the adrenal gland revealed a necrotic and chronic putride abscess-formation with gram-positive fusiform bacteria, in accordance with the morphology of Nocardia farcinata (Fig 4).

Under the pharmaceutical therapy and physiotherapy the neurological status improved and the patient was discharged three weeks after the operation.

**Discussion**

This case presents the surprising diagnosis of an adrenal abscess caused by *Nocardia farcinica*. Nocardiosis mimicking a malignant adrenal mass.

The presented case nicely demonstrates that Nocardia infection can easily be misdiagnosed because there are no characteristic symptoms. Furthermore, the case illustrates the difficulty to differentiate between adrenal abscess, adrenal metastasis, necrotic malign tumour and complex adrenal cysts on CT[1], although contrast CT is generally accepted as the cornerstone of adrenal imaging [2].

An infection with *N. farcinica* is potentially lethal because of the aggressiveness of the bacteria, its tendency to disseminate and its resistance to antibiotics [3].

*Nocardia species* are Gram-positive fusiform bacteria which grow worldwide in soils as well as animal tissues. There are at least thirteen species described[4]. Beside *N. asteroides* *N. farcinica* is one of the prevalent species causing nocardiosis[5], often presenting a high rate of resistance to multiple antibiotics.[6, 7]

Definite rates of pulmonary *N. farcinata* infections are not known but might not be as rare as generally assumed. Some reports indicate an increasing incidence because of a higher rate of immunodeficient patients, as well as improved techniques to identify the bacteria[8].

In a retrospective analysis of 53 cases of *N. farcinica* infection 85% of the patients had predisposing factors like malignancies, medical immunosupression e.g. steroid therapy, advanced HIV infection, diabetes mellitus, renal dysfunction, collagen vascular diseases, alcoholism, tuberculosis, preceding operations, chronic lung disease, trauma or abnormal phagocytic activity. But in 15% of the cases it occurs without underlying illness,[3, 9]
Most of the patients are between 60 and 80 years old[10] and it occurs in men three times more often than in women.[3, 11, 12]

Nocardiosis is usually acquired through the lung, but also through the integument [3, 4, 11] and possibly metastasizes hematogenously into the brain, followed by kidney, joints, bones and eyes.[3, 13] Involvement of other organs like adrenal gland is less common, in fact it is one of the first published cases of an adrenal gland’s abscess caused by a disseminated Nocardia farcinata infection.

Nocardiosis is a microbiological diagnosis. N. farcinica can be isolated in pus, sputum, bronchial secretion, biopsies, blood and urine in many culture media after two to 14 days.[9]

When pulmonary nocardiosis is diagnosed, a CT or MRT of the brain and abdomen should be considered.

Gold standard of medical treatment is trimethoprim-sulfamethoxazole, which penetrates the cerebral barrier well[14]. Sulfonamide, amikacin, imipenem, minocycline and ciprofloxacin are second line antibiotics. There is a characteristic resistance to cephalosporine for Nocardia farcinica[15-18].

Medical treatment would be based on susceptibility results. Therapy must start intravenous and can be replaced by oral therapy depending on clinical and radiological responses.

The therapy must be continued for several months because of high relapse rates. If the brain is involved therapy must last at least 12 months[12, 19], followed by monitoring for at least one year further after completion of the therapy[20]. Patients with a persisting immunodeficiency should get a prolonged therapy and a low-dose prophylaxis[21].

In addition to drug treatment larger abdominal abscess should be treated by drainage and/or radical excision. Cerebral abscesses can be excised and seem to lower the mortality of the patient compared to solitary drug treatment with or without aspiration/drainage, depending on the size and growing behaviour over time[22].

Isolated pulmonary disease has a 90 % cure rate, 63 % in disseminated disease and 50 % in those with brain abscesses.[21] Another study notes a 31 % mortality rate in individuals diagnosed with brain abscesses, rising to 55 % in the immunocompromised population.[22] Depending on the point of diagnosis, the beginning of the treatment and the resistance to antibiotics as well as secondary host factors mortality rate of cerebral abscesses may be even higher, 75% to 90%.[23, 24]
Conclusion

Because of its low incidence nocardia infections are not well known and are therefore very often not considered in the initial diagnosis.

We recommend keeping nocardia infection in mind for patients with atypical pneumonia unresponsive to empirical broad-spectrum antibiosis even in previously healthy patients, even more if they have any suspicious tumour and/or neurologic symptoms.

A delay of adequate antibiotic therapy can have serious consequences.

Furthermore, this case shows the necessity to keep the possibility of an adrenal abscess in mind as one of the differential diagnosis for adrenal incidentaloma in the presence of such clinical and diagnostical findings.
References:

**Figure legend:**

Figure 1: Chest X-ray on admission showed atypical infiltrations.

Figure 2: (A) Contrast-enhanced Coronal CT image of the abdomen shows a 6 cm large suprarenal, contrast enhancing tumour with central septed necrosis (B) Coronal image shows infiltration of the Vena cava inferior and inside a 3-4 cm long thrombus. In addition an infiltration of the hepatic and renal capsula as well as the diaphragm is shown.

Figure 3: Histological findings of the adrenal gland were a necrotic and chronic putride abscess formation with gram-positive fusiform bacteria, matching with the morphology of Nocardia farcinata.

Figure 4: Cranial axial MRI-scan showed amongst others an abscess-typical formation in the right semioval centre matching with to the clinical findings.