Pneumothorax

lecture no. 3

Is accumulation of air in a pleural space or accumulation of extra pulmonary air within the chest ,

Is uncommon during childhood , may result from external trauma , iatrogenic , or mat be spontaneous.

Causes :-- 1-trauma 2- iatrogenic 3– pulmonary dis as in ----: asthma (occurs in 5% of asthmatic patients)

1- chest

pneumonia :- in connection with empyema (pyo-pneumothorax) as in staph pneumonia .

cystic fibrosis :- occurs in 10-25% which commonly above 10 years of age .

kerosene pneumonitis

4- collagen disease :-- like marfan syndrome , Ehlar danols synd histiocytosis .

Pneumothorax may associated with pleural effusion (hydro-pneumo Thorax) or purulent effusion (pyo-pneumothorax)

It is common unilateral , while bilateral is rare beyond neonatal period .

ClF :-- severity of symptom depend on :--

a- extent of disease (extent of lung collapse)

b-amount of pre-existing lung dis.

In infancy :- the S&S is difficult to recognize (as irritable , dyspnea , cynosis)

In spontaneous pneumo-thorax :- may occurs while patients at rest

moderate pneumothorax caused little displaced of intra-thorax organ caused few or no symptoms .

Extensive pneumothorax leading to sever chest pain & dyspnea &may be cynosis especially in children .

Severity of chest pain usually does not directly reflect of extent of collapse .

OlE :--

1- sign of respiratory distress 2-decreased breath sound

3- tympanic by percussion unless associated with empyema or pleural effusion leading to dullness

4- shifting of mediastinum to opposite side

Diagnosis :-- ClF + CXR

in infant translumination of chest wall helps in rapid diagnosis .

It is important to determine whether this pneumothorax undertension (tension pneumothorax) why :--

Because of causing limitation of contra lung expansion leading to compromise venous return .

Feature of tension pneumo-thorax :---

1-presence of circulatory collapse

2- evidence of an audible of Hiss of rapid exist of air with insertion of chest tube .

3- mediastinum shifting to opposite site (sometime no shifting ,if there is bilateral pneumo thorax or stiff lung of both side)

DD:--

1- localized or generalized emphysema

2- cystic fibrosis

3-diaghramatic hernia

Treatment :--- depend on extent of pneumo thorax , nature & severity of underlying disease :--

1- if collapse of less 5% (mild to moderate) often resolve spontaneously within one week & increase or hasten resolution by given high concentration of o2 100% that increased nitrogen pressure gradient between pleural air & blood .

2- if collapse is extensive of more than 5% (extensive) or recurrent or under tension needs chest tube with air drainage .

Pleurodesis is indicated if pneumo-thorax is recurrent , or if the cause is is cytic fibrosis or malignancy .

Pleurodesis is introduction of chemical substance by chest tube into pleural cavity like tetracyclin or silver nitrate .

3- treatment of underlying lung dis.

Pneumo-mediastinum :--

is presence of air or gas in the mediastinum , resulting from dissection of air from a leak in a pulmonary parenchyma into mediast.

Causes :---

1-asthma (commonest cause

2-trauma (penetrate chest trauma , or esophageal perforation)

3-may associated with dental extraction ,D.K.A, acute puncture , acute G.E .

4-idiopathic (occasionally)

It is rarely a major problem in a children because of air leak going into neck or abdomen without affection of mediastinum .

ClF:--

chest pain (transient stabbing that may radiate to the neck is principle feature of pneumo-mediastinum)

OlE :--may be absent or just crunching noise over sternum by auscultation .

Subcutaneous emphysema if present is diagnostic .
Diagnosis is confirmed by chest x-ray which showing mediastinum air with more distinct cardiac border than normal .

