



# Management of Bronchogenic Carcinoma and Pulmonary Resection

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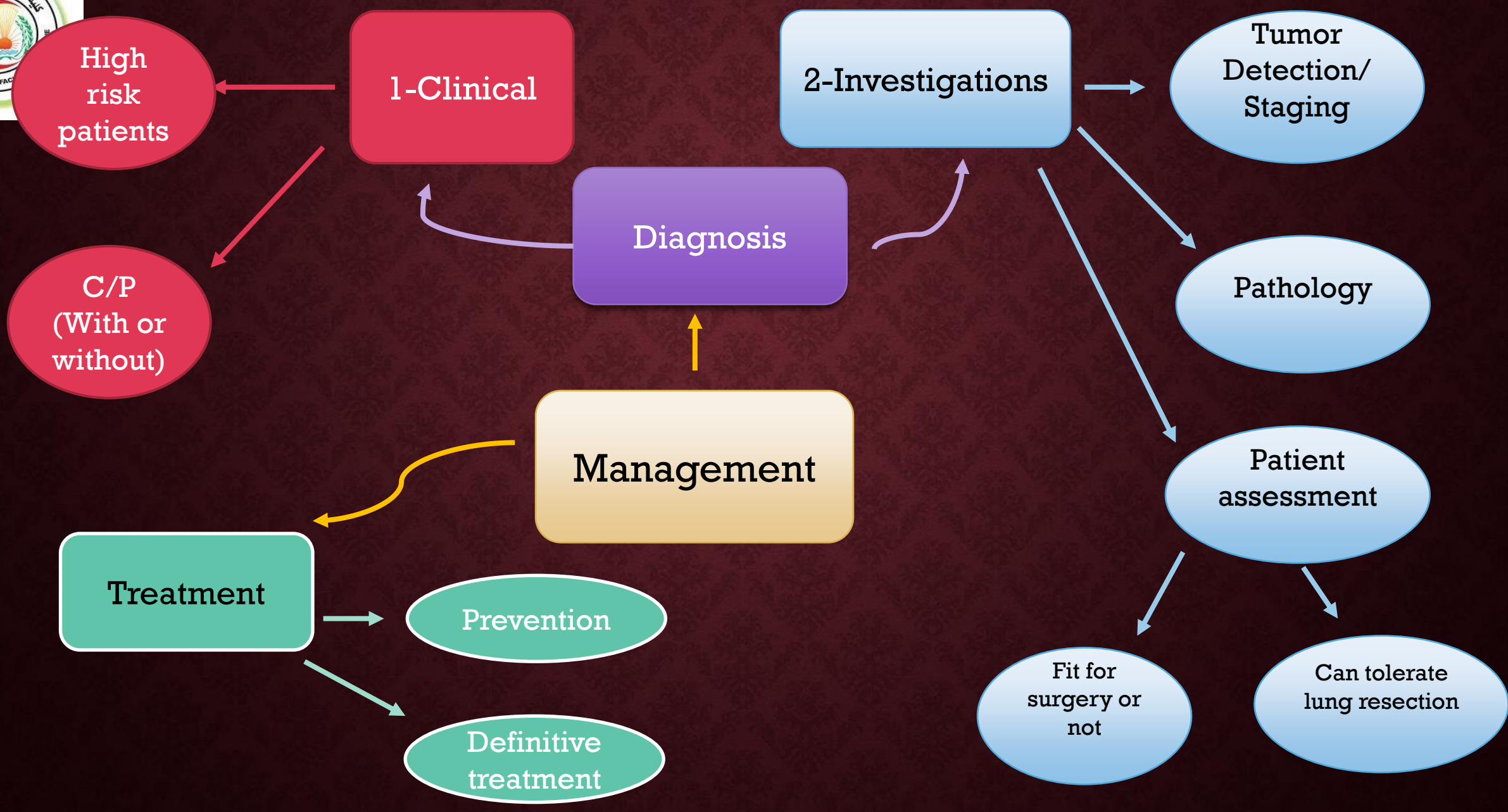
## Objectives:

How to manage a case of  
bronchogenic carcinoma..??

- Diagnosis
- Treatment
- Surgery







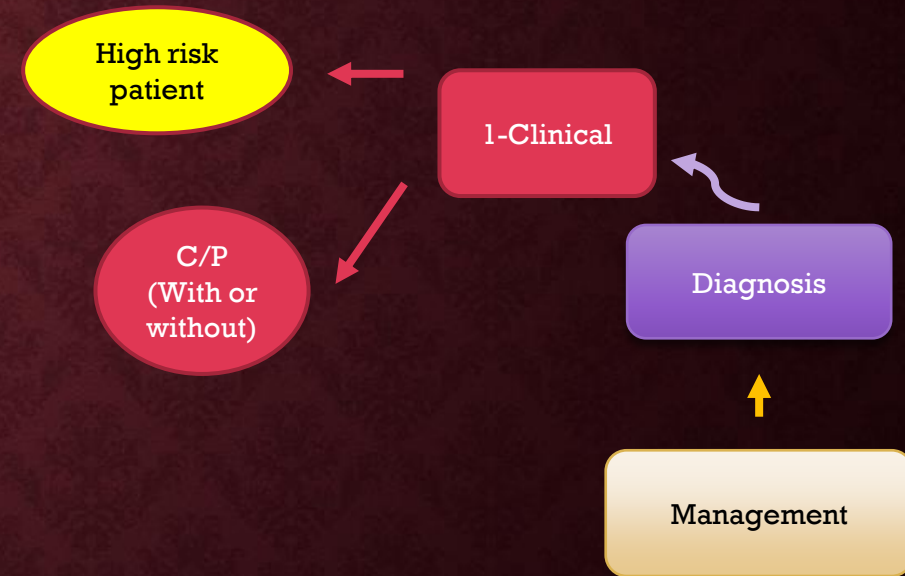


# HIGH RISK PATIENTS

-Age: >50 ys

-Gender: M > F

-Hx of Smoking







-Exposure to air pollution

-Occupational:-

-Asbestosis

-Irradiation

-Previous lung pathology(scar carcinoma)

-Genetic (Lung cancer susceptibility genes) :-

-epidermal growth factor receptor (EGFR)

-major susceptibility locus influencing lung cancer risk at 6q23–25p

-marker on chromosome 15





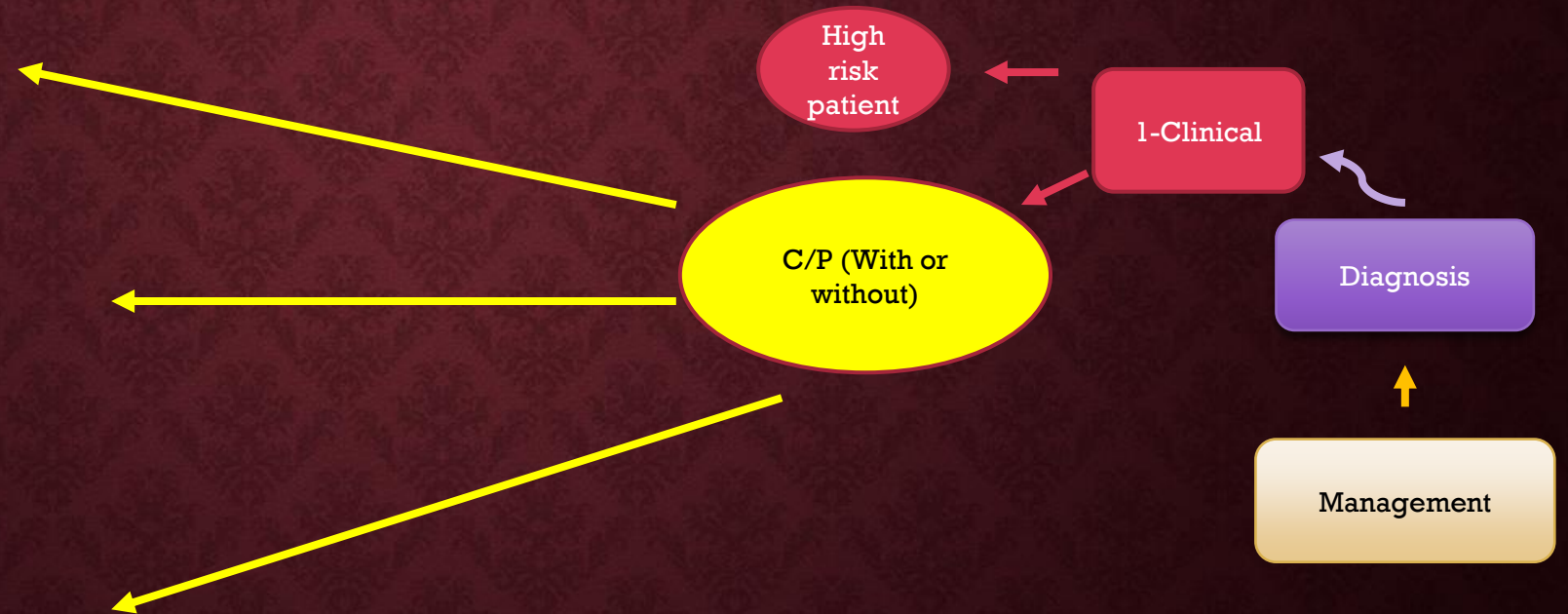
# CLINICAL PRESENTATION

A-General:.

