Interstitial lung diseases are a group of more than 200 different diseases, characterised by a mixture of inflammation and fibrosis. These can be classified in many different ways. In the latest classification [1] these disorders are classified in entities such as pulmonary alveolar proteinosis, lymphangioleiomyomatosis. Next to this there is a group of disorders called granulomatous lung diseases with main representative sarcoidosis and infections such as mycobacterial infections. The other forms are divided into those with known causes and what is left are called idiopathic interstitial pneumonias. This last group of diseases comprises idiopathic pulmonary fibrosis (IPF). Occupational and drug induced lung disease are part of the group of diseases with known cause, next to ILD secondary to underlying connective tissue diseases. This presentation will deal mainly with those interstitial lung diseases caused by occupational or drug exposure. It is difficult to differentiate these disorders as interstitial lung diseases are a very large group of lung diseases with a limited amount of radiologic and histopathologic patterns. Therefor if suspicion of an idiopathic interstitial pneumonia, an underlying cause (connective tissue disease) a thorough investigation is warranted [2]. An extensive history is mandatory in every patient with suspected interstitial lung disease. Exposures can originate from home, but also from hobby’s or occupational exposures. Another important cause is drug induced lung disease. So an extensive drug history is mandatory, this should include current drugs, but also drugs initiated (just) before the initiation of the very first symptoms. Patterns on radiology that require further attention are atypical patterns, but also more common patterns such as NSIP, HP are still possible to be seen in an occupation disease, or in relation with a drug induced lung disease. One of the problems is that histopathology is not always helpful in making a diagnosis of occupational or drug induced lung disease nor in excluding it. We will further divide the text in occupational lung diseases and drug induced interstitial lung diseases.

**Occupational lung diseases**

All ILDs have similar pathophysiology and are characterised by progressive fibrotic changes, structural abnormalities, and common physiology. The result of these different disorders is rather similar: progressive scarring of the lung and gradual loss of function. The term “occupational ILD” groups these ILDs that are thought to be related to occupational exposure(s) [3]. According to the

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**AIMS**

- Discovery of occupational lung diseases
- Discovery of drug induced lung diseases
- When to consider this next to other diagnoses
- Frequent agents to consider

**SUMMARY**

Interstitial lung diseases are a group of more than 200 different diseases, characterised by a mixture of inflammation and fibrosis. These can be classified in many different ways. In the latest classification [1] these disorders are classified in entities such as pulmonary alveolar proteinosis, lymphangioleiomyomatosis. Next to this there is a group of disorders called granulomatous lung diseases with main representative sarcoidosis and infections such as mycobacterial infections. The other forms are divided into those with known causes and what is left are called idiopathic interstitial pneumonias. This last group of diseases comprises idiopathic pulmonary fibrosis (IPF). Occupational and drug induced lung disease are part of the group of diseases with known cause, next to ILD secondary to underlying connective tissue diseases. This presentation will deal mainly with those interstitial lung diseases caused by occupational or drug exposure. It is difficult to differentiate these disorders as interstitial lung diseases are a very large group of lung diseases with a limited amount of radiologic and histopathologic patterns. Therefor if suspicion of an idiopathic interstitial pneumonia, an underlying cause (connective tissue disease) a thorough investigation is warranted [2]. An extensive history is mandatory in every patient with suspected interstitial lung disease. Exposures can originate from home, but also from hobby’s or occupational exposures. Another important cause is drug induced lung disease. So an extensive drug history is mandatory, this should include current drugs, but also drugs initiated (just) before the initiation of the very first symptoms. Patterns on radiology that require further attention are atypical patterns, but also more common patterns such as NSIP, HP are still possible to be seen in an occupation disease, or in relation with a drug induced lung disease. One of the problems is that histopathology is not always helpful in making a diagnosis of occupational or drug induced lung disease nor in excluding it. We will further divide the text in occupational lung diseases and drug induced interstitial lung diseases.
National Occupational Exposure Survey, millions of US workers are potentially exposed to substances known to cause occupational ILD. Theoretically the occupationally related ILDs fall into four (often clinically overlapping) categories: pneumoconiosis, hypersensitivity pneumonitis, other granulomatous or diffuse interstitial fibrosis. Another way how you can look at these diseases is starting from the exogenous agents. These can be divided in biological agents, mineral dusts and fibres, metallic agents and newly recognised occupational causes of ILD.