Treatment :-treatment of underlying disease . •

Pleurisy & pleural effusion :--- •

is fluid collection in a pleural cavity which either serous or • purulent , can be differentiate between them through fluid • aspiration & send for protein , sugar , cell specific gravity, • lactate dehydrogenase •

	serous	exudate •
1-specific gravity	less than 1015	more than 1015 •
2-protein	less than 2.5gmldl	more than 3gmldl •
3-sugar	normal	less than 60mgldl •
4-cell	low cell count	high cell count •
5-LD	less than 200 IUlL	more than 200 IUlL •
6-PH		less than 7.2 •

The commonest cause of effusion is bacterial pneumonia & next CHF, hypoproteinemia , rheumatological causes, metastatic intra-thoracic malignancy & others like T.B , SLE ,aspiration pneumonitis .

Pleurisy :-- •

is inflammation of pleural membrane , classify into 3 type :-- •

1-dry or plastic type 2- sero-fibrinous 3-purulent type •

Dry pleurisy :--- •

its process limited to visceral pleura with small amount of • serous fluid . •

Causes :-- 1- acute bacterial pneumonia & T.b •

2- may associated with connective tissue dis. Like •

Rheumatic fever •

ClF :-- •

cardinal feature is chest pain . •

x-ray diffuse hizziness at a pleural space or dense , sharply • demarcated shadow

DD:-- 1-pleurodynia 2-trauma to rib cage 3-tumour of spinal cord
4-herpes zoester .

Note :- any patient with pleurisy + pneumonia should always screened

For T.B . •

Treatment :- treatment of underlying dis. + analgesia NSAID •

Sero-fibrinous pleurisy :-- •

is defined by a fibrinous exudate on the pleural surface & an • exudate effusion of serous fluid into the pleural cavity .

Causes :-- •

1- most commonly associated with infection of lung or • inflammatory condition of abdomen or mediastinum .

2- less commonly associated with SLE, Rheumatic fever , • lung malignancy . •

ClF :--- •

1- often proceed by dry pleurisy . •

2- when fluid collection , the pain is disappeared & the patients • Asymptomatic •

Note :- if effusion remain small :- have only sign and symptoms of underlying dis., but , if effusion become large leading to resp. Distress .

OlE :-- •

depend on amount of fluid :-- •

large effusion : dullness by percussion •

in infant : there is bronchial breathing •

Diagnosis :-- •

1- ClF 2- X-ray finding 3- WBC 4-thoraco-centesis •

Course :-effusion is usually disappeared rapidly (unless fluid collection with exudate) by appropriate antibiotic . •

if persist (longer) suspected possibility :-- •

T.B , neoplasm , connective tissue dis. •

Treatment :-- •

1- treatment of underlying dis . •

2-if larg effusion , :-needs drainage make the patient more comfortable . •

if become purulent : needs chest tube drainage •

Purulent Effusion :--

is a accumulation of pus in a pleural space , most often associated with bacterial (staph infection) & less frequently with pneumococcal & H. influenza .

- Empyema is most often encountered in infant & pre-school children
- If pus not drained : may dissect through pleura into lung parenchyma producing broncho- pleural fistula & pyo-pneumothorax
- OlE :--
  - most frequently in infant & pre-school children , occurs in 5-10% of patients with bacterial pneumonia
  - 1- interval of few days between onset of bact. Pneumonia & empyema if not treated well .
  - 2- fever 3- respiratory distress 4- if fluid is not shifted with change position , indicated loculated empyema .
- Thoraco-centesis should drained as much as possible & send for gram stain , culture .

CX:--

1-broncho-pleural fistula & pyo-pneumo-thorax (commonest cx)

2- others like purulent pericarditis , pul abscess , peritonitis

& osteomylitis of ribs •

3- septic cx like meningitis , arthritis , osteomylitis •

4- septecemia (occurs infrquently with staph , is often occurs by • H-influenza & pneumo-coccal .

Treatments :--- •

1- pus drainage (continue for about one weeks even small • amount of pus , when no longer drained , removed chest tube)

2- antibiotic •

duration of antibiotic : staph for 3-4 wks •

3- if pneumatocelle ; no treatment unless sufficient size • which embrass respiration or secondary infected (treated by surgery)

4- instillation of fibrinolytic agent into pleural cavity (promate • Drainage, decreased fever, less for surgical interference , shorten • hospitalization .

Thank you --12-