Wt loss, anorexia

B-Intrathoracic

C-Extrathoracic







# B-INTRATHORACIC

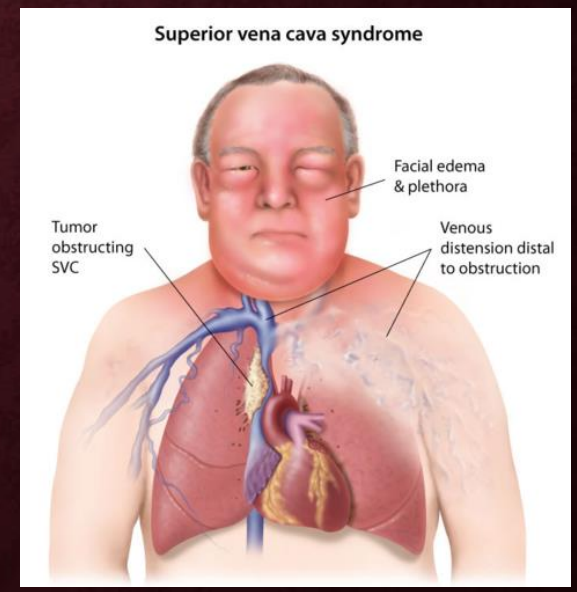
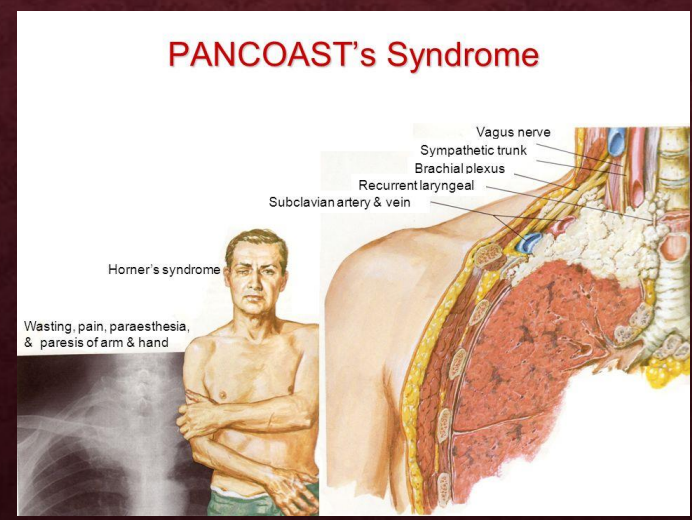
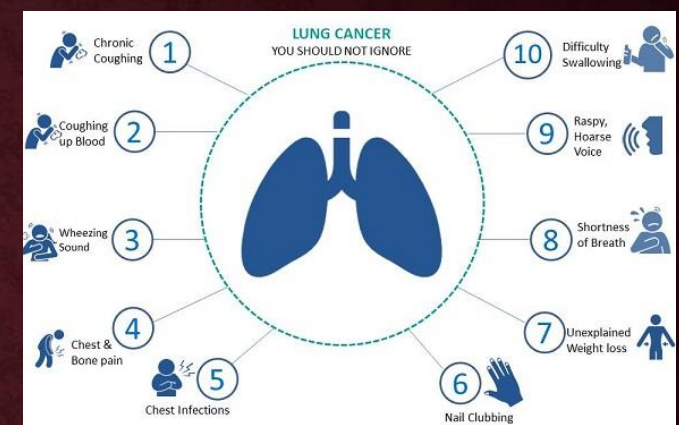
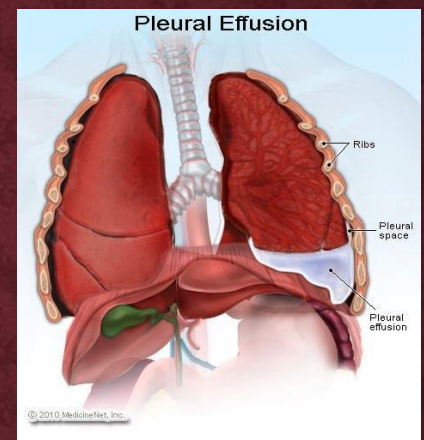
1-Bronchopulmonary

2-pleural effusion

3- Mediastinal syndrome (compressive symptoms)

4-Superior sulcus

(Pancoast) syndrome





## Bronchopulmonary manifestations:-

### A) Peripheral or small:-

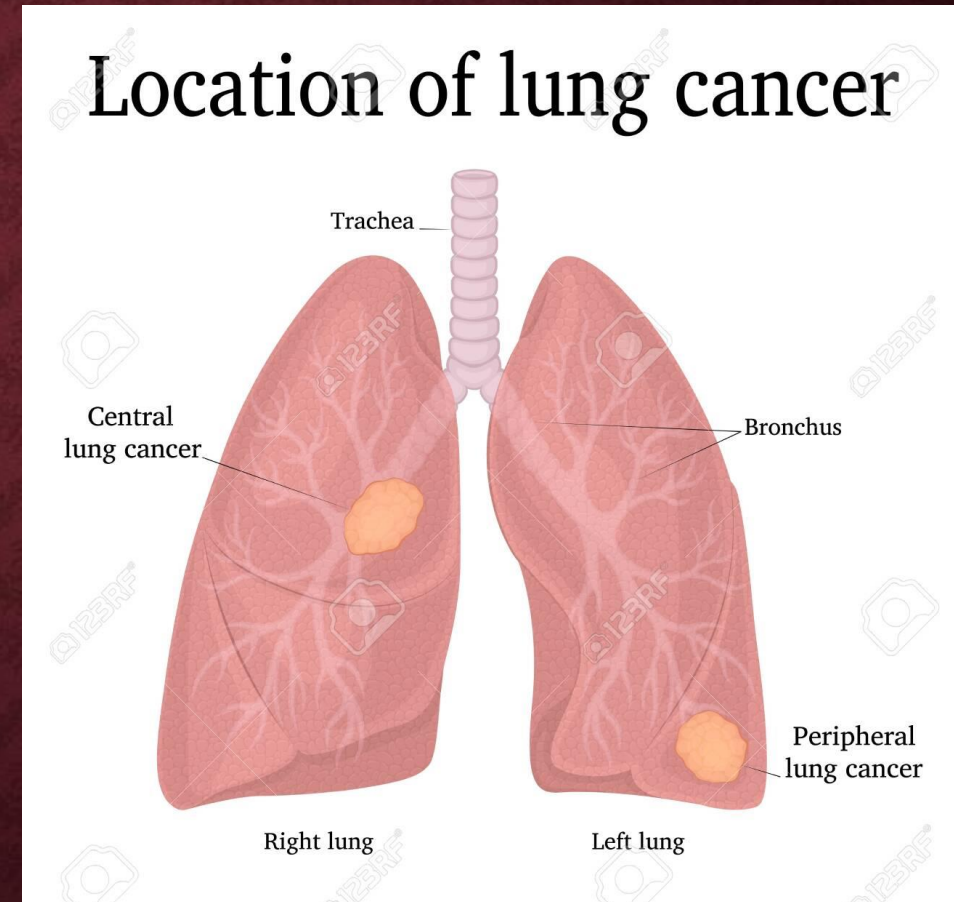
1-Asymptomatic (more common)

2-symptomatic (less common)

### B) Central or large:-

1-Symptomatic (more common)

2-Asymptomatic (less common)







## Symptomatic

-non obstructive:

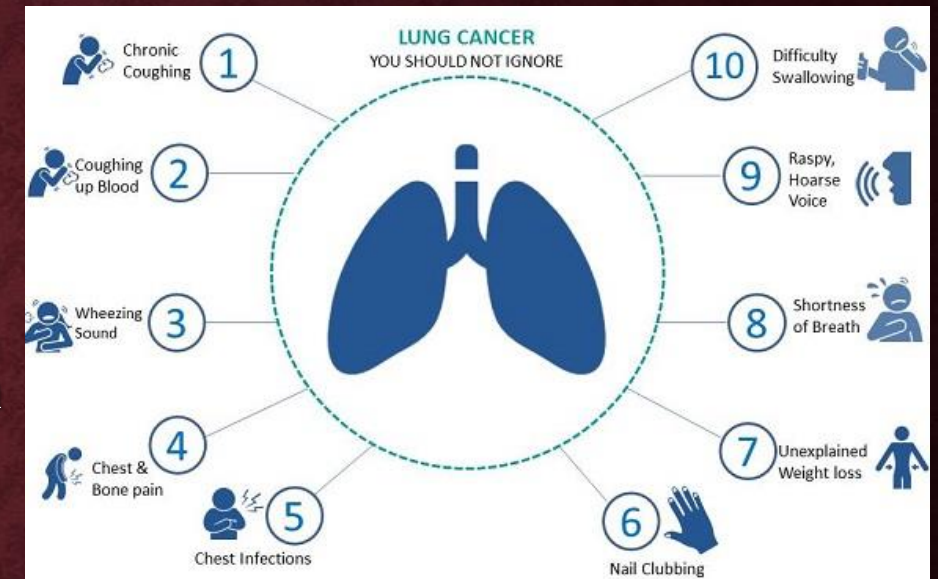
chronic cough, hemoptysis, vague chest pain  
and secondary pneumonitis.

-obstructive :

.. Partial: recurrent bouts of pneumonia, bronchitis, bronchiectasis

and lung abscess.

..Complete: atelectasis and necrosis of distal lung.





