Interstitial syndrome

Ground-glass attenuation
Miliary and nodular images
linear images

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Acinus and primary lobule
1 Terminal bronchiol; 2,3,4. respiratory bronchioli (BR1, BR2, BR3); 5. alveolar canal; 6. alveola sac; 7. alveola.

There are 14 divisions between the trachea and terminal bronchiol

Lobule: morphological unit.
Dimension: 10 to 25 mm.
It is composed of 3 to 5 acini (functional unit) (7.5 mm); 30 to 50 primary lobules (0.5 to 1 mm).
1 et 1'. centrolobular Bronchiol and artery;
2. terminal bronchiol and artery;
3. respiratory bronchiol;
4. canal;
5. sac;
6. alveolar;
7. perilobular vena and lymphatic vessels.
• The different parts of intersticial tissue:
  
  – Intra-lobular tissue
  – Peri-lobular tissue
  – Under-pleural tissue
  – Axial or peri-broncho vascular tissue

(according to Dr. Bernadac)
• The different parts of interstitial tissue:

  – Intra-lobular

(according to Pr. Bernadac)
Intra-lobular interstitial tissue images:

- Ground glass attenuation
- Miliary: micronodules <3mm
- Nodules: between 3 and 7 mm
- Macronodules > 7mm
Ground glass attenuation

Easy to recognise on scanner, it is more difficult on CXR
Ground glass attenuation
Main etiologies:

- Cardiac failure (initial phase before alveolar oedema)
- Viral or atypical bacterial infections
- Lymphoma, haemopatologic malignancies….
- **Pneumocystosis**
Pneumocystosis: one of the main opportunistic lung diseases in AIDS cases
Ground glass attenuation:
pneumocystosis
Man, HIV+ severe dyspnea, normal auscultation, SaO2 86%.

It is a pneumocystis.

CXR features in acute phase:
- Ground glass attenuation and/or alveolar pictures
- Diffuse and bilateral picture
- No retraction, no systematisation
Improvement after 3 weeks of treatment with cotrimoxazole.
Miliary: diffuse micronodules < 3mm

Easy to recognise on scanner, it is more difficult on CXR
It can be difficult to distinguish miliary from ground glass attenuation...
miliary

Ground glass attenuation
Miliary is sometimes barely visible
And sometimes the diagnosis is obvious...
M, 68 y African, t° 40°C, weight loss, dyspnea, miliary left predominant, AFB negative in sputum

AFB+ in bronchial aspiration. Note the asymmetry of the miliary
M, 25 years old  
Non-productive cough  
T° 39°C  
Dyspnea with effort  
AFB – in sputum  

**Miliary.**  
Improvement with anti-TB treatment
Man, 30 years old, non-smoker, dyspnea and cough progressively increasing.
2 chest x-ray with 2-month interval. AFB -

In countries with high incidence, TB is the most probable diagnosis,
But it could be also a sarcoïdosis
Man, 53 years old, refugee from Mauritania. Cough and worsening condition. AFB neg. Headache (notice the unequal size of nodules which is unusual in TB miliary)
Previous case: carcinomatous miliary with metastatic adenopathies, bone and brain metastasis
Woman, 20y
HIV+
Cough, dyspnea,
t° 38°5C
Miliary

AFB -

BAL: Histoplasmosis
Diagnostic of miliary:

- Requires an excellent quality CXR and very attentive analysis by the physician. Negatoscope.
- Pictures often barely visible, in contrast with the importance of general signs (asthenia, dyspnea, fever, weight loss) in case of TB.
- AFB in sputum is usually negative.

The primary diagnosis is TB.

Main differential diagnosis (miliary and nodules < 7mm) are:

- Fungal infection, particularly in cases of AIDS, (histoplasmosis, cryptococcosis, ...)
- Sarcoidosis (incidence in your countries ?)
- Carcinomatosis miliary
- Pneumoconiosis (probably frequent in your countries / Mines)
- Auto-immune affection, haemotologic malignancies, immuno-allergic pneumopathy...
In countries with high incidence of TB and HIV, if X-ray shows miliary pattern

- First diagnostic suspect is TB
- If not clinical response after 3 weeks of treatment, in PLHIV, consider adding anti-fungal treatment
- BUT DO NOT INTERRUPT TB TREATMENT!
- Among PLHIV, if severe clinical picture with X-ray ground glass attenuation picture and hypoxemia, consider PCP and start treatment
Nodules
Main etiologies of diffused nodules >7mm

- **Tuberculosis**
- **Pulmonary metastasis**

Less frequent etiologies:
- silicosis
- sarcoidosis
- lymphoma
- fungal infection
- multiple abcesses by septic emboly
- hydatid cyst
- bronchiolo-alveolar cancer and multiple bronchial cancers
- vascularitis, Wegener, auto-immune disease, histiocytosis…
Man, 55 years old
Antecedent of left pleural effusion
Hemoptoic sputum
AFB+
Notice the excavation. This explains why this patient is AFB positive.
Woman 55 years old, cough and dyspnea with effort. Tobacco >1 pack/day
Bronchial adenocarcinoma with lung metastasis
Bronchial carcinoma with carcinomatous miliary
Lung metastasis (uterus leiomyosarcoma)
Man, 65 years old, Asthenia, no respiratory symptoms except light cough. Antecedent of rectal cancer treated by surgery…
Chest radio 6 months later
Balloon release: pulmonary metastasis of rectum cancer
Silicosis in an older mineworker
Silicosis in an older mineworker
The different parts of intestinal tissue:

- Under-pleural tissue
- Axial tissue
- Peri-lobular tissue
- Intra-lobular tissue

(according to Pr. Bernadac)
The pathology of under-pleural tissue is characterized by linear images called Kerley A or B lines.
Kerley lines: main etiologies

- Cardiac failure (B kerley lines)
- Viral infections

- Less frequent:
  - carcinomatous lymphangitis
  - Fibrosis, regardless of the etiology (toxic, auto-immune, allergic, idiopathic..)
  - pneumoconiosis
  - haemopathy
  - …
The different parts of interstitial tissue:

- Peri-lobular tissue

(according to Pr. Bernadac)
The increasing thickness of the peri-lobular septa and their intersection produce reticular opacities which line polyedric spaces: «Meshed net» aspect.

The main etiology is pulmonary fibrosis, regardless of the etiology (idiopathic, toxic, autoimmune...).
Idiopathic fibrosis
Idiopathic fibrosis
The different parts of interstitial tissue:

- Axial or peribronchovascular tissue

(according to Dr. Bernadac)
The pathology of peri-bronchovascular tissue is characterised by linear opacities from the hilus to the periphery of the lungs. Main etiologies are:

- Carcinomatous lymphangitis
- Fibrosis regardless of the etiology (idiopathic, autoimmune, allergic, toxic)
- Sarcoidosis
- Viral and fungal infection

The association of nodular and linear images is highly suggestive of carcinomatous lymphangitis.
Man, 60 years old. Dyspnea with effort, poor condition and jaundice.

The association of nodular and linear images suggests in this context a carcinomatous lymphangitis (pancreatic origin).
Previous case
Conclusions

- The Interstitial pathology is complicated
- The etiologies are numerous
- The intrication with alveolar pictures is frequent (cardiac failure, TB, infections..)
- The interpretation requires a very good quality chest radiography (especially for miliary)
- CT scan is much more performant but not always easily accessible