胸腔部住院醫師工作簡介

目錄

胸腔部工作須知

1.Critical case 須 visiting stuff, 或 cover CR 評估 是否 transfer to ICU.

2.下班前 Critical case 須交班

3.Avoid CO_2 retention in COPD, **FiO_2 不能過高**

4.Watch out the usage of **sedatives**.

5.Invasive examination 須 VS or Fellow agree.

6.Pleural effusion patient 須 echo-guided chest taping.

7.Echo, bronchoscope, pleural biopsy, pigtail insertion 須簽同意書及危險同意書. Bronchoscopy 須 NPO

8.Chest tube drainage 須 keep output < 1500cc/day or 200cc/2hr to avoid **re-expansion pulmonary edem**a. Stop drainage if symptom of severe cough, cold sweating, hypotension, pink frothy sputum or chest tightness appear. Record output till <50-100cc/day .

9.Pleurodesis : Minocycline 400 mg + 2 amp Xylocaine (2%, 5ml) in normal saline 50 cc (total 100 cc) for retention 2 hrs and change position every 15 min.

10.Chest tube wound CD by intern , pneumothorax Q 2 days, for pleural effusion at least QD.

11.Pulmonary Function test :

Screening spirometry：flow-volume curve, 用已區分 obstructive or restrictive lung disease。

Methacholine provocation test: 病人是否有 airway hyperresponsiveness. 病人若已有 Airway compromise 勿開。

Bronchodilator test: 用來判斷是否為 reversible air-flow limitation。

Diffusion capacity: 用來是否氣體交換障礙。

12.**住院病人不要常規開立 SMAC**

非必要並避免 routine follow up data,如 theophylline level, sugar by finger stitch 等.

13.開立 bronchoscopy, chest echo, 須要聯絡排程, 接受 bronchoscopy 檢查前一晚須 Midnight NPO.

14.Sputum smear and culture 須 use the same specimen,非必要送檢一套即可.TB sputum and smear 須 QD × 3 da ys.

15.勿隨便開立 O2 prn，病人使用氧氣前，住院醫師應先評估臨床狀況，例如是否有其他可治療的狀況如 bronchospasm，而非病人只要覺得喘，就不看病人狀況，隨便交代給氧氣敷衍了事。

16.Medication or Order Renew every week.

17.Chart run: AM 0730~0830 W1-W5 於中正 13 樓 220 會議室 (R / Intern / Clerk 務必參加)

18.CXR teaching: PM 1815~2000 on W3 QW, 中正 13 樓 220 會議室(R / Intern / Clerk 務必參加)

19.北區景福館胸腔疾病聯合討論會: PM1400~1700 on W3 qweek

20.安排檢查請 **set IV line**

Admission Order (總論)

1.Physician responsible for the patient
on the service of Dr___
2. Diagnosis :
3. Condition :on critical, guarded
4. Vital signs: frequency, and parameters for notification of the physician (e.g. systolic BP < 90)
5. Activity : limitations, as tolerable or bed rest
6. Allergies : what kind of drug or other material
7. Nursing instructions :(e.g. foley training, wound care, daily weights or I/O).
8. Diet :(DM, low salt diet or other description ____Kcal/day) or as tolerable.
9. Intravenous fluid : including composition and rate (避免 fluid overload,像老人,CHF etc)
10.Lab: CBC,D/C
biochemistry 根據病人個別狀況或 VS order
sputum smear and culture QD x 2 days (infectious S/S)
sputum smear and culture for TB QD x 3 days (suspected or infectious S/S)
CXR (PA and lat view)
ABGs prn
tumor marker(eg. CEA)
U/A and S/A (if necessary)
11.Medication : including dose, frequency, and route of administration
a.O_2 :nasal cannula 1-5l/min
mask 35%-50%
venturi mask:24%,28%,32%,35%,50%
b.Bronchodilator oral form :berotec 1# bid to 2# tid,or meptin 1# bid,
ventolin 1#tid to qid
MDI : berotec 1-2 puff prn ,serevent
neubilized : bricanyl, berotec
c.Anticholinger MDI : atrovent 2-4 puff tid-qid
neubilized : atrovent
d.Aminophylline oral form :xanthium or phyllocontin(125,250 mg)
IV form : 0.5mg/Kg/min and adjust dosage by age, comorbility, and drug interaction
e.Steroid : oral form : predisolone(5 mg)
DPI : pulmicort 2-4 puff bid
IV form : solu-cortef (100 mg) 1 Amp q6h to q8h, Dexan
f. Antiobiotic 見 Next page order
12.Other :chest CT, chest echo, bronchoscopy , bone scan, liver echo etc
胸腔科檢查請 sign VS and 欲做內容及目的
14. Chemotherapy : as protocal, 請務必比較之前的處方劑量， 是否有做調整。