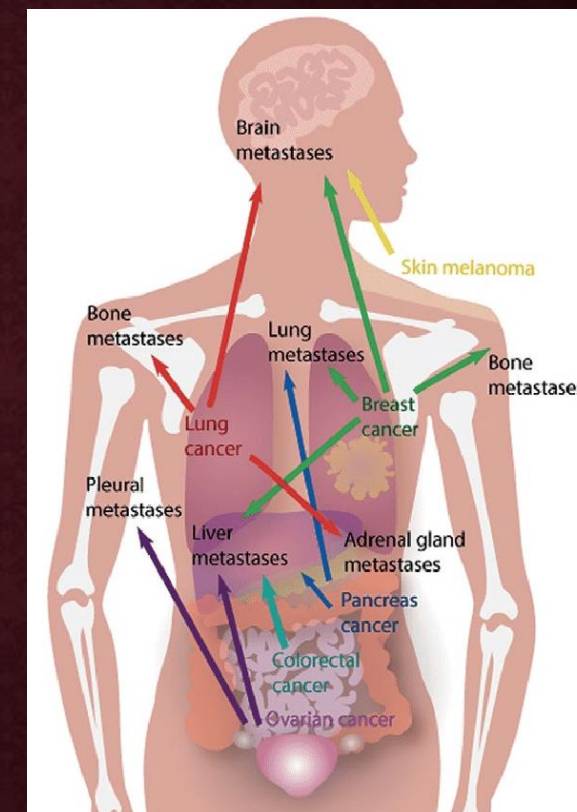
# C-EXTRATHORACIC

1-Distant metastasis:  
bone, liver and brain

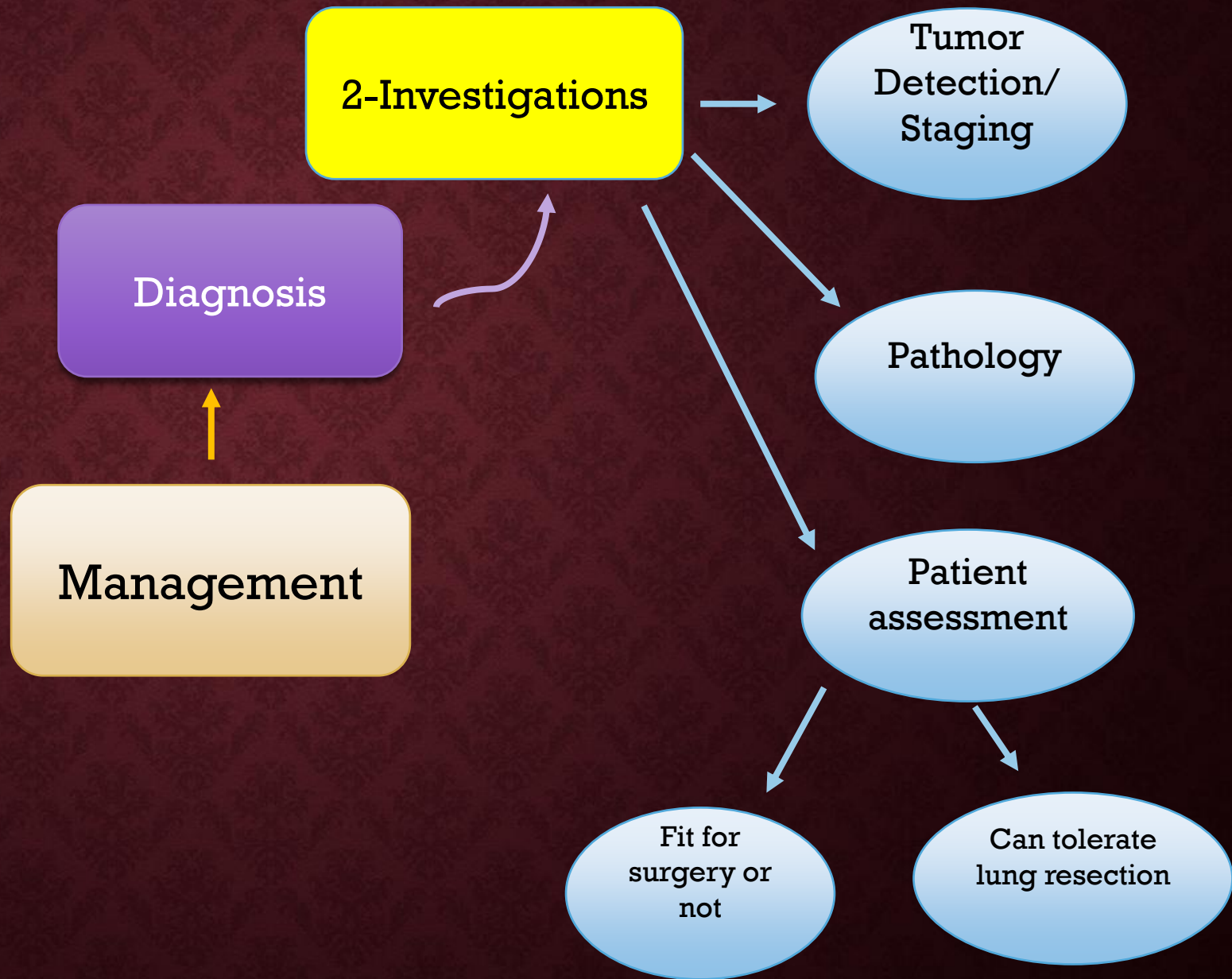
2-Paraneoplastic syndrome  
(small cell lung cancer)

<b>Endocrinological</b>	<b>Hematological/vascular</b>
Hypercalcemia (PTH-RP)	Anemia
Hyponatremia (SIADH)	Autoimmune hemolytic anemia
Cushing's syndrome (ACTH)	Leukocytosis
Gynecomastia (beta hCG)	Eosinophilia
Galactorrhea (prolactin)	Monocytosis
Hypoglycemia	Thrombocytosis
Acromegaly	Idiopathic thrombocytopenic purpura
	Trousseau's syndrome
<b>Nonbacterial thrombotic endocarditis</b>	
<b>Vasculitis</b>	
<b>Neurologic</b>	<b>Miscellaneous</b>
Peripheral neuropathy	Fever
Cerebellar degeneration	Renin hypertension
Encephalomyelitis	Membranous nephropathy
Lambert-Eaton syndrome	Hyperuricemia/hypouricemia
<b>Musculoskeletal/dermatological</b>	
Clubbing	
Hypertrophic pulmonary osteoarthropathy	
Dermatomyositis	
Polymyositis	

PTH-RP: Parathyroid hormone related peptide, SIADH: Syndrome of inappropriate antidiuretic hormone hypersecretion, ACTH: Adenocorticotrophic hormone, hCG: Human chorionic gonadotropin







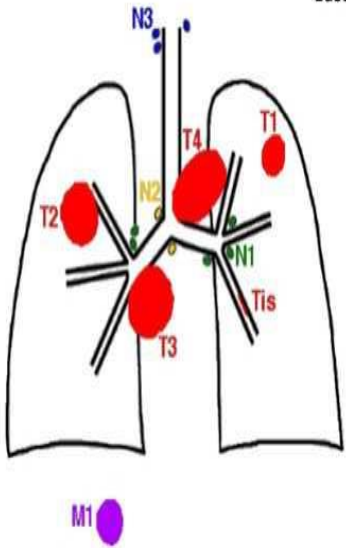


# TNM classification (8<sup>th</sup> edition):

## Staging of Lung Ca.

Based on Anatomical structure involved.

**T** – Tumor (T1-4)  
**N** – Node (N1-3)  
**M** – Metastasis (M0-1)



### Lung Cancer Staging:

- I - T1 N0 M0
- II - T1 N1 M0
- III - Tn N2 M0
- IV - Any M1

[muhadharaty.com](http://muhadharaty.com)

### TNM 8<sup>th</sup> - Primary tumor characteristics

<b>T<sub>x</sub></b>	Tumor in sputum/bronchial washings but not be assessed in imaging or bronchoscopy
<b>T<sub>0</sub></b>	No evidence of tumor
<b>T<sub>is</sub></b>	Carcinoma in situ
<b>T<sub>1</sub></b>	≤ 3 cm surrounded by lung/visceral pleura, not involving main bronchus
<b>T<sub>1a(mi)</sub></b>	Minimally invasive carcinoma
<b>T<sub>1a</sub></b>	≤ 1 cm
<b>T<sub>1b</sub></b>	> 1 to ≤ 2 cm
<b>T<sub>1c</sub></b>	> 2 to ≤ 3 cm
<b>T<sub>2</sub></b>	> 3 to ≤ 5 cm or involvement of main bronchus without carina, regardless of distance from carina or invasion visceral pleural or atelectasis or post obstructive pneumonitis extending to hilum
<b>T<sub>2a</sub></b>	>3 to ≤4cm
<b>T<sub>2b</sub></b>	>4 to ≤5cm
<b>T<sub>3</sub></b>	>5 to ≤7cm in greatest dimension or tumor of any size that involves chest wall, pericardium, phrenic nerve or satellite nodules in the same lobe
<b>T<sub>4</sub></b>	> 7cm in greatest dimension or any tumor with invasion of mediastinum, diaphragm, heart, great vessels, recurrent laryngeal nerve, carina, trachea, oesophagus, spine or separate tumor in different lobe of ipsilateral lung
<b>N<sub>1</sub></b>	Ipsilateral peribronchial and/or hilar nodes and intrapulmonary nodes
<b>2</b>	Ipsilateral mediastinal and/or subcarinal nodes
<b>3</b>	Contralateral mediastinal or hilar; ipsilateral/contralateral scalene/supraclavicular
<b>M<sub>1</sub></b>	Distant metastasis
<b>M<sub>1a</sub></b>	Tumor in contralateral lung or pleural/pericardial nodule/malignant effusion
<b>M<sub>1b</sub></b>	Single extrathoracic metastasis, including single non-regional lymphnode
<b>M<sub>1c</sub></b>	Multiple extrathoracic metastases in one or more organs

T/M	Label	N0	N1	N2	N3
T1	T1a ≤1	IA1	IIB	IIIA	IIIB
	T1b >1-2	IA2	IIB	IIIA	IIIB
	T1c >2-3	IA3	IIB	IIIA	IIIB
T2	T2a Cent, Visc Pl	IB	IIB	IIIA	IIIB
	T2a >3-4	IB	IIB	IIIA	IIIB
	T2b >4-5	IIA	IIB	IIIA	IIIB
T3	T3 >5-7	IIB	IIIA	IIIB	IIIC
	T3 Inv	IIB	IIIA	IIIB	IIIC
	T3 Satell	IIB	IIIA	IIIB	IIIC
T4	T4 >7	IIIA	IIIA	IIIB	IIIC
	T4 Inv	IIIA	IIIA	IIIB	IIIC
	T4 Ipsi Nod	IIIA	IIIA	IIIB	IIIC
M1	M1a Contr Nod	IVA	IVA	IVA	IVA
	M1a Pl Dissem	IVA	IVA	IVA	IVA
	M1b Single	IVA	IVA	IVA	IVA
	M1c Multi	IVB	IVB	IVB	IVB





## ***\*\*WHO HISTOLOGIC CLASSIFICATION OF BRONCHOGENIC CARCINOMA:-***

1-Non small cell lung cancer(NSCLC)

2-Small cell lung cancer (SCLC)

