

وَقُلْ رَبِّ زِدْنِي عِلْمًا



RESPIRATORY SYSTEM

HAYAT BATCH



SUBJECT : Community

LEC NO. : Two / occupational lung disease

DONE BY : Anas zakarneh



بِسْمِ اللّٰهِ الرَّحْمٰنِ الرَّحِیْمِ

هسا بدنا نبليش بbranch ثاني من الcommunity اللي هو occupational lung disease راح ناخذ أمثلة عليه و نفرق بينهم و نشوف شو المميز بكل مرض مثلا وين مكان شغل المريض عشان أتوقع شو هو المرض و ممكن نستخدم الX-ray



An overview of

Occupational lung diseases



Dr. Omnia Elmahdy

2-Environmental measures

1. **Containment:** (prevention of escape of toxic substances into the ambient air). by placing a barrier between the hazard source and the work environment . Containment can be achieved by a variety of engineering methods such as **air cleaning device** and **exhaust fan**.



2. **Replacement:** E.g. reduce lead in petrol, use more **renewable energy**, **electric cars**, **natural gas**.



هسا آخر سلايد بالمحااضرة الماضية حكينا عن انو ممكن نعمل containment و replacement للمواد الضاره في air pollution هاظ الحكي كله ممكن ينفع بالwork environment طبعاً .. مثلاً ممكن اعمل containment بحيث يكون في air filter /exhaust fans جوا المصنع مثلاً بحيث انو ما يتعرض هاظ الworker للمواد الضاره من هاي الصناعات ... كمان ممكن اعمل replacement بحيث لو في عندي مادة خطيره باستبدالها بمادة اقل خطوره بس تعطيني the same result in the end

و ممكن اعمل protection and isolation لل worker عن طريق أني افرض تعليمات معينة مثلاً

انو كل عامل في المصنع الفلاني لازم يلبس mask / protective gloves / helmet / goggles حسب الخطر اللي يكون معرضه هاظ العامل لازم يلبس uniform معين

يعني بالنهاية الهدف من occupational health إنني أحافظ على الhealth and well being of the worker بكل اشكالها سواء physical/ mental/ social وغيره

طب الصناعات

Occupational health is concerned with the health of the **workers** as well as the work **environment**



Aims of occupational health

1. **Promotion and maintenance** of highest degree of physical, mental and social **wellbeing** of workers.
2. **Prevention of health hazards** and **protection of workers risks** that may arise due to occupational exposures.
3. **Proper selection of worker** to fit the worker for proper job.
4. Achieving **highest productivity**.

A- Pneumoconiosis

B- Occupational Bronchial Asthma

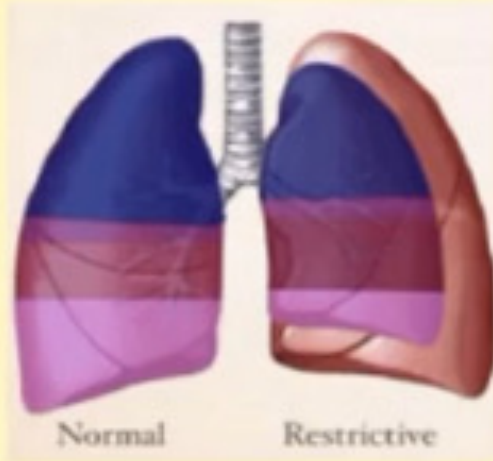
٢) بالنقطة الثانية بعمل prevention of health hazards and protection of workers risk هاظ المصنع مش بس معرض لغبار و مواد ضاره لا تنسى انو بتعامل مع machines اللي ممكن تعملو إصابة خطيره او حتى death فلانم يكون عندي protection and safety بدرجة منيحة

٣) ضع الشخص المناسب في العمل المناسب مثلاً عندي عامل يشتغل على آلة معينة ما بروح بويه على آلة جديدة من غير ما ادربه عليها لفته منيحة و كافية

٤) هسا بالآخر حماية العمال هدفها أحقق إنتاجية عالية بحيث انو حمايتهم بخليهم يكونو منتظمين بالعمل و بقلل غيابهم عن العمل و ما يكون عندهم اداء ضعيف فبزيد الإنتاجية زي ما حكينا

راح نوضح اليوم نوعين من الأمراض تحت كل واحد في كمان نوعين
برضو لازم و أنت بتدرس تقارن بيناتهم و تقدر تفرق بينهم

A- Pneumoconiosis



Restrictive disorders

Reduction in lung volume

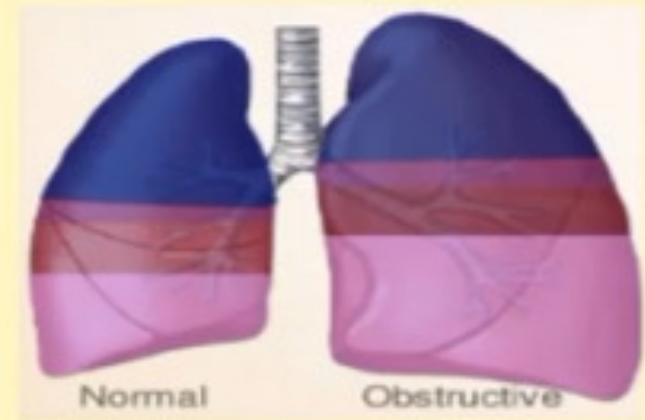
Difficulty inhaling

Increased tissue

Due to stiffness of lung tissue/chest wall

هون في عنا fibrous tissue
كثير فبعمل restriction
ال lung volume قليل
مثل pneumoconiosis اللي
حناخه اليوم

