Radiological aspects of pneumonias in neutropenic patients

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Introduction

An increased risk of pneumonia is connected with long-term neutropenia caused by hematological malignancies and its immunosuppressive treatment.
Imaging, such as chest X-ray and chest CT scan, plays a pioneering role in the diagnosis of immunocompromised patients with respiratory dysfunction.
Pneumonia accounts for only 10% of lower respiratory infections, and represent the first cause of infectious mortality in Western countries.
Our objective is to analyze radiographic patterns in adults with prolonged pneumonia and neutropenia

Patients & Methods

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Type of study and operating software

- Prospective
- Observational
- Descriptive
- IBM SPSS Statistics version 21

Period and location

- May 1st 2019 to February 29th 2020.
- Hematology and pediatric oncology department
- Hospital : August 20th
- Casablanca, Morocco

Patients included

- > 18 years old
- AML
- Aplastic anemia
- Allograft patients
- Febril neutropenia (PNN < 2x 109 / L)after chemotherapy
- With or without respiratory symptoms
- Research of the galactomannan antigen : 1x/week

Chest X-Rays

- Hospital admission
- Fever without respiratory signs

Chest CT Scan

- Pain on deep inspiration
- Prolonged fever not responding to antibiotics
- Positive Galactomannan antigen test (even without fever)

Results

Over this study period, 50 episodes of infectious pneumonitis occurred in 49 episodes

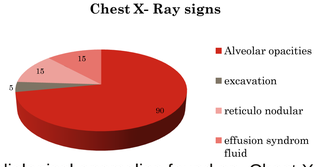


Figure 1 : Radiological anomalies found on Chest X-Rays

Radiological aspects on chest CT Scan	N	%
Condensation hearth	23	46
Micronodules	29	58
Nodules	29	58
Ground glass opacity	30	60
cavity image	5	10
Atelectasis	5	10
Reticulo-nodular infiltrates	8	16
Interstitial thickening	11	22
Halo sign	8	16
Air crescent sign	1	2
Fluid effusion	17	34
tree in bud aspect	1	2
Centrilobular emphysema	1	2
Mediastinal lymphadenopathy	15	30
Pericardial effusion	7	14

Table 1 : The different radiological aspects observed on chest CT

		N (T=22)	%
Clinical features	Fever	8	36
	Wet caugh	6	27
	Dry caugh	7	32
	Dyspnea	1	4
	Chest pain	2	9
	hemoptoid sputum	1	4
	asymptomatic	1	4
Radiological signs	Halo sign	5	23
	Condensation hearth	22	100
	Air crescent sign	1	4
	excavation	1	4

Table 2 : The clinico-radiological characteristics of patients with positive Galactomannan antigenemia.

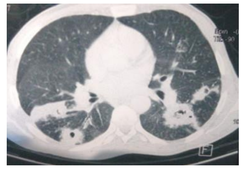


Figure 2 : Multiple excavated pulmonary nodules associated with a few foci of parenchymal condensation of interest in both lung fields
(56 years old male patient, dry cough + fever, Ag Galactomannan positive at 6.08 ng/ml)

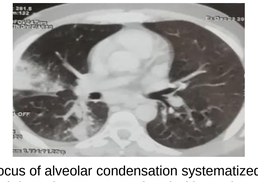


Figure 3 : Focus of alveolar condensation systematized in the right posterior segment with air bronchogram, associated with condensation and ground glass opacities in the right upper lobe.
(43 year old female patient, HSC pre-transplant, fever and dry cough, Ag GM 1.05 ng/ml)

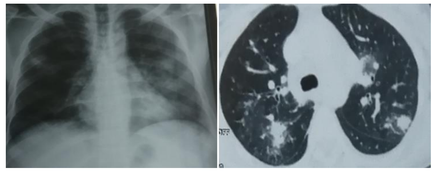


Figure 4: Comparative reading of RT and chest CT in a patient of our study.
RT: Alveolar opacities in the lower 2/3 of the left hemi thorax.
CT: Multiple foci of diffuse condensation in both lung fields associated with ground glass opacities and reticulo-micronodular infiltrates.

Discussion

In multiple series of research, thoracic CT has consistently proved its superiority to standard radiography. According to Heussel et al., 50% of neutropenic patients in his research population were neutropenic, a lung lesion that was initially undetectable on conventional radiography was discovered on chest CT.
In a study published in March 2020, if pneumonia is suspected, radiography is used in only 40% of cases, but CT is used in 76% of cases, and no imaging is used in 3% of cases before the onset of the first symptoms of pneumonia, during the first fever, and in the event of a prolonged fever.

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