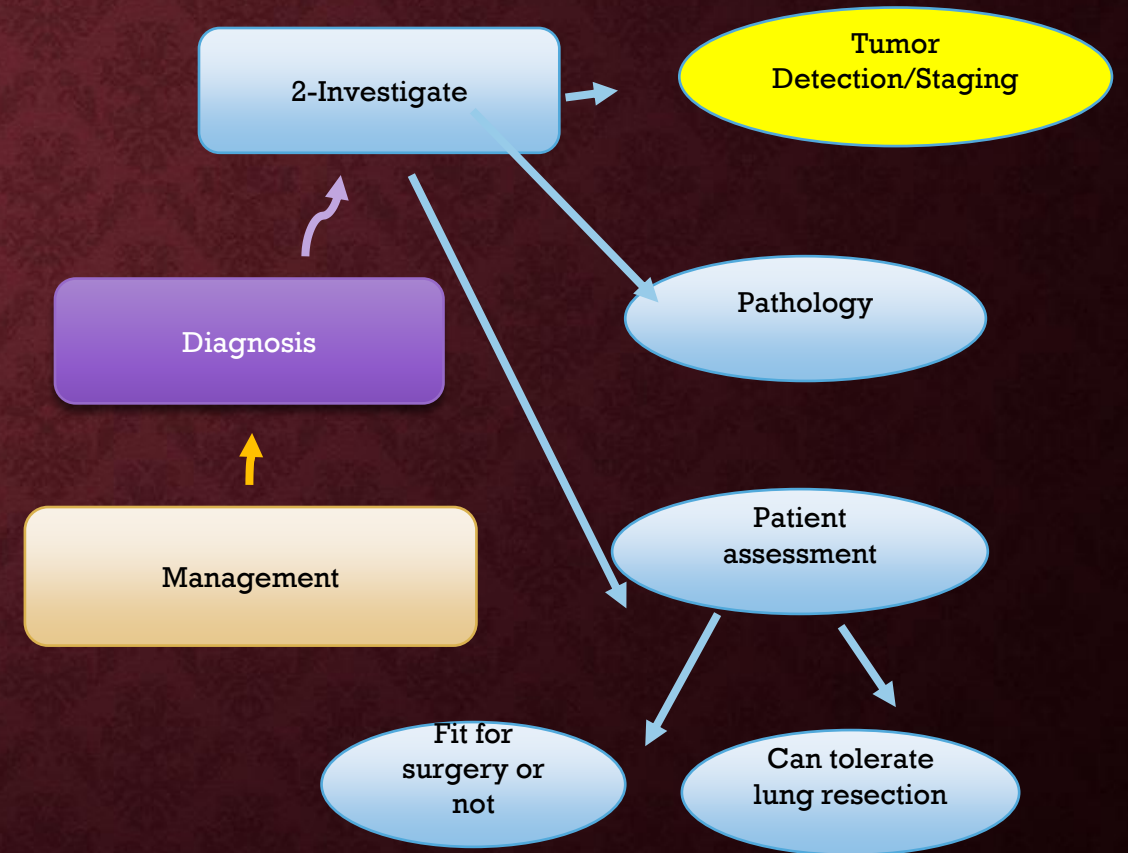


# 1-Tumour detection and staging

1-Radiological

2-Tumour markers

3- Metastatic workup

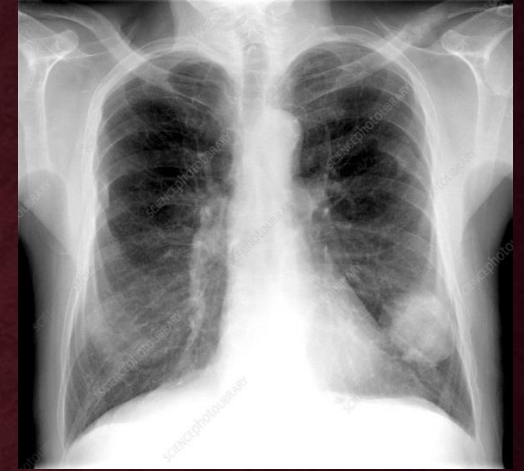




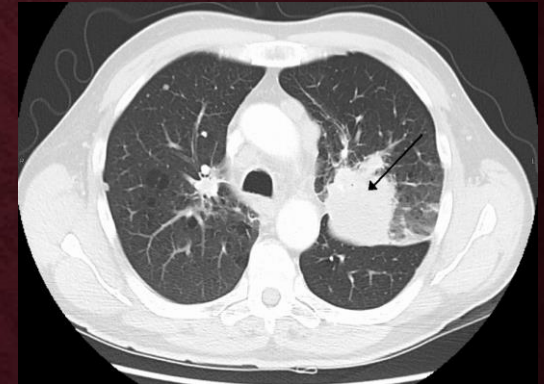


- CXR

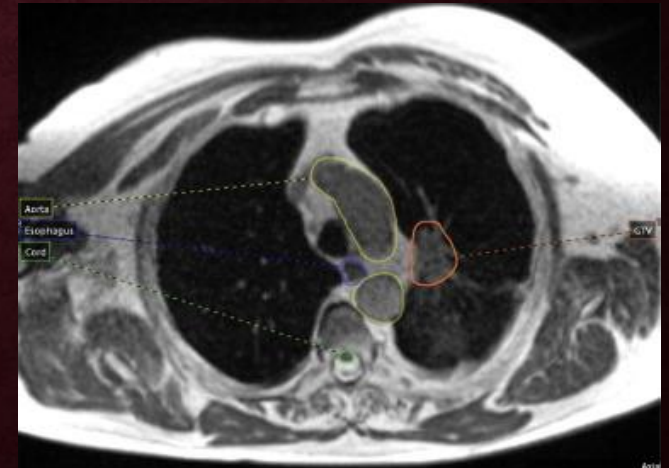
## Radiological



- CT



-MRI (infiltration to the surroundings)





## Metastatic workup

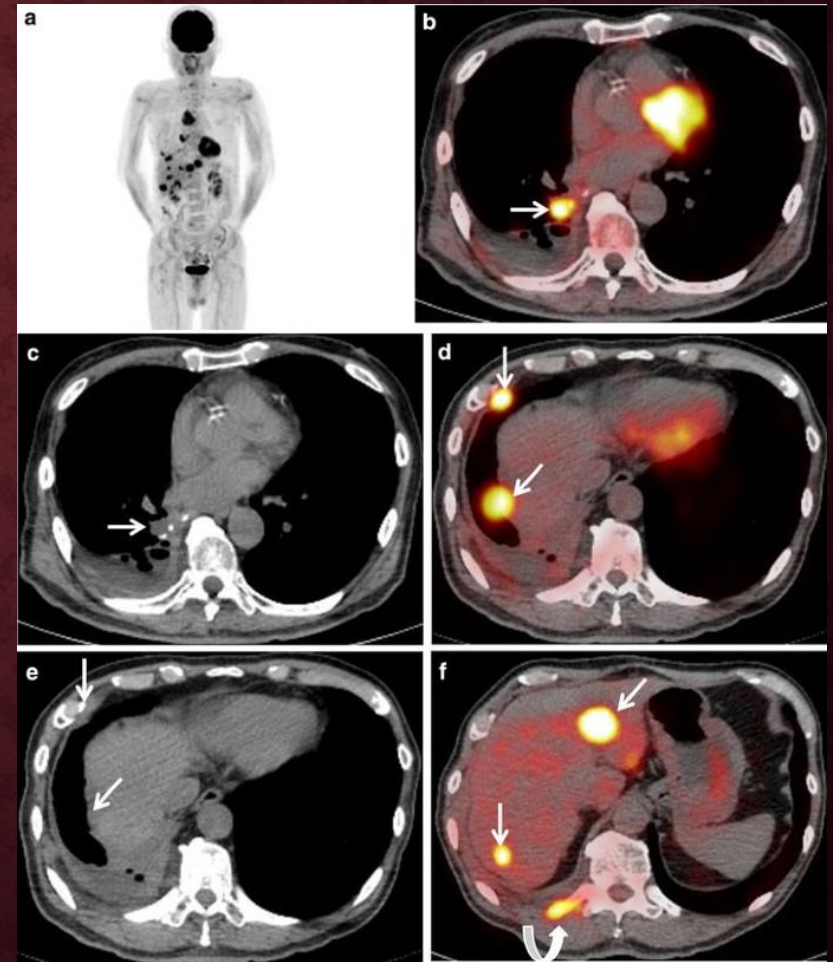
-PET scan(whole body)

18-fluorodeoxyglucose (18FDG PET scan)

....standard uptake value (SUVmax) ..2.5

-Abd.US,CT :liver,adrenal

-CT brain







## 2-Detection of pathology

1-Sputum cytology

2-Tissue and LN biopsy:-

a-needle biopsy---FNAB(trans;thoracic, bronchial, esophageal)

---true cut

b-Endoscopic:

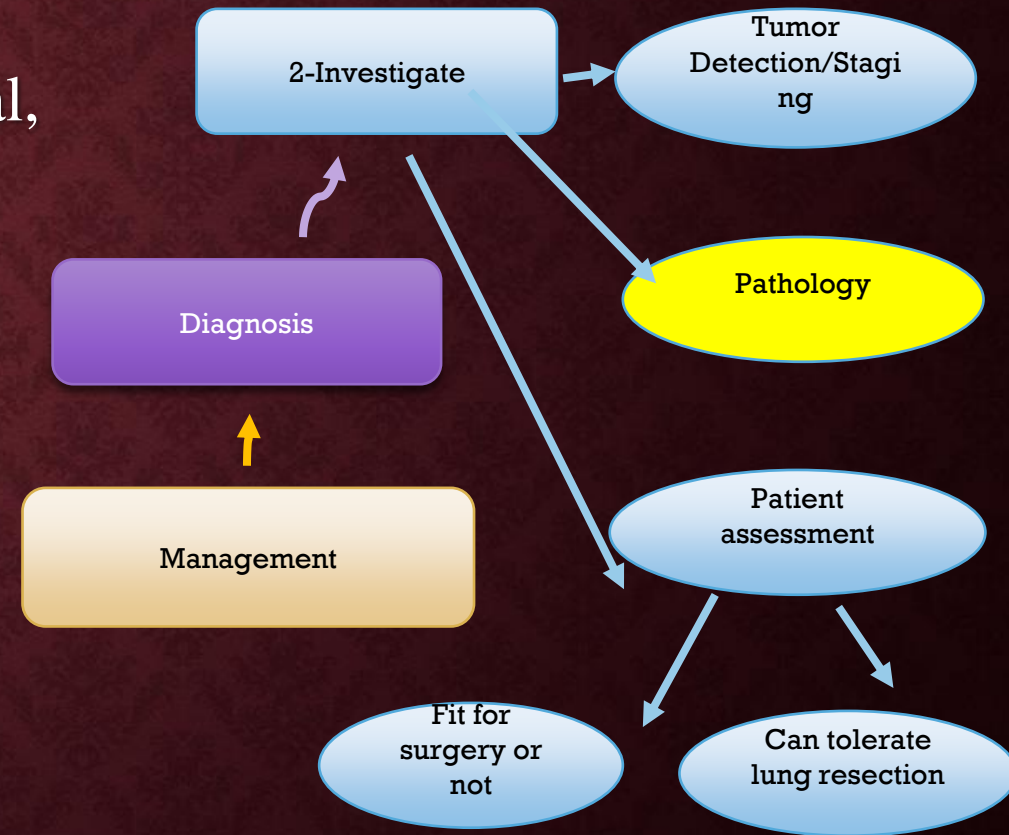
-bronchoscopy:-punch  
-EBUS  
-brushing  
-lavage