B- Occupational Bronchial Asthma



Obstructive disorders

Reduction in airflow

Difficulty exhaling

Shortness of breath

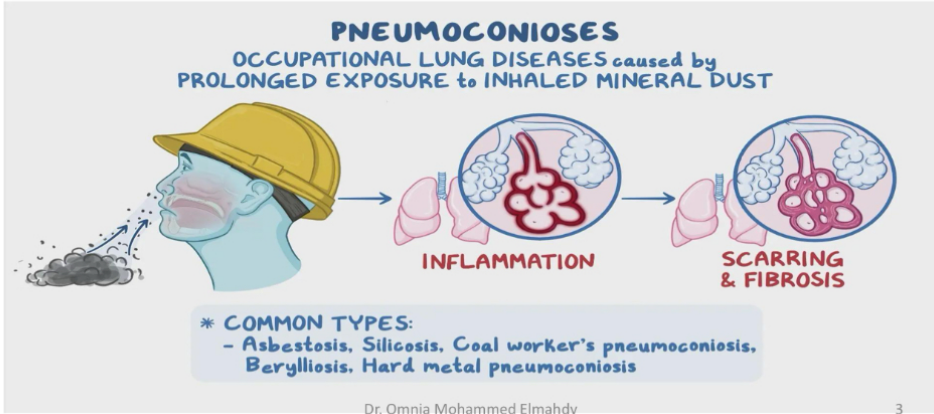
Destruction of tissue

Air remains inside after full expiration

هون يكون عندي مشكله بنفس
ال airway فبكون في عندي allergy
ال bronchial asthma فبصير
بال airways تضيق فما بتعرف الرئة
تفرغ كل الهواء اللي فيها بالتالي بكون
حجمها

A- Pneumoconiosis

Group of occupational lung diseases which occurs due to **inhalation of dust, retention and reaction around such dust**. The primary pneumoconioses are **asbestosis** and **silicosis**



هسا يا سيدي العزيز خلينا نبليش بأول نوع

Pneumoconiosis

بكون في عندي عامل مصنع مثلا بعمل inhalation ل dust معين بيبتج من صناعة معينة فبعد ما يتنفسه هاض العامل بتكون
حول inflammation حولين هاض ال dust بالنهاية بصير عندي scarring and fibrosis

اشهر اثنين همي asbestosis and silicosis

راح ناخذ بكل واحد شو السبب و شو ال dust اللي بتعرض لها الشخص

هسا ال symptoms and sign راح يكونو نفس بعض للمريضين معناته لازم يكون في demarcation بكون مهم في
occupational lung disease and history

مثلا وين بشتغل

هسا العمال ببداية عملهم بالمصنع لازم نعمل اشئ اسمه pre employed examinations

عشان اتأكد انو ال condition تبعته منيحة و طول ما احنا ماشيين بضل اعمل ال examination

بحيث لو حصل أي مشكله أصير اقدر اقدم الو علاج و اكتشف شو ادى إلى هاي المشكله

هسا اللي بفرق بين asbestosis and silicosis بدرجة كبيره هو ال chest x-ray

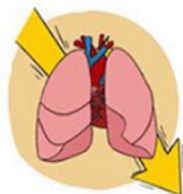
معناته باختصار حتى افرق بين الاثنين بدي اعرف اولاً وين بشتغل هاض الشخص

بعدين اعمل x- ray findings

Common manifestations Of Pneumoconiosis



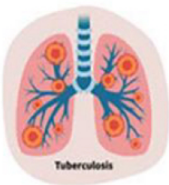
Affect activities of
daily living



Decrease heart and
lung function



Increase risk of
lung cancer



More susceptible to
infectious disease



Loss ability of work



Family burden



May lead to death

1- Silicosis

مش obstructive بسيط

- **Def.;** Occupational fibrotic restrictive lung disease, due to inhalation of **silica dust** (SiO_2)
- **Source;** اللي بشتغلو بتكسير الحجاره
 - ✓ Stone cutting
 - ✓ Construction
 - ✓ Ceramic industry
 - ✓ Glass industry.
 - ✓ Pottery manufacturing