Airway Disease Order

(A) COPD and bronchial asthma

Initial orders

(1) CBC & DC st
(2) blood gas st
(3) CXR st
(4) check AEC(absolute eosinophil count) and IgE in cases of asthma before corticosteroid therapy (not necessary in cases of COPD)
(5) give oxygen therapy st (limited to 2 L/min by nasal cannuna in cases of COPD)
(6) give berotec inhalation st and q 6h in acute stage then shift to oral form a few days later and simultaneously give amminophyllin infusion in acute atage then shift to oral form a few days later
(7) if the symptoms do not improve after above medication give hydrocortisone 2 amp st and 1 amp q 6h
(8) give antibiotics to these patients with secondary infection
- acq PCN + GM are most commonly used
(9) critical case (hypotension, dyspnea..), 可開後線藥物, 需 inform duty VS

Following orders

(1) follow WBC & DC 1 week later if have initial leukocytosis
(2) follow blood gas p.r.n.
(3) follow CXR if pneumothorax is suspected

Infectious Diseases Order

(A) Pneumonia

Admission orders

(1) CBC & DC
(2) sputum Gram's stain st x 2
(3) sputum bacterial culture x 2
(3) blood culture st x 2
(4) check cold hemaagglutinine and mycoplasma pneumonia Ab title (if indicated)
(5) CXR st
(6) give antibiotics according to Gram's stain result -
Aminoglycoside 在肺部的分佈濃度很低，爲血液濃度的 30-40％。所以肺部感染若非合併菌血症(bacteremia)或敗血症(sepsis)，請勿用 aminoglycoside.

note: Do not repeat the orders which are already done in the ER.

Following orders

(1) follow WBC & DC 1 week later
(2) follow CXR 1 week later
(3) if atypical pneumonia follow cold hemaagglutinine and mycoplasma pneumonia Ab 1 week later

(B) Lung abscess:

Admission orders

(1) (2) (3) (5) (6) as pneumonia

Following orders

(1) (2) as pneumonia

(C) Empyema:

Admission orders

(1) (2) (3) (5) as pneumonia
(4) arrange echo-guide pleurocentesis for Gram's stain and bacterial cultures of pleural effusion x 1
(6) give antibiotics according to the Gram's stain and bacterial culture of pleural fluid or give antibiotics
(7) perform tube thoracostomy if the diagnosis is proved

Following orders

(1) record amount of pleural fluid drainage QD

(2) CD wound of thoracostomy QD

(3) follow WBC & DC 1 week later

(4) remove chest tube if pleural fluid become clear and less than 50 cc per day

(5) consult chest surgeon if fever persist and pus drainage continune

(D) Pulmonary tuberculosis

(1) sputum for AFB smear and culture qd x 3 days

(2) CXR

(3) give antituberculous drugs INH 300 mg/d + RIF 450-600 mg/d
+ EMB 1200 mg/d + PZA 2# tid.or
Rifatar 4# qd (or5# qd if > 50Kg) + EMB 2# qd (3#qd if > 50Kg)h

(E) Tuberculous pleural effusion

Initial order

(1) diagnostic pleurocentesis + pleural biopsy

(2) pleural fluid for AFB smear and cultute x 1

(3) sputum for AFB smear and culture x 3

(4) CXR st

(5) give antituberculous drugs as pulmonary TB

Following orders

(1) follow CXR 1 week later

Medical History

1.Dyspnea

- Respiratory, cardiac, hematologic, metabolic, neuromuscular and psychogenic disorders, etc..
- Sudden onset: asthma, pulmonary embolism, myocardial infarction.
- PND, Orthopnea in COPD due to pooling of secretions, gravity-induced decrease in lung volume
- sleep-induced increase in air-flow resistance.