- Mediastinoscopy

- VATS

c-open biopsy

3-Pleural or pericardial aspiration

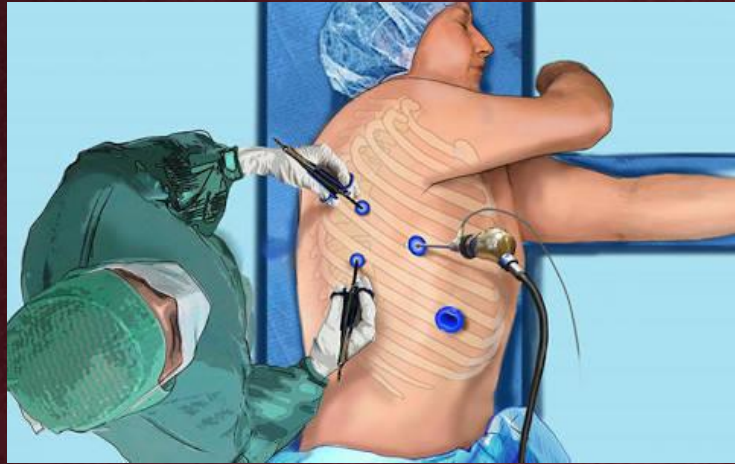




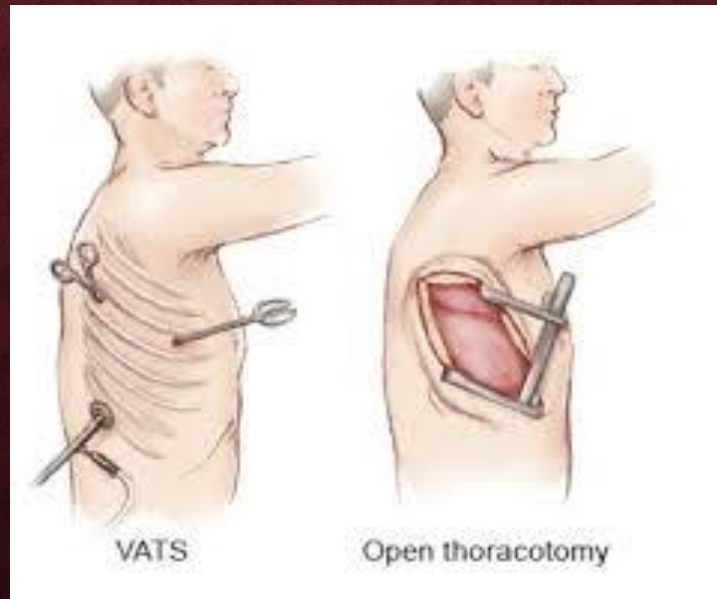




## VATS biopsy

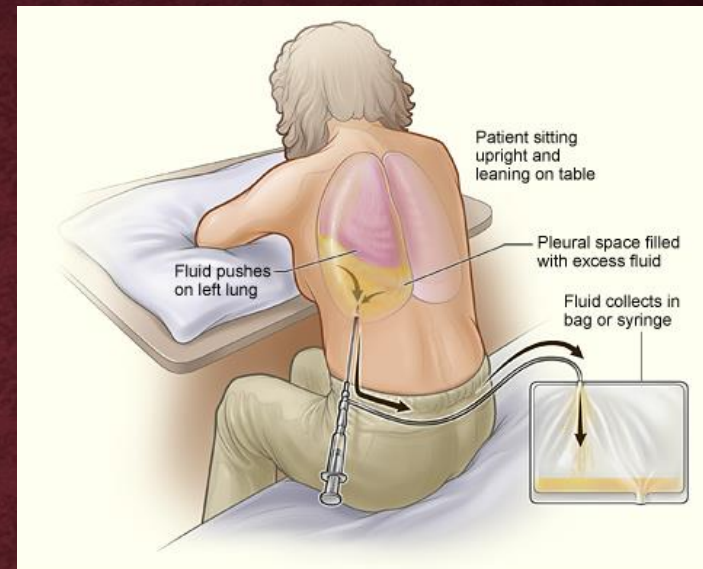


## Open biopsy

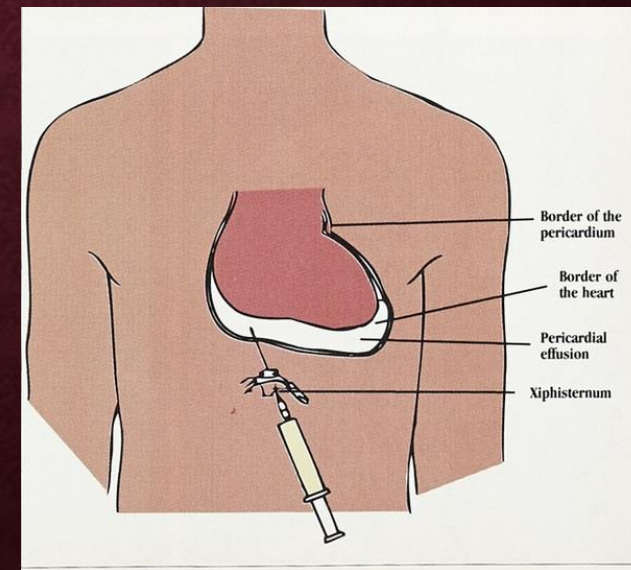




## Pleural aspiration(pleurocentesis)



## Pericardial aspiration(pericardiocentesis)





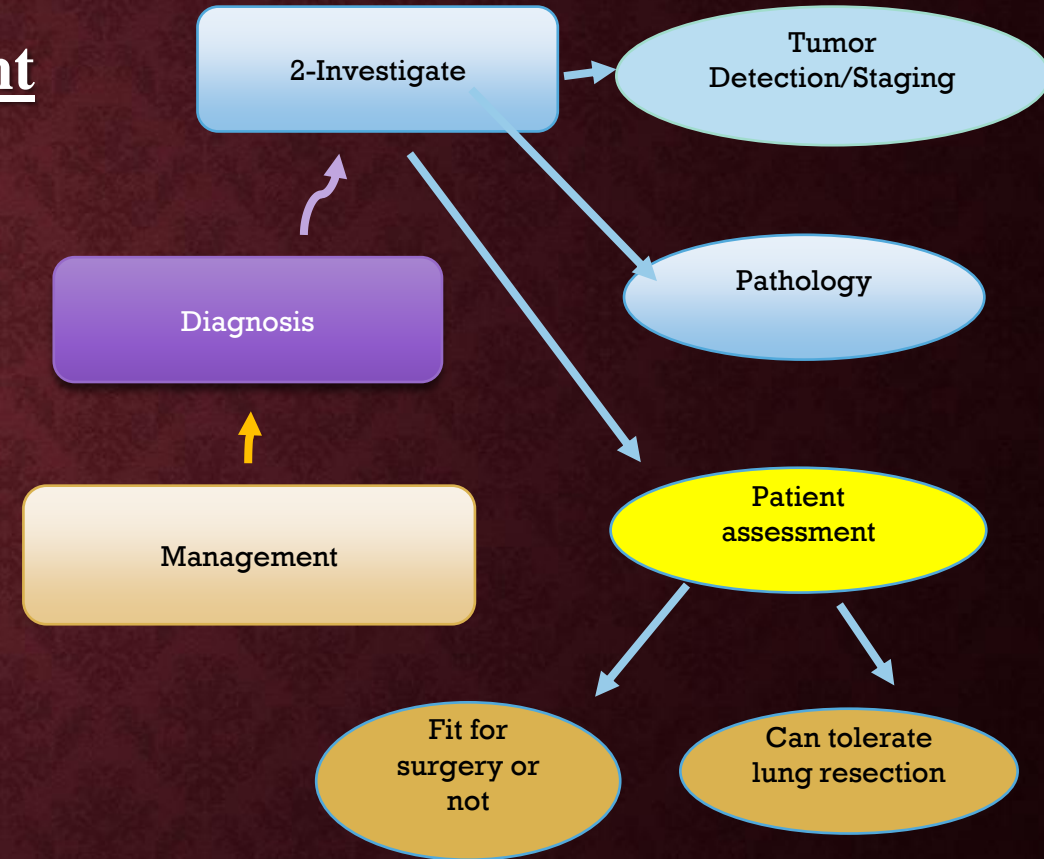


### 3-Patient assessment

#### 1-Routine preoperative evaluation:

- Lab: CBC, LFT, RFT, .....
- ECG
- Echo

#### 2-Pulmonary function tests





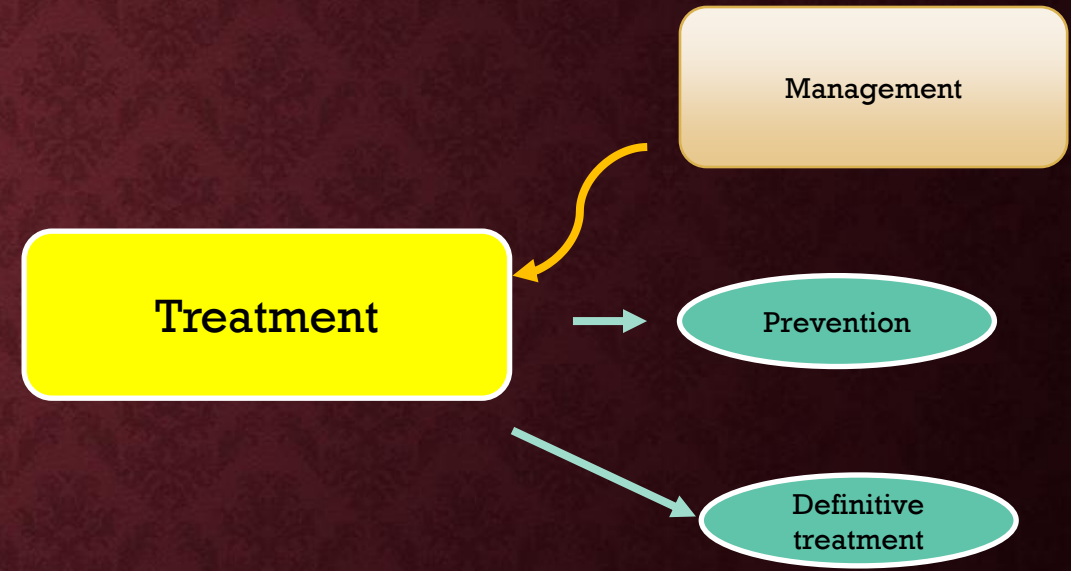
# Treatment

## 1-Prevention:-

- 1- Prevention of predisposing factors
- 2-screening

## 2-Definitive treatment:

- 1-Bronchoscopic
- 2-Surgical
- 3-Adjuvant therapy:-
  - Chemotherapy
  - Radiotherapy
  - Immunotherapy



Treatment is tailored according to the individual pathology and staging





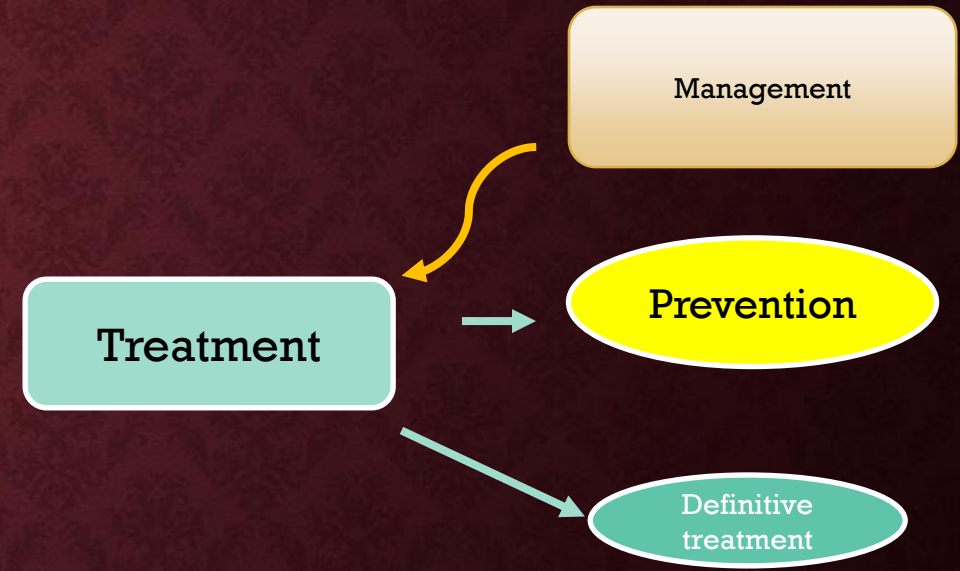
## 1-Prevention:-

### 1- Prevention of predisposing factors

- Smoking
- Exposure to pollution

### 2-Screening

- Early diagnosis (By CT chest) and treatment...