صناعة الفخار

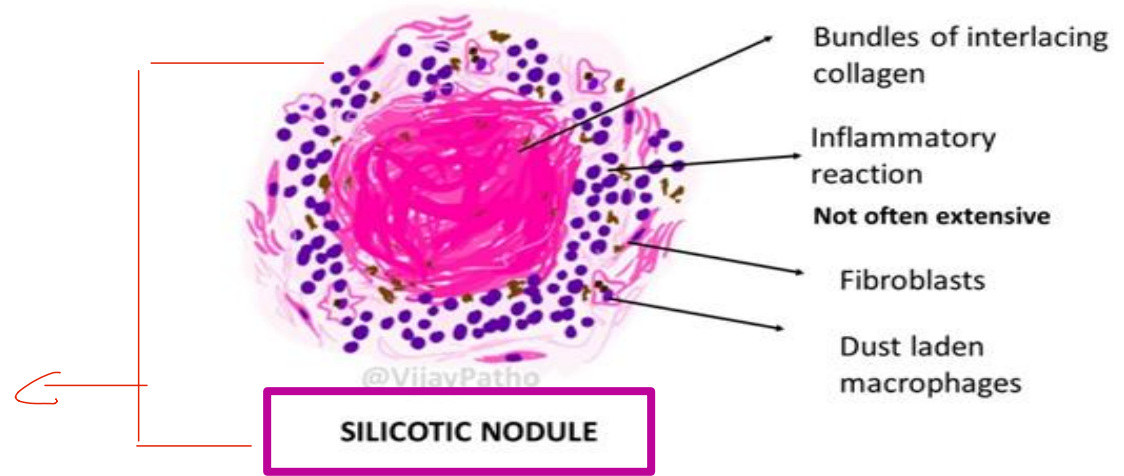
بالنسبة للدكتور مش كثير مهم ال pathogenesis بس اللي بهمك انو بهاض المرض بتكون اشبي اسمه silicotic nidule

• Pathogenesis;

The prevalence & severity of the disease is determined by the intensity of exposure to free silica dust. This may be due to:

- ✓ Mechanical irritation
- ✓ Chemical irritation
- ✓ Immunological reaction

لو تطلع هون بتلاحظ انو ال silica جوا و حوليها collagen and inflammatory reaction الخ إلى آخره.



• Complications;

* **T.B:** The incidence of tuberculosis in patients with **silicosis** is **21.8 times higher** than that recorded in the general population. هون الفرق بين المرضين ... ممكن تلاقي TB مع مريض ال silicosis

* **Lung cancer** → In both asbestosis and silicosis

* **Super infection** especially fungal infections.

Pathology;

عشان هيك حكينا عن الnodule فوق

• **Nodular fibrosis**

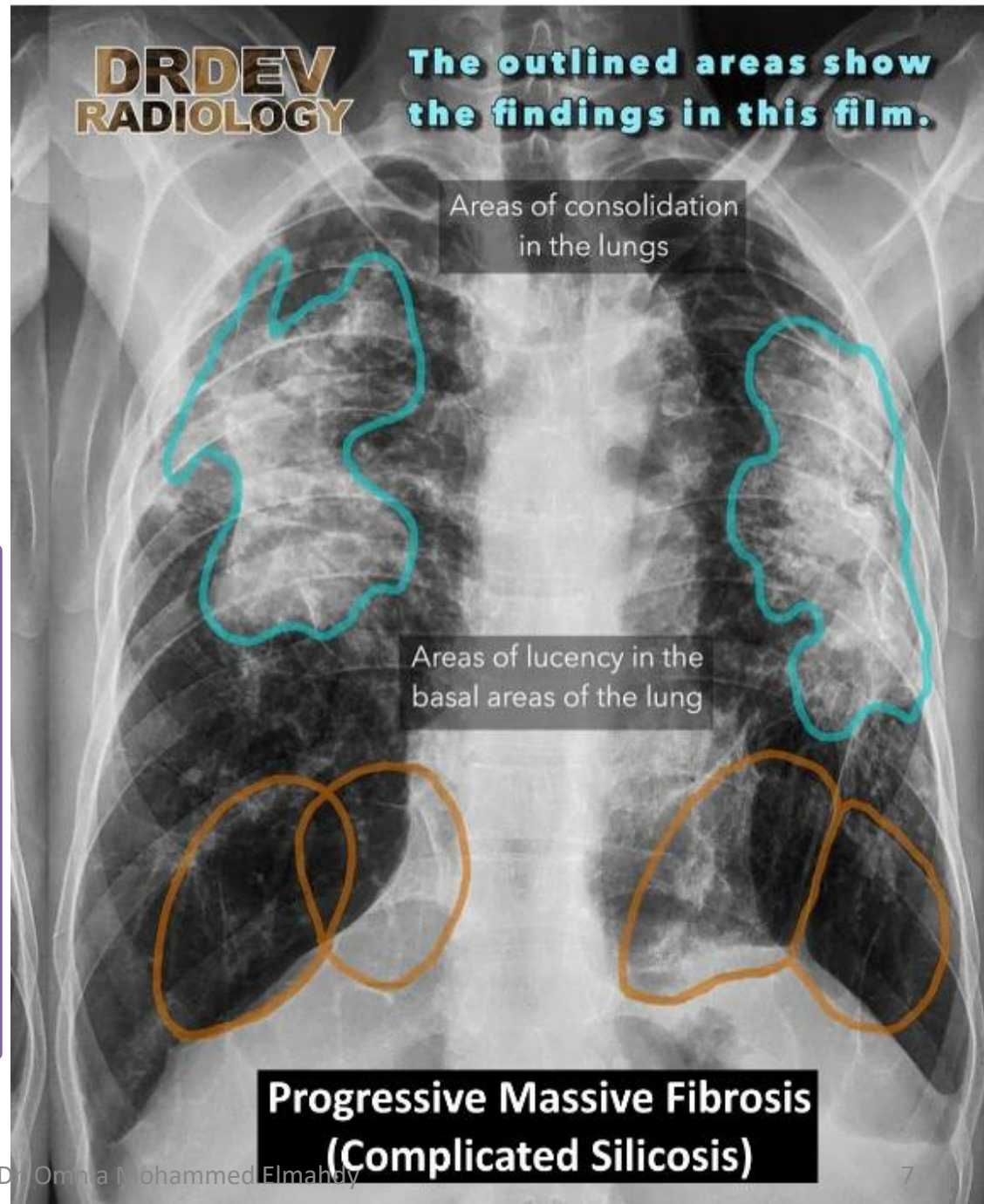
- Calcification
- The pathological lesions characteristics are:

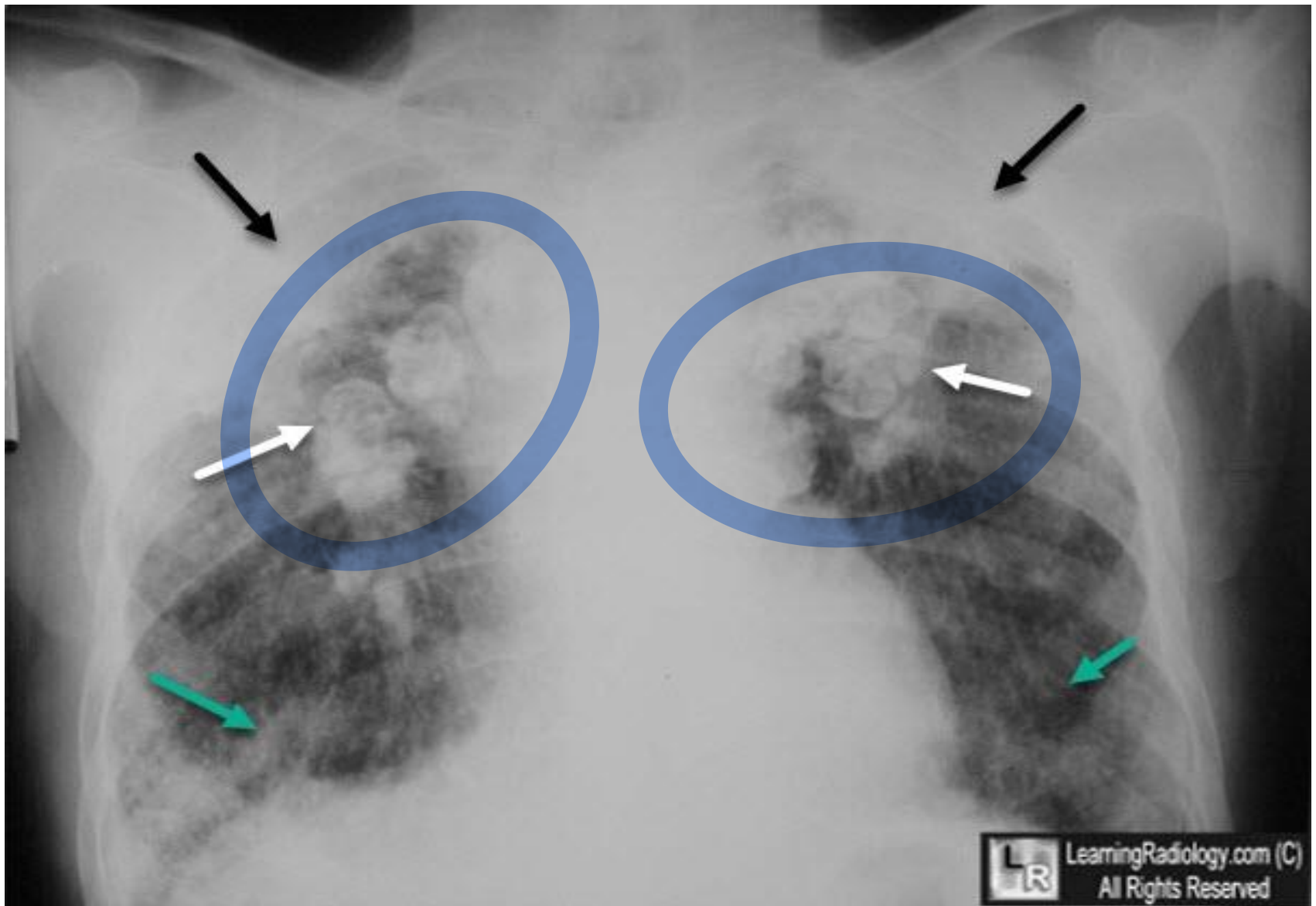
bilateral, found in **upper lung lobes**.