2.Cough

- **Acute or chronic**: URI (viral nasopharyngitis), allergen inhalation; Postnasal drip, asthma, GE reflux, chronic bronchitis, bronchiectasis, TB, Cancer.
- **Productive or nonproductive**: Inflammatory process, ACE inhibitor.
- **Time relationship**: Nocturnal (Asthma, CHF), Meal (esophagogastric disease), Awaken (bronchiectasis).
- **Type and quality of sputum**: foul -smelling sputum (anaerobic), frothy saliva-like sputum (bronchoalveolar carcinoma), pink-tingled foamy sputum (pulmonary edema), rust-colored (pneumococcal pneumonia), copious purulent sputum with intermittent blood streaking (bronchiectasis).

3.Associated symptom*:* wheezing, stridor, fever & chills, weight loss, malaise.

Cause	Characteristics
Infectious	
URI	*Symptom of URI as sore throat, running nose.*
	Productive cough > 3 months for 2 years.
Bronchitis	*Copious, foul, purulent sputum.*
	Hemoptysis, afternoon fever, body weight loss.
Bronchiectasis	
TB	
Inflammatory(Parenchymal and airways)	
Postnasal drip	*Dripping in throat.*
Reflux esophagitis	*Supine position.*
Smoking	*Injected throat, marked in morning.*
Tumors	
Foreign body	*Localized wheezing.*
Cardiovascular	*Supine aggravated by dyspnea.*

4.Hemoptysis

Bronchitis/bronchiectasis, Lung Ca, tuberculosis; Massive 600 cc in 48 hours or 100ml in 24hours

5.Chest pain

Pleurisy : restricted in distribution, clear relationship to respiration; localized, position-related

Acute : pneumothorax, embolism, pneumonia

6.Family, social, occupational histories

smoking PPD-years.

Physical Examination

1.Inspection:

Rate, rhythm, depth, effort, symmetry 8~16 times per min.(paradoxiacl or accessory movement)

2.Auscultation:

Pitch, intensity, duration.

Respiratory sound: origin from larger airway , high pitched component filtered out by lung tissue.

Vesicular sound: Soft relatively low-pitched, inspiratory last longer.

Bronchial sound: Expiatory is equal or longer then inspiratory. consolidation or collapse.

Crackles: Discrete, non-continuous sounds. Previous deflated airway are reinflated during inspiration.

1.Fine crackles: soft very short high-pitched.

2.Coarse crackles: louder , slightly longer, lower pitched large airway due to secretion.

3.Early inspiratory: proximal and larger airway --- COPD.

4.Late inspiratory: interstitial fibrosis, pneumonia, CHF.

Wheezes: Continuous musical sounds.. Sibilant higher-pitched wheeze.

Gr 1: end-expiration, Gr 2: whole-expiration, Gr3: inspiration + expiration, Gr4: silent.

Rhonchi : continuous sonorous low-pitched rhonchus

Stridor: Loud musical sound of constant pitch during inspiration.

Pleural rub, Inspiratory Squawk, Egophony, Whisper pectoriloquy.

3.Palpation:

Indentation of tender area, mass, respiratory expansion.

Tactile fremitus: Vibrations transmitted through the bronchopulmonary system to chest wall when patient speak “ninety-nine ”. Absent if airway are blocked (tumor or foreign body), lung move away from the chest wall (pneumothorax, pleural effusion thickening, elevated diaphragm). Increased in consolidation.

4.Percussion:

Dullness (liver, pleural effusion, consolidation), resonance (lung), Hyperresonance (emphysematous lung, pneumothorax), Tympany (abdomen).Diaphragmatic excursion.

