Incidence of infectious lung disease in neutropenic patients

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Background

•Immunosuppression caused by hematologic malignancies can affect all cell lines.

•Profound neutropenia is the main risk factor.

•More than 60% of neutropenic patients develop a lung infection. These infections develop in 13-31% of patients during induction chemotherapy for acute myeloid leukemia (AML).

•They are associated with a significantly higher mortality rate than other infectious diseases.

•**Objective**: Deduce the incidence of infectious lung disease in our neutropenic patients.

Patients & Methods

Study	• Observational, descriptive and prospective study.
Period	• 10 months, from 01 May 2019 to 29 February 2020.
Place	• Department of hematology and pediatric oncology 20 August of Casablanca. • Protected unit (AML and aplastic anemia) and transplant unit
Patients	• Adult patients over 18 years of age • With neutropenia (a PNN count < 2x 10^9 / L)

•Patients on prophylaxis (ciprofloxacin and Fluconazole)
•Clinical suspicion of infectious pneumopathy due to the presence of functional signs, auscultatory signs, and/or fever >72 hours without documented infection.

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•Chest CT + sinus in the first 24 hours.

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•Chest CT normal: Absence of infectious pneumonia.

•Scannographic appearance of pneumonia.

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•Performance of non-invasive examinations* and bronchoscopy with BAL

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•Aggravation/ Persistence of lesions: Discussion RCP

•Negative or not feasible**

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•Treatment empirical:
▪Broad-spectrum antibiotic with an anti-pseudomonas agent
▪Voriconazole

•Positive with isolation of a microorganism

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•Treatment specific:
▪ anti-tuberculosis therapy
▪ Piperacillin-Tazobactam

** C-reactive protein, blood culture, colonization test, Cytobacteriological examination of sputum, Serum galactomannan antigenemia assay, Quantiferon, Xpert MTB/RIF test (GeneXpert ®).*
*** Bronchoalveolar lavage (BAL) is not feasible due to deep thrombocytopenia, which limits the movement of patients, or due to the non accessibility of this examination.*

Results

50 episodes of infectious lung disease/ 235 admissions

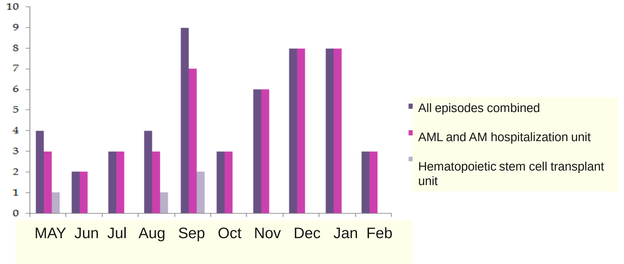
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Incidence: 21,28%

Table1: patient characteristics

Characteristics	N	%
Diagnostics:		
AML	44	88
AM	3	6
Hodgkin's lymphoma (Allogeneic HSCT)	1	2
T-ALL	1	2
acute transformation of CML	1	2
Age (Median/Range)	39 years	[19Y -64Y]
Sex: Female	25	51
Male	24	49
Duration of hospitalization (Median/Range)	35.5 days	[06D -106D]
Clinical signs :		
Fever	23	46
Cough	36	72
Chest pain	5	10
Respiratory distress	6	12
Pleural effusion syndrome	3	6
Associated infections:		
Mucositis	12	24
Skin infection	9	18
Acute otitis media	1	2
Dental abscess	1	2

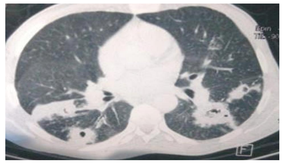
•The most frequent phase of treatment was that of Induction in AML.



•**Figure1**: Infectious lung disease rates by month and hospital unit during the study

•**Table2**: The most frequent radiological aspects observed on the patients' thoracic CT scans.

Radiological aspects	N (%)
Condensation focus	23 (46)
Micronodules	29 (58)
Nodules	29 (58)
Ground glass opacity	28 (56)
Pleural effusion	17(34)
Cavitary image	5(10)



•**Figure 2** : Multiple excavated pulmonary nodules associated with a few focuses of parenchymal condensation.
(♂, 56 years old, AML, induction, dry cough + fever, GM Ag positive at 6.08 ng/ml) Probable invasive pulmonary aspergillosis.

•**Table3:** The different microbiological examinations performed

Examination	Realization N (%)	Positive result N (%)
Cytobacteriological examination of sputum	7 episodes (14%)	0
Bronchoalveolar lavage (BAL)	9 episodes (18%)	4 (44,5%) : ▪ 2 Aspergillus spp (22%) ▪ 1 Fusarium spp (11%) ▪ 1 GeneXpert positif (11%)
GeneXpert technique	6 episodes (12%)	1 (BAL) (16,66%)
Serum galactomannan antigenemia assay	47 episodes (94%)	22 (46%)
Blood cultures	42 episodes (84%)	10 (23%): ▪ 5 Coagulase-negative Staphylococci (12%) ▪ 2 Methicillin-sensitive Staphylococcus aureus (5%) ▪ 1 Klebsiella pneumoniae Multi-R ESBL + (3%) ▪ 1 Escherichia coli BLSE+ (3%) ▪ 1 Candida pelliculosa (3%)

•Diagnostic investigations and follow-up of patients allowed us to identify the probable cause of infectious pneumopathies in 86% of cases.

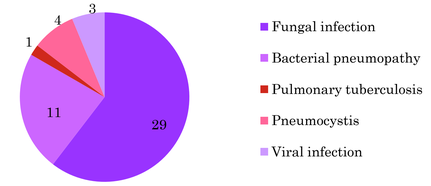


Figure3: Highly probable etiological diagnosis

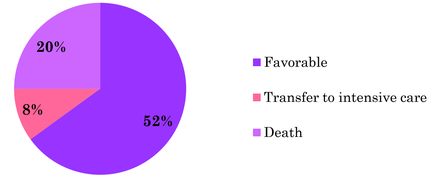


Figure 4: The evolution of patients with infectious lung disease

Conclusion

•The review of the literature has shown that the incidence rate of pneumonia during neutropenia was variable between 14% and 30%, and the etiological diagnosis is not always possible during these infections, the treatment is essentially empirical with a terrible prognosis.

References

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2.Khawaja F et al, Respiratory syncytial virus in hematopoietic cell transplant recipients and patients with hematologic malignancies. Haematologica. 2019;104(7):1322-1331.