**Biological agents**

Biological agents most often cause hypersensitivity pneumonitis. Hypersensitivity pneumonitis (HP), is a syndrome characterized by a combination of inflammation and fibrosis located in both the airways and the lung parenchyma [4]. This disease entity is a challenge for the physician as there are many pitfalls at different levels from diagnosis to treatment [5]. Clinical presentation might be extremely variable even as the nature of the causal antigen. Different forms are acute, subacute and chronic HP. Determining the cause is crucial as avoidance is the first rule in treatment. Classical causes of HP are pigeon breeders lung, or bird fanciers lung. Less known types might be metal workers fluid which contain microbiological contamination [6].

**Mineral dusts and fibres**

Mineral dust-induced respiratory disease is dependent on the quantity of dust inhaled and the size of the dust particles inhaled. The smaller the particles the deeper the penetration in the lung. Dust or fibres may cause pneumoconiosis. Well known examples are silicosis and asbestosis. Histopathologically, asbestosis and UIP-IPF have similar features, however the natural behavior of the two conditions is significantly different. Another important issue might be a possible compensation for asbestosis, underscoring the need for accurate differentiation.

In 2004 asbestosis guidelines were published [7] stating that 1) pathological changes in asbestos related diseases shown in radiological and pathological results agree with morphological findings, 2) findings suggesting asbestos inhalation such as pleural plaque and asbestos exposure in the occupational history and asbestos particle detection on the basis of asbestos inhalation, and 3) discrimination from other diseases that are the cause of the detected morphological abnormalities. In early asbestosis, the fibrosing process is limited to the alveoli around the bronchioles. From this fibrosis extends until it ultimately links adjacent bronchioles; at which time, the initial, predominantly peribronchiolar pattern of fibrosis may no longer be evident [8].

Furthermore histologic evidence of asbestos inhalation is provided by the identification of asbestos bodies either lying freely in the air spaces or embedded in the interstitial fibrosis. Asbestos bodies are distinguished from other ferruginous bodies by their thin, transparent core. Two or more asbestos bodies per square centimeter of a 5-mm thick lung section, in combination with interstitial fibrosis of the appropriate pattern, are indicative of asbestosis. In addition quantification of asbestos load may be performed on lung digests or bronchoalveolar lavage material.

**Metallic agents**

Several metals might cause occupational ILD. Metal might be found pure, or in alloys. A well-known occupational lung disease is Beryllium lung disease. Important is to find out exact exposure, as Beryllium is only used in very specific industrial applications such as aerospace, dental applications…

**Newly recognised occupational causes of ILD**

There are many newly recognised occupational lung disease might be indium lung. This agent has been rarely used in the nineties (only bearing and nuclear reactor compounds. But more recently it is highly used in LCD screens [9]. Another example is popcorn flavouring lung, where workers were exposed to high levels of diacetyl in food flavouring [10]. Prevention is key in the treatment of...
occupational induced by limiting exposure. This can only happen when the disease and adjacent cause is identified.

Drug-induced lung diseases

What has been indicated for occupational lung disease accounts also for drug induced lung disease. Almost any patient presenting with ILD might have drug-induced ILD. Almost every pattern seen on radiology or histopathology. Almost every drug can induce drug-induced lung disease. An extremely valuable help in the challenge to diagnose these disorders is the website www.pneumotox.com started by the group of Philippe Camus of the Department of Pulmonary Medicine and Intensive Care University Hospital Dijon in France.

Many different patterns can be associated with drug induced lung disease [11]. A pattern of organising pneumonia can be associated with minocycline, but also methotrexate, nitrofurantoin or other agents. A pattern of HP can be seen interferon-alfa, phenytoin and many others. A pattern of eosinophilic pneumonia can be seen in amiodarone induced lung disease, cocaine.

Identification of a potential agent is challenging [12]. Important in diagnosis is a tiem frame between exposure and the start of the symptoms: should be in general weeks or months after the start of treatment. Critical for drug-induced lung diseases is the improvement after cessation of the drug, if no improvement, the diagnosis should be reconsidered. Often in the context of an oncological treatment several drugs might be suspected, than choosing the right one is challenging [13].

REFERENCES


**EVALUATION**

1. Which of the following patterns can never be seen in occupational lung disease?
   a. Hypersensitivity pneumonitis
   b. Non specific interstitial pneumonia
   c. Usual interstitial pneumonia
   d. Organising pneumonia
   e. None of the above

Answer E

2. Which is the best treatment for occupational lung diseases
   a. corticosteroids
   b. prevention
   c. antifibrotics
   d. prevention is key, if needed consider corticosteroids

Answer D

3. In your opinion which answer is correct? What is the best approach for drug-induced lung diseases?
   a. Think of it in atypical patterns on HRCT
   b. Only drugs mentioned on www.pneumotox.com can induce
   c. Only if specific abnormalities are seen on histopathology
   d. In every patient presenting with some form of ILD drug-induced ILD should be excluded

Answer D