	Percussion	Tactile fremitus, whisper sound	breathing sound	Added sound
Normal	Resonance	Normal	Vesicular	None
CHF	Resonance	Normal	Sometimes prolonged expiration	crackles at base, cardiac asthma
Pleural effusion	Dullness	Decreased Egophony +	Decreased	
Consolidation	Dullness	Increased Egophony +	Bronchial	crackles
Emphysema	Hyperresonance	Decreased	Prolonged expiration	Wheezes
Atelectasis	Dullness	Decreased	Decreased	None
Pneumothorax	Hyperresonance normal	Decreased	Decreased	None

常見檢查注意事項

■Bronchoscopy

Indication:.1. Malignancy 2.Interstitial lung isease
3.Pneumonia 4.Immunocompromised host
5.Nonresolving lesion 6.Smoke inhalation
7.Foreign body 8.Therapeutic bronchoscopy

■High risk during routine bronchoscopy:

Pulmonary: 1.unstable asthma 2.hypercabia
3.hypoxemia 4.partial tracheal obstruction
5.lung abscess 6.respiratory failure

Cardiac : unstable angina pectoris
recent myocardial infarction
life-threatening cardiac arrhythmia
refractory severe hypertension

Neurological: raising intracranial pressure,uncontrolled seizure

Other: 1.superior vena cava obstruction 2. poor patient cooperation
3.severe generalized debility

■Chest Echo

Indication: 1. Unsuccessful thoracentesis
2. A small amount of fluid judged to be too dangerous for routine bedside thoracentesis
3. In debilitated patient
4. Loculated pleural effusion or empyema
5. Opacified hemithorax

■Pulmonary function test

screening spirometry

		Obstructive Defect		
		mild	moderate	severe
FEV1/FVC →	indicating airflow obstruction:	75 ~ 60 %	60 ~ 40 %	< 40 %
FVC →	indicating lung restriction:	80 ~ 60 %	60 ~ 40 %	< 40 %
MMEF →	indicating small airway disease:	< 60 %		

Response to bronchodilator : △FEV1 or △FVC > 200cc and △percentage > 12%
△FEV1 or △FVC>15%

Provocation test :PC20

Lung volume study:TLC. RV. FRC.

Diffusion capacity : DLco

胸管及肋膜沾黏術

Procedures for pleural sclerosis Order

1.demoral 1 amp im or IVF 30 min before procedure
2. instill (A or B or C) ＋20ml 1% lidocaine and NS total 100cc into drain tube
   A. OK –432 10 K.E (2amp)（限 malignant pleural effusion）
   B. Doxycycline 10 amp(5-10 mg/kg)
   C. Bleomycin (30mg)
3. flush tube with 20 ml of saline then clamp tube
4. put patient in prone, supine, right decubitus, left decubitus and sitting for 5 min each position, repeat each position for 30 min each
5. unclamp tube for drainage until amount < 150ml per day, then remove tube
6. if 24 hour drainage exceeds 200 ml repeat the procedure

* Procedures for removing of chest tube

1. CD and suture the wound initially
2. let patient in fully deep inspiration state
3.one doctor remove the chest tube the other tight the suture simultaneously
4. remove suture 1 week later

Arterial Blood Gas and Acid-Base disorders

■Acid-Base Disorders

Never overcompensation.

Respiratory compensation immediately; metabolic compensation : begin at 6-12 hr, maximal in few days.

PaCO2 = 40 mm Hg pH = 7.4.

PaCO2 ↑ or ↓ 10 mm Hg --- pH ± 0.08.

	Acidosis	Alkalosis
Metabolic	1.1-1.3 mm Hg ↓ (HCO_3^- ↓ 1 Eq/Liter)	0.6-0.7 mm Hg ↑ (HCO_3^- ↑ 1 Eq/Liter)
Acute Respiratory	1 mEq/Liter ↑ (PCO2 ↑ 10 mm Hg)	2.0-2.5 mEq/Liter ↓ (PCO2 ↓ 10 mm Hg)
Chronic Respir	3.0-3.5 mEq/Liter ↑ (PCO2 ↑ 10 mm Hg)	4.0-5.0 mEq/Liter ↓ (PCO2 ↓10 mm Hg)

■**Metabolic acidosis** : pCO_2=1.5 x HCO_3^- + 8(±2), low limit 10 mmHg

■**Metabolic alkalosis** : ↑ in pCO_2 =Δ [HCO_3^-] x 0.6 (0.5~1.0),
upper limit 55 mmHg

■**Acute respiration acidosis** : ↑ in [HCO_3^-] = Δ pCO_2/10 (usually increase only 3~4) upper limit 30 mEq/L

■**Chronic respiration acidosis**: ↑ in [HCO_3^-] = 4 x Δ pCO_2/10
upper limit 45 mEq/L

■**Acute respiration alkalosis** : ↓ in [HCO_3^-] = 2 x Δ pCO_2/10,(usually decrease only 3~4) low limit 18 mEq/L

■**Chronic respiration alkalosis**: ↓ in [HCO_3^-] =5 x Δ pCO_2/10
low limit 14 mEq/L

pH = 6.1 + log{[HCO_3^-]/(0.031×PCO2)}.

