Case Report

Diffuse infiltration of Aspergillus hyphae in the thyroid gland with multinodular goiter

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ABSTRACT

A 35-year-old woman presented with a thyroid mass, weakness and shortness of breath of 3 years duration. On physical examination, she had a diffusely enlarged thyroid gland with multiple nodules. There were no signs to suggest immune suppression. The patient farmed and raised livestock. Biochemical tests and hemogram were normal. She underwent surgery, and a histological examination of the surgical specimen revealed nodular hyperplasia. Microscopically, silver methenamine (PASM) stain-positive hyphae that divided into branches at 45° and conidia were detected beside the thyroid capsule, with conidia in the cystic nodule. Moreover, ischemic changes of the thyroid tissue were observed closer to the capsule. We report a case of Aspergillosis of the thyroid of a patient who underwent surgery for a multinodular goiter.

KEY WORDS: Aspergillosis, immunocompetence, thyroid gland

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INTRODUCTION

Aspergillus is a genus of ubiquitous saprophytic fungi normally found in soil, decaying vegetation and dust. Although there are more than 1000 Aspergillus species, only *Aspergillus niger, A. fumigatus and A. flavus* are pathogenic.[1] Invasive Aspergillosis is a common fungal infection in patients with hematological malignancies. Because Aspergillus species are angioinvasive, they frequently disseminate from the lung to other organs via the hematogenous route. Extrapulmonary involvement occurs at an advanced stage of invasive Aspergillosis, and is ominous. We report a patient with multinodular goiter and semi-invasive Aspergillosis of the thyroid.

CASE REPORT

A 35-year-old woman presented with a thyroid mass, weakness and shortness of breath of 3 years duration. Examination revealed a diffusely enlarged thyroid gland with multiple nodules. The patient farmed and raised livestock. In December 2009, she was admitted to our hospital with an enlarging neck mass. Fine-needle aspiration (FNA) and ultrasonography were not performed.

She underwent surgery with a working diagnosis of multinodular goiter. Macroscopic examination of the surgical specimen revealed a dark brown lobulated nodular goiter with a total thyroid weight of 85 g. The two lobes measured 6 cm × 5 cm × 4 cm and 4 cm × 3 cm × 3 cm. The surface was soft and dark brown.

Microscopically, periodic acid Schiff-positive [Figure 1] and silver methenamine (PASM)-positive hyphae that divided at 45° into branches and conidia were detected next to the thyroid capsule, with conidia in the cystic nodule [Figure 2]. Moreover, focal ischemic changes in the thyroid tissues were observed. There were no multinuclear giant cells, eosinophils, microabscesses or granulomatous reaction.

The physical examination was normal, with no signs of immunosuppression. The thyroid function test results were T3 2.46 pg/ml, T4 1.14 pg/ml and TSH 40.7 μIU/ml. The hemogram was normal. Post-operative blood culture was negative for any fungal organism.

DISCUSSION

The incidence of Aspergillus infections has increased dramatically over the past decade. Hornef *et al.*[2] describe a case of involvement of thyroid gland, but the clinical features of the case were not elaborated in detail. The organ distribution of extrapulmonary Aspergillosis has been described from an autopsy study by Hori *et al.*[3]

The ability of the thyroid gland to resist infection is well known, and

infection in the thyroid gland is rare, particularly so with the advent of widespread use of antibiotics. The remarkable resistance of the thyroid gland to infection is attributed to many factors. A rich lymphatic and vascular supply, well-developed capsule and high iodine content of the gland are various mechanisms suggested to account for this relative resistance to infection.[4,5]

Fungal infection of the thyroid is extremely uncommon. Most reported fungal infections of the thyroid have occurred concurrently with systemic infections in immunocompromised hosts, some of which had a pre-existing thyroid disease.[2,6] The index case reported by Berger *et al*.[6] had no pre-existing thyroid disease; however, it was a post-LURRAT recipient with increased susceptibility to various kinds of infections. A recent review by Goldani *et al*.[7] described Aspergillus as the most common fungal infection of the thyroid.

In this case, conidia were detected next to the thyroid capsule, with conidia in the cystic nodule [Figure 3]. This feature has not been reported earlier.