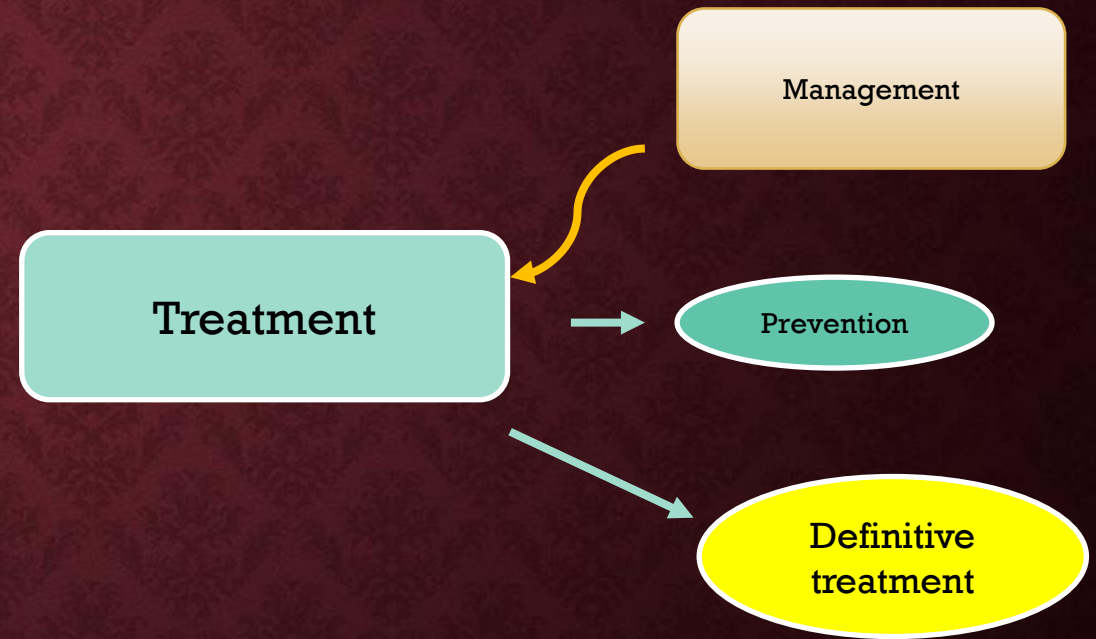
## 2-Definitive treatment:

1-Bronchoscopic

2-Surgical

3-Adjuvant therapy:-

- Chemotherapy
- Radiotherapy
- Immunotherapy







# 1-BRONCHOSCOPIC

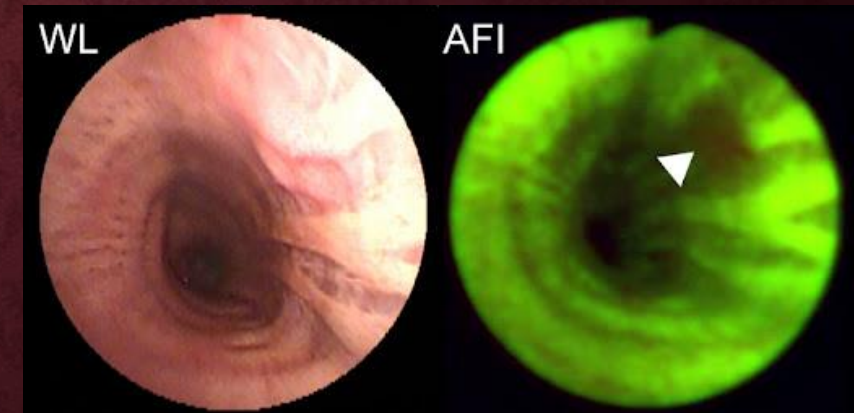
used in:

1-advanced disease to relieve bronchial obstruction (Palliative ttt)

2-unfit patient for surgery (Palliative ttt)

3-local endobronchial recurrence

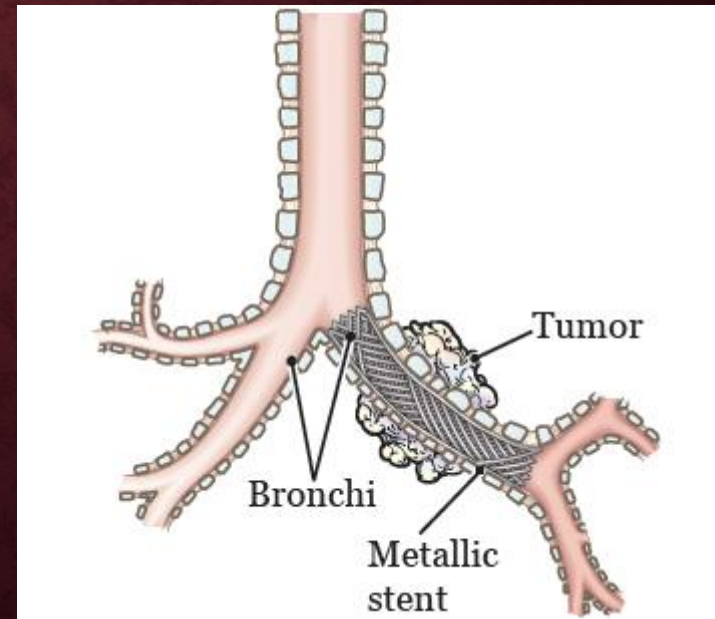
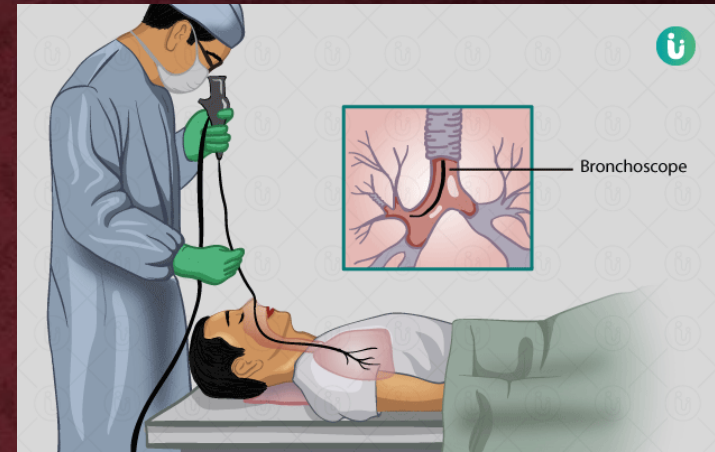
4- local endobronchial occult carcinoma (autofluorescence bronchoscopy)





## In the form of:-

- Photodynamic therapy
- Thermal Laser Ablation(Nd YAG,CO2)
- Brachytherapy
- Cryotherapy
- Electrocautery
- Argon Plasma Coagulation
- Stents





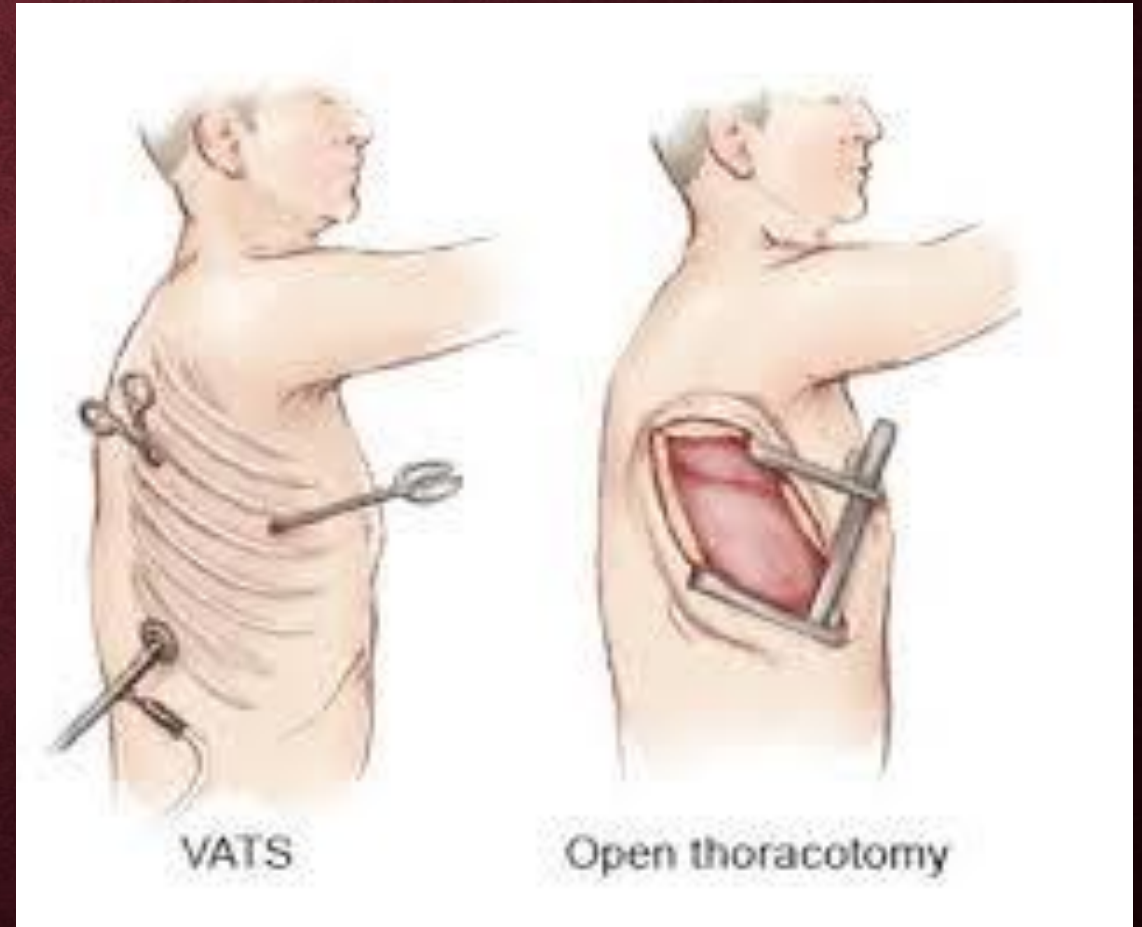


## 2-SURGICAL:-

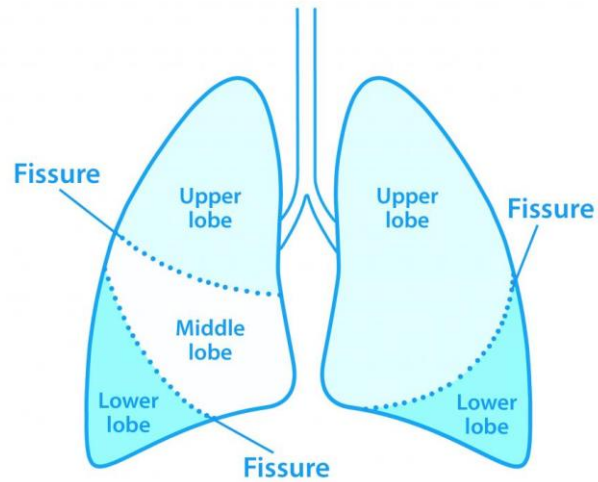
via

-Open thoracotomy

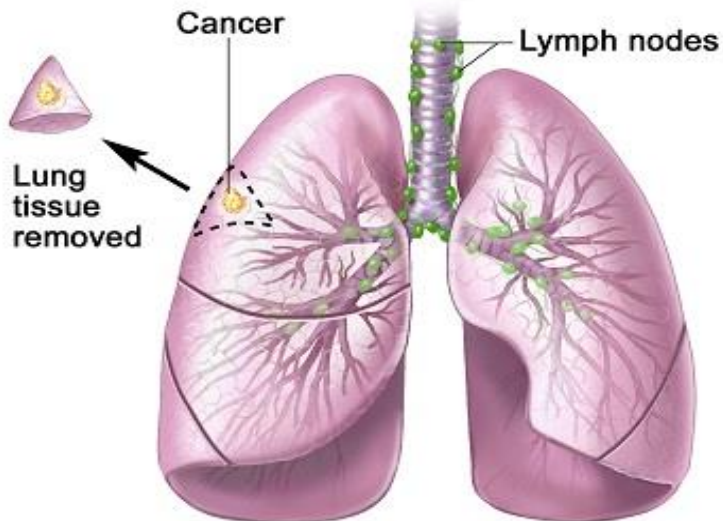
-VATS (Thoracoscopic surgery)



