Pulmonary and paranasal sinus aspergillosis
Published on 06.03.2016

DOI: 10.1594/EURORAD/CASE.13326
ISSN: 1563-4086
Section: Chest imaging
Area of Interest: Lung Ear / Nose / Throat
Procedure: Diagnostic procedure
Imaging Technique: CT-High Resolution
Imaging Technique: Conventional radiography
Special Focus: Infection Case Type: Clinical Cases
Authors: Anastasia Barth, Vincent Lenoir, Anne-Lise Hachulla
Patient: 52 years, female

Clinical History:

52-year-old woman, known for myeloid leukaemia, underwent chemotherapy and two allogeneic haematopoietic stem cell transplantations. Four months later, the patient presented with a marked pancytopenia and desaturation to 80% on ambient air.

Imaging Findings:

On the first non-enhanced chest computed-tomography (CT), nodules and masses surrounded by a halo of ground-glass attenuation were visualized (Figure 1). On the follow-up, a chest X-ray showed an increased patchy consolidations and ill-defined nodular opacities (Figure 2). On the follow-up CT scan performed 5 days later, these nodules and consolidations have increased in size, and involved now all the lobes (Figure 3 a/b). Because of obstructive nasal symptoms, a maxillo-facial CT was performed, and which confirmed a spontaneous hyperdense nodule in the paranasal sinuses, typically found in aspergillosis (Figure 4 a/b).

Discussion:

Aspergillus is a ubiquitous airborne filamentous fungus. It is inhaled by humans and is then eliminated through their mucociliary system via their internal immune mechanisms. Aspergillus development occurs in case of immunocompromised patient or in patients with airway pathology, pulmonary cavitation or asthma. There are four different patterns of pulmonary aspergillosis: allergic bronchopulmonary aspergillosis, aspergilloma, semi-invasive aspergillosis, and invasive aspergillosis. The invasive aspergillosis principally affects severely immunocompromised patients. The most common is the angioinvasive form (80% of cases). It relates to a pulmonary vasculature invasion, responsible for thrombosis, pulmonary haemorrhage and infarction. The airways invasive form (20%) is linked to the airways wall and peribronchial invasion. The acute tracheobronchitis (5%) is caused by an invasion of proximal bronchi or trachea [1-2].

The angioinvasive aspergillosis is the most severe form, due to its rapid evolution and non-specific symptoms. It affects mainly neutropenic patients after hematopoietic stem cells transplantation, during chemotherapy for leukaemia or after transplantation (heart/lungs). The severity of neutropenia as well as its duration are the main risk factors [3-4].

The clinical presentation is nonspecific symptoms such as cough, dyspnoea, chest pain, fever or haemoptysis. The disease can spread to other organs through the vascular system. Chest radiography often shows patchy segmental or lobar consolidations or multiple, ill-defined nodular opacities. Chest CT shows consolidations and nodules surrounded by ground glass opacities, defined by the “halo sign”. The
nODULES are the result of coagulation necrosis whereas the ground glass opacities are caused by alveolar haemorrhage. Pulmonary infarction and pleural effusion may also be observed [2-5]. The excavation of the nodules, called “air crescent sign”, coincides with the resolution of neutropenia. It represents the separation of necrotic and healthy parenchyma. The involvement of the nasal cavity and paranasal sinuses could be found. Acute invasive fungal sinusitis is a rapidly progressing infection, which concerns immunocompromised patients. The acute sinusitis is characterized by a hypoattenuating sinuses filling with air-fluid levels on noncontrast CT. Dense elements within those fillings are a specific sign of fungal infection. At a later stage, bone erosions could be observed resulting in intracranial, intraorbital or intracavernous extension [6]. The diagnosis is confirmed by the detection of Aspergillus antigens in serum or bronchoalveolar lavage, Aspergillus hyphae by a direct examination or DNA by PCR. Voriconazole is the treatment of choice. However, the overall mortality rate remains around 30%-50% [4].

**Differential Diagnosis List:** Angioinvasive aspergillosis, Candida infection, Wegener’s granulomatosis, Kaposi’s sarcoma

**Final Diagnosis:** Angioinvasive aspergillosis

**References:**


Description: Non-enhanced chest CT: multiple nodules (arrows) surrounded by a halo of ground-glass attenuation (halo sign), corresponding to an angioinvasive form of aspergillosis. **Origin:** Division of Radiology, University hospitals of Geneva, Geneva, Switzerland
**Figure 2**

Description: Increased consolidations (stars - Fig. 3a). **Origin:** Division of Radiology, University hospitals of Geneva, Geneva, Switzerland
**Description:** Multiples nodules surrounded by ground glass opacities (arrows - Fig 3b). **Origin:**
Division of Radiology, University hospitals of Geneva, Geneva, Switzerland
**Figure 3**

Description: Partial filling of the sinuses of the face, with air-fluid levels in support of acute sinusitis signs. Presence of spontaneously dense elements within sphenoidal and maxillary sinuses (arrows), evoking the diagnosis of invasive aspergillosis infection. **Origin:** Division of Radiology, University hospitals of Geneva, Geneva, Switzerland.
Figure 4

**Description:** Patchy consolidations and profuse ill-defined nodular opacities (arrows). **Origin:** Division of Radiology, University hospitals of Geneva, Geneva, Switzerland