Most thyroid lesions of invasive Aspergillosis are described as focal abscesses, patchy hemorrhagic lesions due to vascular invasion or diffuse necrotizing thyroiditis.[7] In patients with thyroid Aspergillosis, local inflammation and direct tissue destruction caused by invasive Aspergillosis of the thyroid can cause thyroid hormones to leak into the bloodstream, sometimes leading to thyrotoxicosis. Our patient was asymptomatic, with a T3 of 2.46 pg/ml, T4 of 1.14 pg/ml, TSH of 40.7 μIU/ml and normal hemogram.

Majority of the patients with thyroid Aspergillosis remain asymptomatic, as in our case. The thyroid node was not suspected to be mycotic clinically. The diagnosis of thyroid fungal invasion is delayed in most cases, and is usually difficult to diagnose antemortem.[3]

Extrapulmonary Aspergillosis has a high morbidity and mortality. Early recognition of these entities, prompt initiation of new, highly active antifungal therapies and adjunctive surgical management could improve the prognosis.[3] Our case was treated surgically without any antifungal therapy.

In conclusion, in our case, we found Aspergillosis in the thyroid of the patient who was operated for multinodular goiter. Our patient had no diabetes mellitus, alcoholism, past respiratory infection, immunodeficiency status and history of trauma. Clinicians should be aware of thyroidal invasion caused by Aspergillus hyphae in a healthy individual with multinodular goiter.

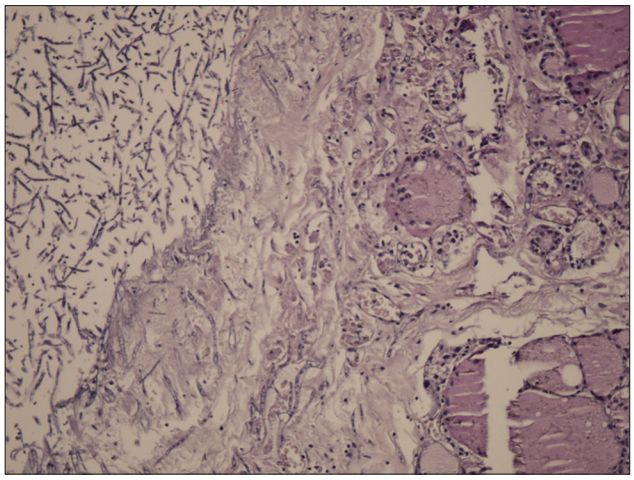

Figure 1: The histological appearance of Aspergillus hyphae with septae, branching at 45° (periodic acid Schiff, ×400)

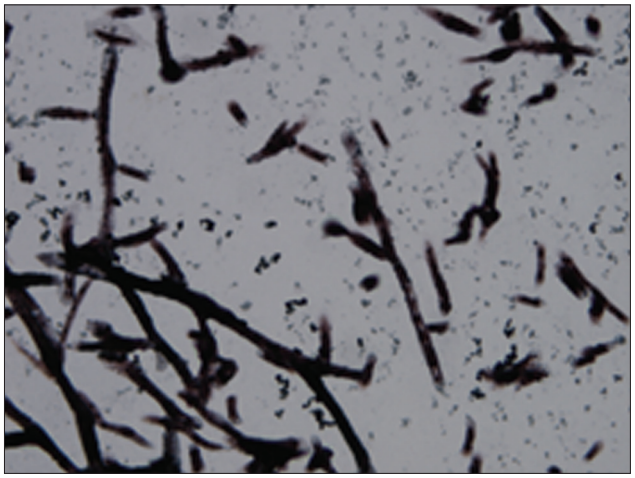

Figure 2: Aspergillus hyphae (silver methenamine, ×1000)

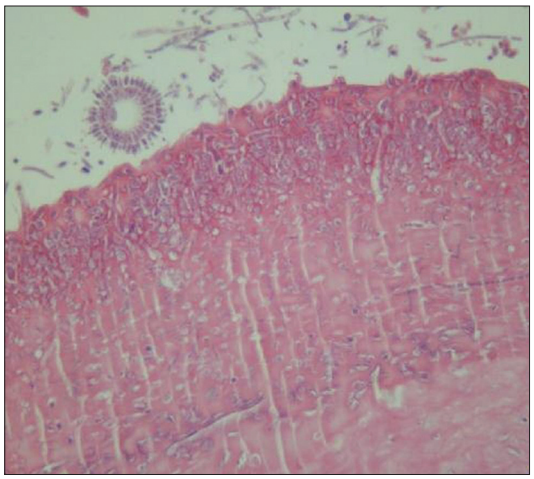

Figure 3: Aspergillus hyphae and conidia in the cystic nodule (hematoxylin and eosin, ×200)

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