شو بنشوف بالx-ray

Chest X-ray; according to severity

bilateral fine **nodular** opacities in **upper part** of the lung in the early stage and **egg shell calcification** of hilar L.N





هاض المنظر اللي قدامك اسمه

egg shell calcification
of hilar L.N

باعتبر اشفي ممكن عن طريقه بحدد ال silicosis

ملاحظة الدكتور ممكن تجيب صورته ال x-ray عشان تعرف
ال diagnosis

Dr. Omnia Mohammed Elmahdy

2- Asbestosis

ركزلي على اللي بحدودو.

- Def.; Occupational fibrotic restrictive lung disease due to inhalation of asbestos fibers

- Source; صناعة مكابح السيارات

✓ Car brakes manufacturing.

✓ Clothes & gloves for oven
بمعنى المواد و الملابس المقاومة للحرارة

✓ Workers for insulation of roofs,
المواد العازلة اللي بنستخدمها بالبناء اللي
بنعزل فيها السطح و هاي الأمور

✓ Cement industry.
صناعة الأسمنت



Pathogenesis:

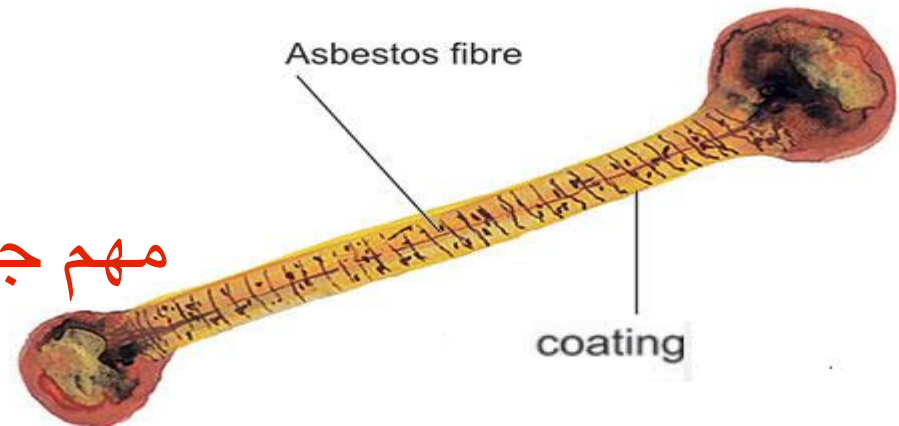
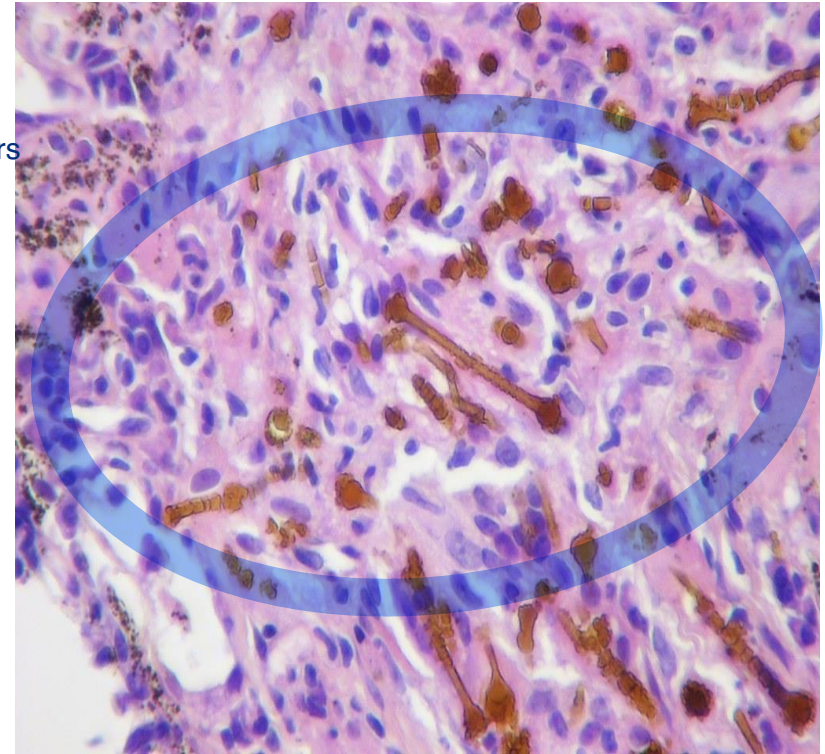
زي ما حكينا بهمناش التفاصيل بال
بس الفكره انو asbestos fiber بتكون حواليه
Reaction من
Reticulin and ferritin
و بتكون فيه accumulation حول asbestos
asbestos bodies بتكون اسمهم fibers
لونهم اصفر و شكلهم مثل drum stick

✓ Asbestos bodies:

- Formed of accumulation of **reticulin** around asbestos fibers, surrounded by **ferritin** granules, yellow in color, beaded and clubbed ended
- They can be detected microscopically in the **sputum** of asbestos exposed workers
- They are indicators **exposure** to asbestos but **not diagnose** asbestosis

بدنا نعرف انو هذول ال bodies بقدر استخدمها عشان اتأكد انو
هاض الشخص متعرض ل asbestos بس ركز معي مش شرط
وجودهم بدل انو هاض الشخص عندو asbestosis... يعني أي
شخص بتعرض ل asbestos بظهر عنده asbestos bodies
بس مش شرط يكون عنده asbestosis

مهم جدا



Pathology ;

- It is a **bilateral** diffuse interstitial pulmonary fibrotic, lesion affect at first **lower lung lobes**.
عكس الsilicosis

Chest X-ray; according to severity

- start in lower lobes,
- **honey comb appearance of lung**,
شبه خلية النحل
- shaggy heart**, tenting of diaphragm,
- no LN affected**.