■Metabolic acidosis

Anion Gap = [NA^+] -([Cl^-] + [HCO_3^-]); (12± 4).

Osmolality = (mosm/kg) = 2 [Na+] + [glucose/18] + [BUN/2.8].

Osmolal gap: measured plasma Osmolality exceeds the calculated Osmolality by 10 mosm/kg.

Clinical presentation: Kussmaul's respirations, decreased myocardial contractility,hypotension, tissue hypoxemia, cons change.

Increased anion gap

Diabetic **K**etoacidosis, **U**remia, **S**alicylate intoxication, **S**tarvation ketosis, **M**ethanol, **A**lcohol ketoacidosis, **U**nmeasured osmoles, **L**actic acidosis.

Normal anion (hyperchloremic)gap

Renal loss (Renal tubule acidosis: Type II , Proximal tubule to reclaim filtered bicarbonate; Type I , distal nephron acidification; Type IV, insufficient urinary buffers such as NH_4^+), GI loss (diarrhea, uretero- sigmoidostomy).

Urine anion gap = $[NA^+] + [K^+] - [Cl^-]$; Negative signifies normal renal NH_4^+ excretion

--- **Non-renal cause**.

If concurrent volume depletion due to GI losses, distal acidification may be impaired due to a decrease in distal NA^+ delivery.

HCO_3^- deficit = 0.5 × lean body weight × (desired $[HCO_3^-]$ - measured $[HCO_3^-]$), pH < 7.2.

Avoid over- alkalinization (tetanus, seizure, arrhythmia, increased lactate production).

■Metabolic Alkalosis

1.Chloride responsive (urine chloride < 10 mEq/L):

ECF volume depletion, posthypercarpnic state, cystic fibrosis (IV saline, Carbonic anhydrase inhibitor (acetalomide)).

2.Choride resistant (urine chloride > 20 mEq/L):

Hyperadrenocorticoid, Bartter's syndrome, severe hypokalemia, hypomagnesemia

3.Milk-alkali syndrome, hypercalcemia of nonparathyroid origin, high dose penicillin.

■Respiratory acidosis

1.CNS depression (drugs, brain injury, obesity), Neuromuscular disorders (GBS, myasthenic crisis)

2.Pulmonary disease (COPD, sleep apnea, kyphoscoliosis).

Symptoms:

--Agitation, somnolence, hypertension, tachycardia, arrhythmia, asterixis.

Serum bicarbonate < 35mEq/L.

■Respiratory Alkalosis

.CNS disorders (Anxiety, brainstem tumor, infection), hypoxemia, sepsis, liver disease, drugs (Salicylates, theophylline, progesterone), Pulmonary disease, ventilator overventilation.

Symptoms:

--Light-headness, paresthesia, cramps, tetany, arrhythmias.

Serum bicarbonate > 15mEq/L always. Unless pH > 7.5 no need for treatment.

■Mixed acid-base disturbance

Chest X- ray Reading

■Quality of film :

Class A : Trachea and main bronchus - visible
Thoracic spine and intervertebral space - just visible
Abdominal spine and intervertebral space - invisible
Retrocardiac lung marking - visible

Class B : not affecting reading

Class C : more than one criteria and not affecting reading

Class D : cannot read

■Position :

T3 or T4 spinous process : midway of bilateral clavicle

T5 or T6 Spinous process : above carina

Full-inspiratory film (At total lung capacity) :
Anterior - R5 or R6 , Posterior - R10

■Thoracic wall :

Normal - Bell shape

COPD- Box shape

Funnel Chest - ribs as heart shape

■Diaphragm :

Right higher than left ,but no more than 4 cm

Height of dome :1.5-2.0cm

Excursion :3-7 cm

Diaphragm thickness: 5-8 mm

Distance between diaphragm and gastric bubble < 1 cm

■Mediastinum :