# Types of pulmonary resections.....



## Wedge Resection of the Lung

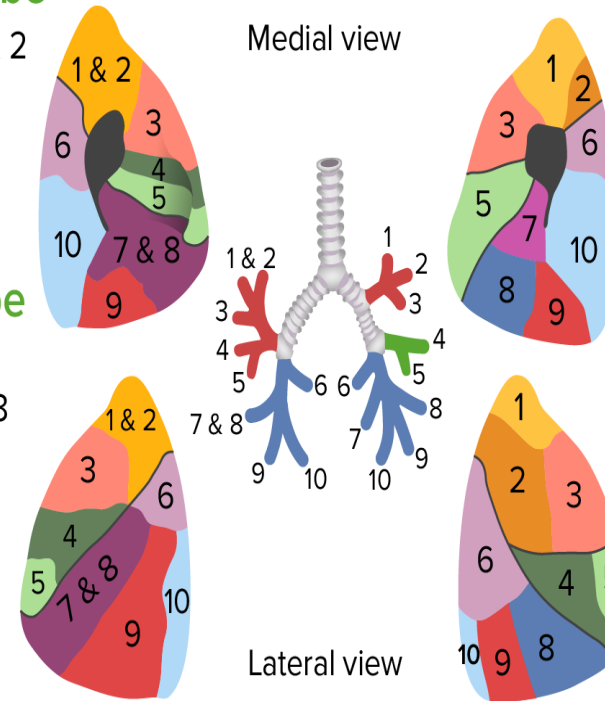


## Left superior lobe

- Apical posterior 1 & 2
- Anterior 3
- Superior lingula 4
- Inferior lingula 5

## Left inferior lobe

- Superior 6
- Anterior basal 7 & 8
- Lateral basal 9
- Posterior basal 10



## Right superior lobe

- Apical 1
- Posterior 2
- Anterior 3

## Right middle lobe

- Lateral 4
- Medial 5

## Right inferior lobe

- Superior 6
- Medial basal 7
- Anterior basal 8
- Lateral basal 9
- Posterior basal 10





# SURGERY

## Lobectomy

(either open or thorascopic)

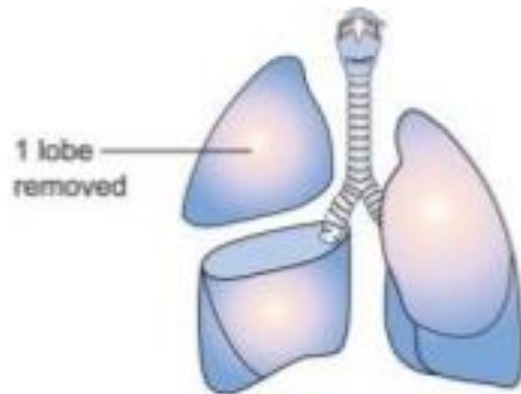
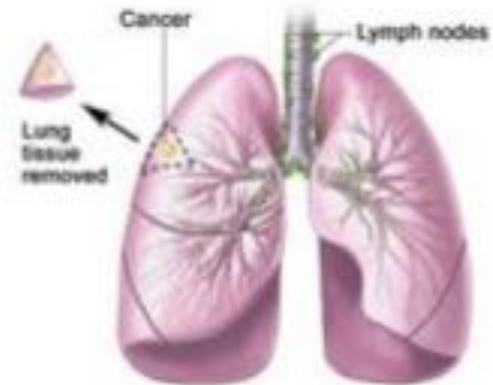


Diagram showing the removal of one lobe of the lung (lobectomy)  
Copyright © CancerHelp UK

## Segmentectomy Wedge Resection



Source: CancerHelp UK

## Bi-lobectomy Pneumonectomy Bronchoangioplastic

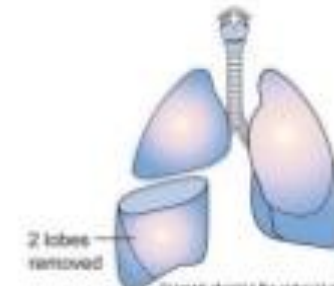


Diagram showing the removal of two lobes of the lung (bi-lobectomy)  
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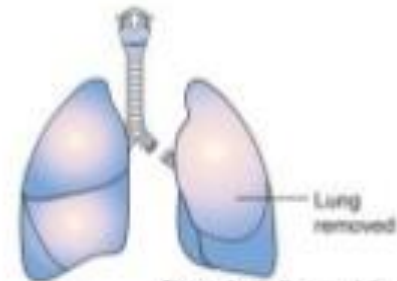
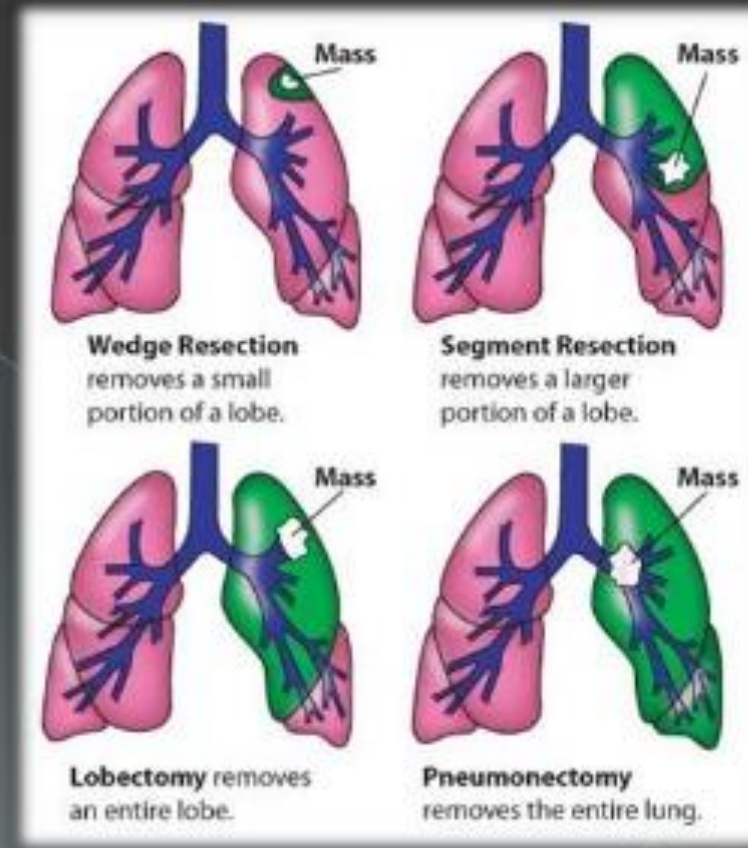


Diagram showing the removal of a whole lung (pneumonectomy)  
Copyright © CancerHelp UK

## Bronchoplasty Sleeve lobectomy

# Surgeries

1. Pneumonectomy
2. Lobectomy
3. Wedge resection
4. Segmental resection
5. Sleeve lobectomy







Collective treatment is tailored according to ...

-Pathology

-Staging



Pathology

SCLC

NSCLC

Stage

Stage I

Stage II

Stage III

Stage IV





# Pathology

SCLC  
(Metastasis)

NSCLC

- Mainly Chemoth. +Radioth.
- Role of surgery :-
  - only in stage I -----resection of the tumour + preoperative chemoth
  - postoperative:.
    - Chemoth.+Radioth.
    - Brain radioth.

Mainly surgery



# Stage

Stage I

Stage II

Stage III  
(local invasion)

Stage IV  
(Metastasis)

Surgery + complete lymphadenectomy

-Surgery then Adjuvant therapy  
Or  
-Neoadjuvant therapy then Surgery

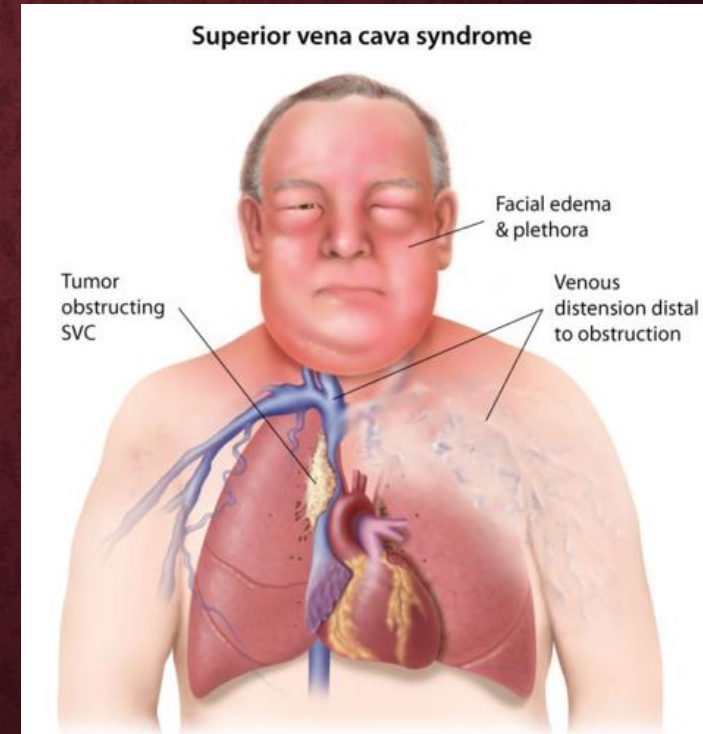
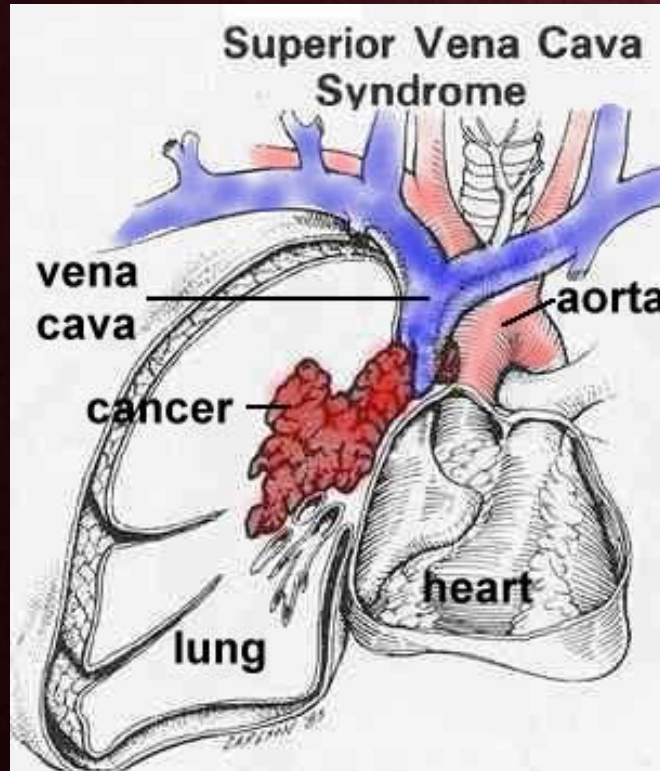
-Chemotherapy  
-Radiotherapy