ركز هون ما عندي حثة الlymph node





Silicosis



Asbestosis

عشان تفرق بينهم

Complications :

- ✓ Mesothelioma
 - ✓ Lung cancer
 - ✓ Super infection
- هناك بميزها ال TB هون بميزها ال mesothelioma
 مشتركات بينهم زي ما حكينا

Diagnosis of occupational lung diseases

(1) Occupational history

(2) Clinical examination:

symptoms & signs

(3) Investigations:

* x-ray: The most important

site (upper or lower) and shape (rounded or irregular) of the opacities

* lung function tests:

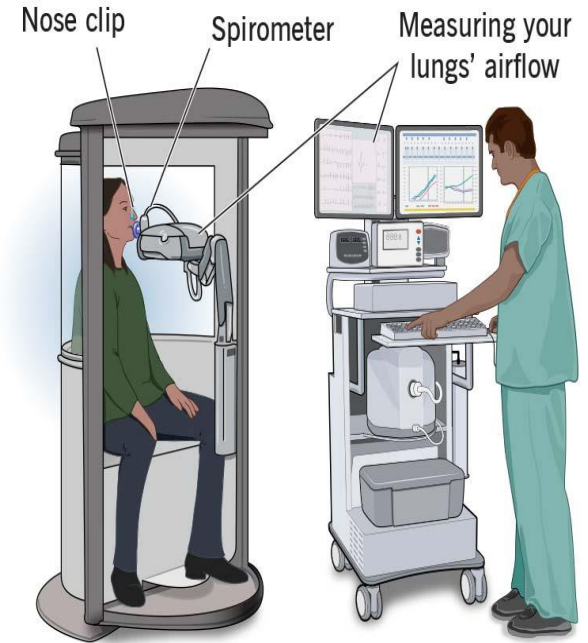
Restrictive

* CT & MRI

- Sputum examination for T.B in silicosis and for asbestos bodies in asbestosis

Help for diagnosis but not diagnostic

Spirometry



Pulmonary function test

Spirometer

Cleveland Clinic ©2024

اللي أخذناه بالفسيو

عارف انو كلنا مش فاتحينها

عشان هيك احفظو هون بس الاسم 😊😊

شبه ال bronchial asthma

B- Occupational Bronchial Asthma

It's obstructive lung disease

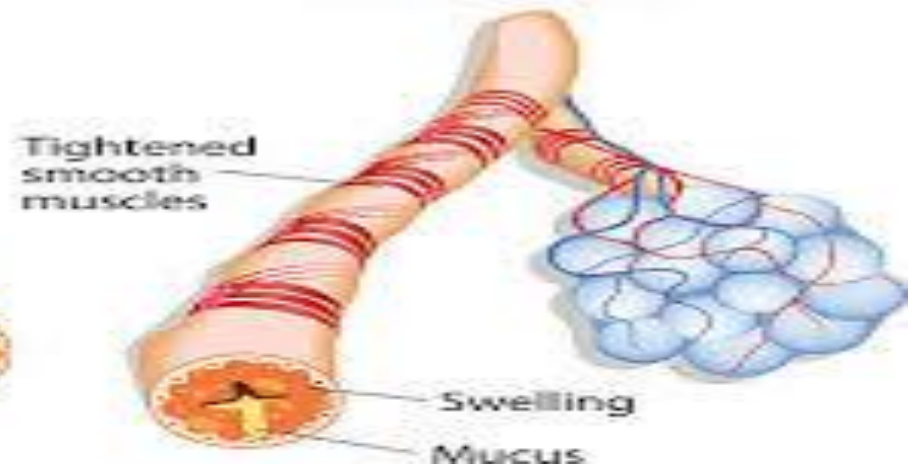
Hyper responsiveness of trachea, bronchial tree due to causes & conditions attributable to a particular occupational environment **characterized by recurrent attacks of dyspnea, cough, sneeze & variable airflow obstruction.**

هون بصير في swelling و تجمع
لل mucus فبضيق ال airway

Normal bronchial tube



Inflamed bronchial tube of an asthmatic



Sources of exposure

زي الأطباء البيطريين

- ✓ **Lab workers:** "exposure to mice, rats, guinea pigs"
- ✓ **Farmers:** "grain mites, chicken, ducks"
العث اللبي يكون عند المحاصيل
- ✓ **Carpenters:** "Hard wood dust"
النجارين
- ✓ **Veterinarians:** "cats, dogs, horses"
- ✓ **Chemicals :** Isocyanates (most common)
بتدخل في صناعة الدهانات و السيارات و غيره