Trachea : diameter < 2.0-2.5 cm
normal tracheal wall thickness: 2-4 mm

Carina : Angle $75^{)}$ (right $30^{)}$, left $45^{)}$)

Mediastinal widening : > 8.5 cm or > 25% of chest width

■Heart :

Cardiothoracic(C/T) ratio ≤ 0.5 in PA view, ≤ 0.6 in AP film

RAE : RA border to midline ≥ 4.5 cm

RVE : apex left and upward

LAE : Loss of cardiac waist, Double contour shadow, Carina angle ≥ 90), Esophagus posterior deviation (lat. view)

LVE : apex left and downward

■Lung :

Alveolar pattern: Acinar shadow : ill-defined infiltration, around 1 cm
Confluence, air-bronchogram

Interstitial pattern : ground-glass, reticulonodular, Kerley A,B,C line, Peribronchial cuffing : wall thickness ≥1mm,

Nodule < 1cm, Tumor 1-4 cm, Mass > 4 cm

Vessel : outer 1/3 without lung marking
Right descending PA diameter < 1.6 cm (at the level of intermediate bronchus)
Diameter of pulmonary artery is smaller than that of accompanied bronchioles

■■■■■

A.Airways :

B.Bones, Breast shadow : fracture, tumor metastasis, demineralization

C.Cor pulmonale, Calcification, carina : C/T ration > 0.5 in PA view

D.Diaphragm : Right higher than left one-half ICS, The left diaphragm : gastric bubble, anterior part obliterated by heart

F.Fissures : Major fissure : 5 th ICS

G.Gastric bubble : No more than 2 cm to dome of diaphragm

H.Hila : Right side never higer than left side, left higer < 3 cm

I.Interstitum

K.Kerley's line :

Kerley's A (Deep septa) : Up to 4 cm, radiate from hilar to central portion, in the mid and upper zones never reach pleura

Kerley's B (interlobular septa) : 1 mm thick and longth is less than 2 cm , seen best at the peripheral lung base horizontal parallel, often reach to the edge of the lung, often in the right side

L.Lobes :

M.Mediastinum :

N.Nodules : < 1cm, calcification favor benigh ; doubling time

O.Overeration :

P. Pleura

Cor Pulmonale : Right descending PA ≥ 2.0 cm, or width of hilum ≥ 0.36 of thoracic width

COPD : Chronic bronchitis/ non-specific

Emphysema: increase lung volume: hyperinflation : Post > 11 ICS ,
height of dome < 1.5cm, increase intercostal space
enlonged and narrow heart. attenuation of the vessels: reduction in size and number of blood vessels, bullae → severe area

Bronchiectasis: visible dilated bronchi, persistent consolidation, loss of volume

Evaluation of the position of tube and catheter

Atelectasis : (Obstruction, compression, adhesion)

Direct sign

1.Increased density

2.Displacement of fissures

3.Crowding and reorientation of pulmonary vessels

Indirect sign :

1.Elevation of diaphragm
2.Displacement of hilus
3.Compensatory overinflation of the normal lung
4.Crowding of ribs
5.Shift of mediastinum
6.Cardiac rotation
7.Bronchial rearrangement

RUL collapse :

1.Elevation of minor fissure, anterior displacement of the major fissure
2.Elevation of right hilum

LUL collapse :

1.Poorly marginated left perihilar density that appear to be sepatared from the mediastinal border by a hyperlucency that highlights the aortic arch
2.An increased density that is sharply marginated anterior by the displaced major fissure in lateral view
3.Herniation of comensatory overinflation of the right upper lobe across th midline.

RML and RLL collapse :

1.Inferior shift of both the minor fissure and posterior portion of major fissure.
2.Minic elevation of the diaphragm

LLL collapse :

1.Triagular opacity behide the heart.
2.The lateral border is sharp because of the inferomedial shift of the major fissure; A line parallels the heart border

3.A poorly marginated density over the lower vetebral bodies sihouttes the left leaf of the diaphragm

Silhouette sign :

1.Right heart border : RML, RUL B3
2.Aortic knob : LUL B1+2
3.Left heart border : Lingula
4. Descending aorta : B6+B10
5.Back of left diaphragm : Basal segment of LLL
6.Back of heart : B6, B7+8 of LLL