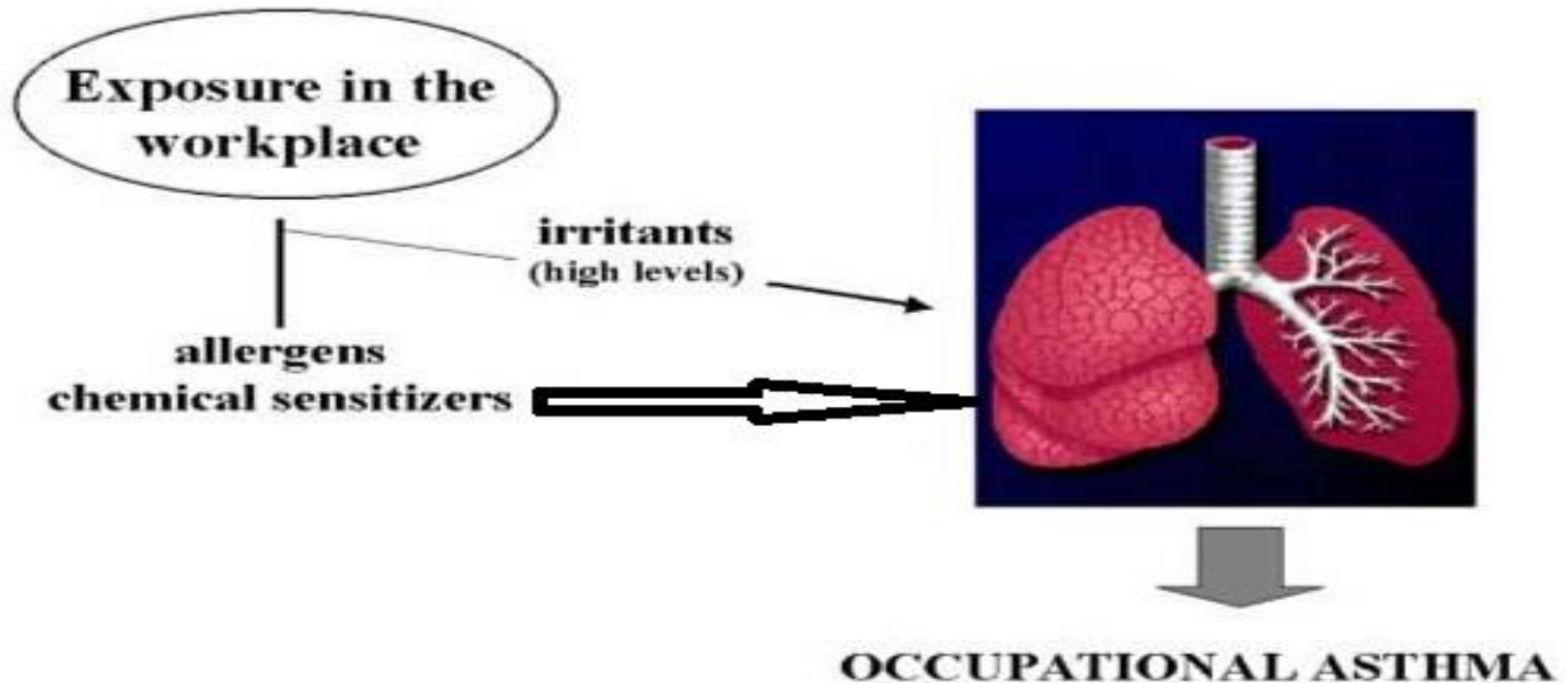


Pathogenesis

Antigen-antibody reaction

- Ag-Ab reaction with release of mediators leading to immediate or delayed reaction + irritation {Irritant-induced asthma (IriA)}

اللي حكينا عنهم فوق



Reactive airways dysfunction syndrome

It is an example of **irritant-induced asthma**. A case of RADS is defined as follows: يعني عنده أعراض ال bronchial asthma بس ما عنده كيف بقدر أشخصها ؟
previous respiratory complaint

- ✓ **No previous respiratory complaint.** (history)
- ✓ Exposure to known **irritant** in **high concentration.**
- ✓ **Onset** of symptoms after a **single exposure within 24 hours**, and persistence of symptoms for **at least 3 months.**
- ✓ Symptoms **similar to asthma** with cough, wheeze and dyspnea.
- ✓ Air-flow **obstruction** on **pulmonary function testing.**
- ✓ Presence of nonspecific **bronchial hyper-responsiveness.**
- ✓ Other pulmonary **diseases ruled out.** هون هاض اكثر اشى بشخصه

Diagnosis

(1) Occupational history زي أعراض الasthma

(2) Clinically: tightness- cough- expectoratation- wheeze

(3) Investigations:

بلاقيش عنده مشكله بالأوقات العادية بس أجي اعمل x-ray

▪ Chest X-ray: **Free**

▪ Pulmonary function test: **Obstructive**

▪ **Inhalation bronchial provocation test:** ← **Hyper-responsiveness.**

- Carried out by allowing the patients to **inhale the accused substance** in the form of aerosol, pulmonary function tests are **performed before and after.**
يعطيه المادة الirritant على شكل aerosol و يشوف الفرق

▪ **Stop Resume Work Test:** ←

- **Drop in eosinophil** in blood & sputum, several days **after stopping work.**

بلاحظ انو الeosinophil قلت بعد ما استراح لفته



Byssinosis

It is an occupational asthma due to exposure to Cotton dust (as in textile industry).

Source of exposure

الثنين بس بدرجة اكبر القطن

- ✓ Cotton , flax القطن و الكتان
- ✓ Textile industry



Diagnosis

هسا اللي بميز هاض المرض بقلك أنا الأعراض تبعتي بتزيد بالأيام اللي بشتغل فيها بس أجي أريح جمعة و سبت برتاح بس ارجع اشتغل يوم الأحد مثلا بترجع الأعراض .

(1) Occupational history

(2) Clinically :

- Symptoms: Feeling of **chest tightness on the day following the holiday**, then proceed to the different Clinical grades
- Signs: **may be free between attacks**, sometimes wheeze in late stage according to functional grade

(3) Investigations:

- **Chest X-ray: “Free”**
- **Lung function test: Obstructive**
- **Inhalation bronchial provocation test.**

Prevention and control of occupational lung diseases

حكينا عنها اول اشني

1. **Pre-employment & periodic medical examination:**
Pulmonary function tests
2. **Environmental monitoring**
3. **Administrative control measures:** worker rotation
بكون في شفت عشان ما يقعد ع نفس الشغلة فتره طويلة
4. **Adequate control:** adequate ventilation and dust control
5. **Personal protective equipments:** wearing masks

May Success
be with you,
always.

All The Best.

لا تنسوني من دعواتكم يا جماعة



من الدكتور👩🏻‍⚕️

A 45 year old **stonemason** presented with progressive dyspnea associated with **hemoptysis** and loss of weight. He worked in **building construction** for 15 years and had a 10 pack year smoking history. His chest x-ray shows **apical opacities**.

What is your provisional diagnosis?



حسب اللي قلناه منطق يكون **Silicosis**

What are your investigations to confirm diagnosis?

هاض و اللي تحت مش للحفظ
المهم تتذكر تبعون السلايدات



shutterstock · 1418609453

Investigations:

Chest X-ray; according to severity bilateral fine **nodular** opacities in **upper** part of the lung in the early stage and **egg shell calcification** of hilar I.N

Sputum examination for T.B

Lung function test: Restrictive

FVC & total lung capacity → Largely ↓↓↓

FEV1 decreases due decrease total FVC

FEV1/FVC → $\frac{\text{Decreased}}{\text{largly decreased}}$ = Normal or above

normal in sever cases

C.T & MRI

How to prevent this disease?



shutterstock - 1418609453

- Substitution of hazardous silica by a non hazardous substance.
- Isolation and Segregation
- Ventilation
- Environmental monitoring
- Pre-employment medical examination
- Periodic medical examination
- Protective equipment; respirator, mask

Quiz time

1. A 45-year-old construction worker presents with progressive shortness of breath and a dry cough. He reports a history of working with stone cutting for the past 20 years. His chest X-ray shows bilateral fine nodular opacities predominantly in the upper lung lobes. What is the most likely diagnosis?

- a) Silicosis
- b) Byssinosis
- c) Occupational Bronchial Asthma
- d) Pneumoconiosis

2. A 55-year-old former shipyard worker presents with dyspnea on exertion and a history of asbestos exposure. His chest X-ray reveals a honeycomb appearance of the lungs, predominantly affecting the lower lobes. What condition is commonly associated with his occupational exposure?

- a) Silicosis
- b) Byssinosis
- c) Occupational Bronchial Asthma
- d) Asbestosis

3. A 35-year-old laboratory technician complains of recurrent episodes of coughing, wheezing, and shortness of breath, especially after handling laboratory animals. What occupational lung disease is most likely causing his symptoms?

- a) Silicosis
- b) Byssinosis
- c) Occupational Bronchial Asthma
- d) Pneumoconiosis

4. A 40-year-old farmer presents with episodic wheezing, coughing, and difficulty breathing, particularly during harvest season. He reports exposure to grain mites and poultry. What type of occupational lung disease is he most likely experiencing?

- a) Silicosis
- b) Byssinosis
- c) Occupational Bronchial Asthma
- d) Pneumoconiosis

5. A 50-year-old carpenter develops cough, dyspnea, and wheezing shortly after being exposed to hardwood dust in his workshop. His pulmonary function test shows evidence of airflow obstruction. What is the likely diagnosis?

- a) Silicosis
- b) Byssinosis
- c) Occupational Bronchial Asthma
- d) Pneumoconiosis

Key answers

- 1. a) Silicosis
- 2. d) Asbestosis
- 3. c) Occupational Bronchial Asthma
- 4. b) Byssinosis
- 5. c) Occupational Bronchial Asthma