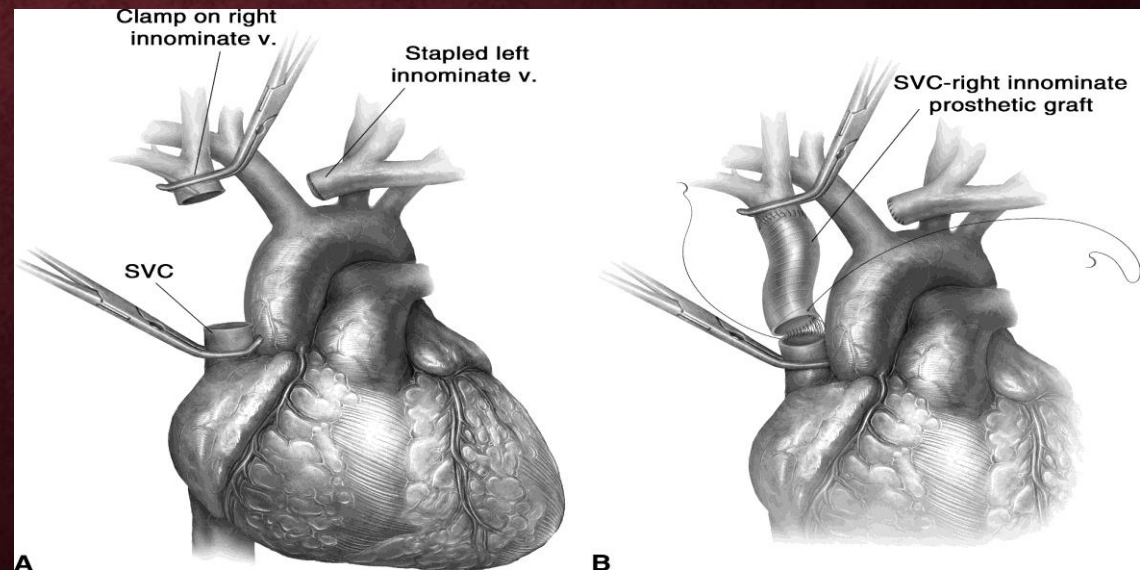
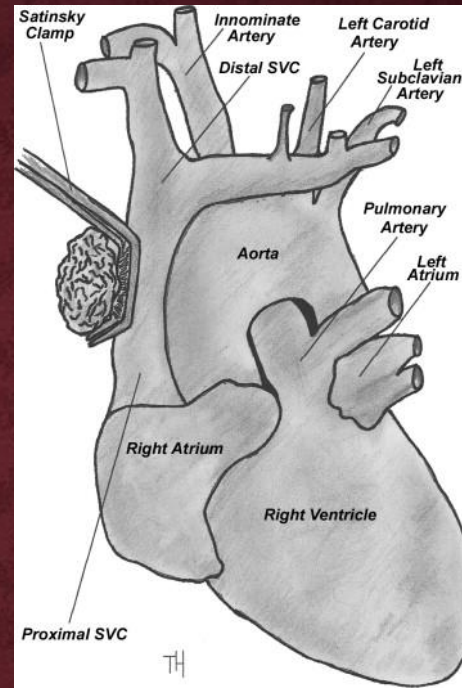
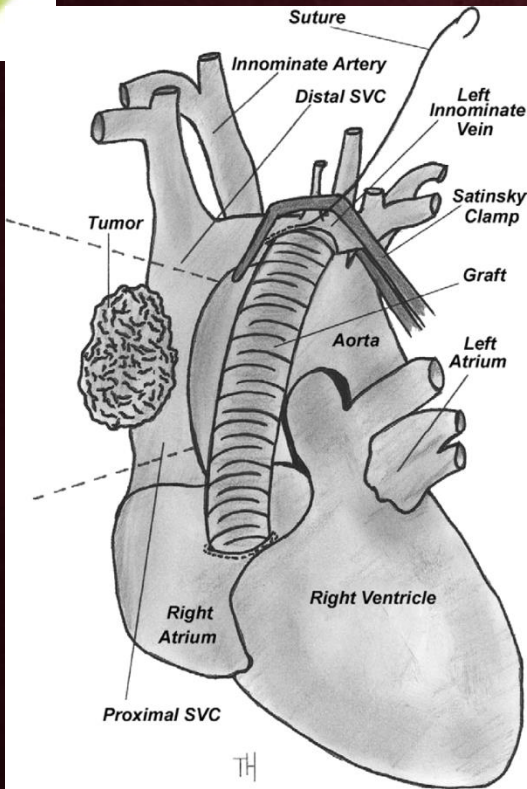




# Invasive lung cancer

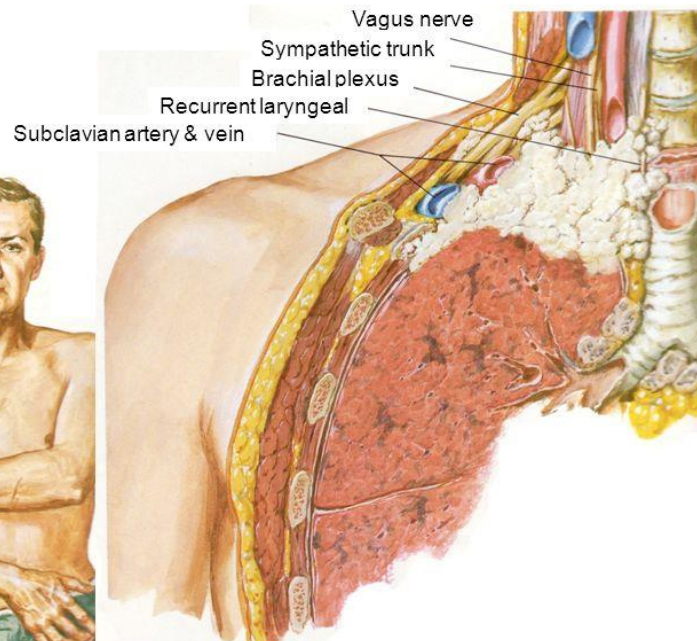
## SVC invasion





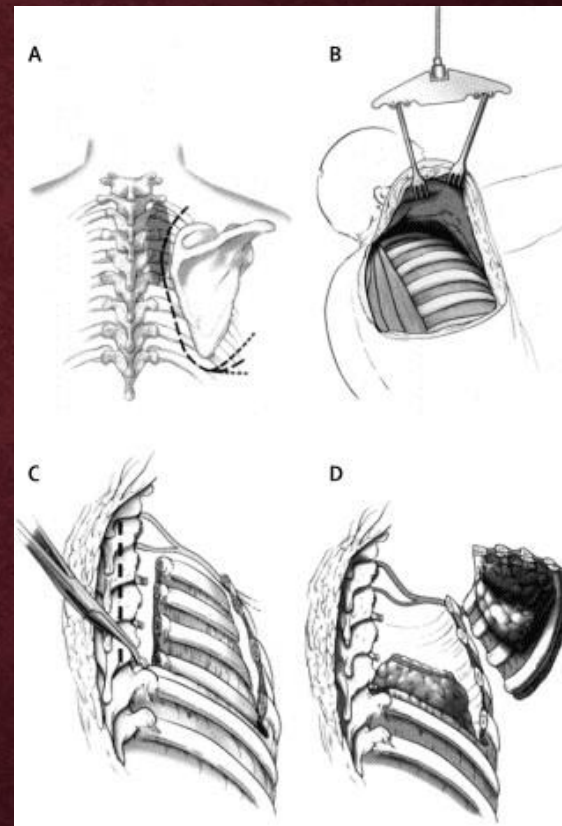
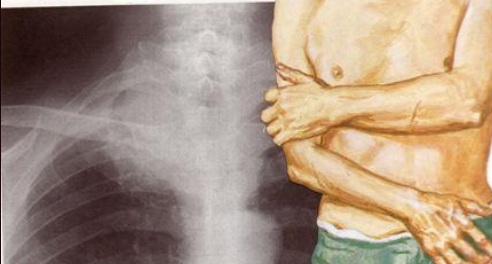


# PANCOAST's Syndrome



Horner's syndrome

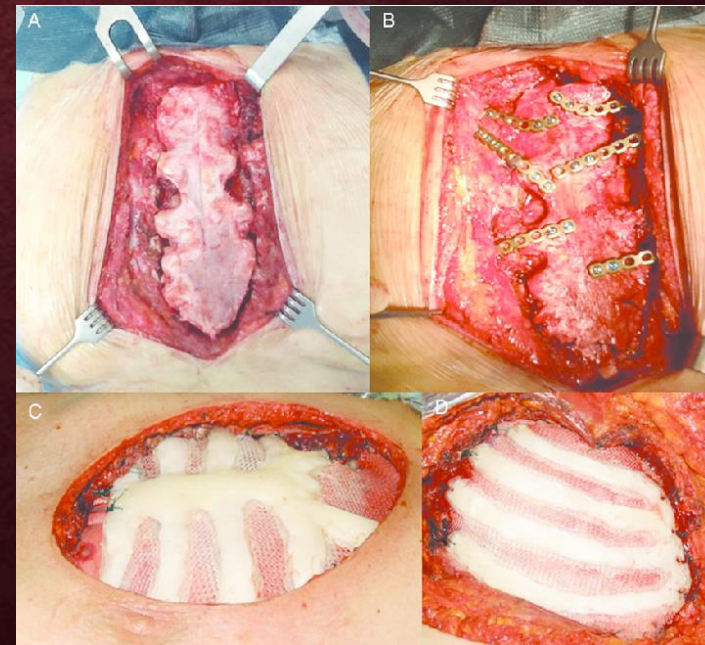
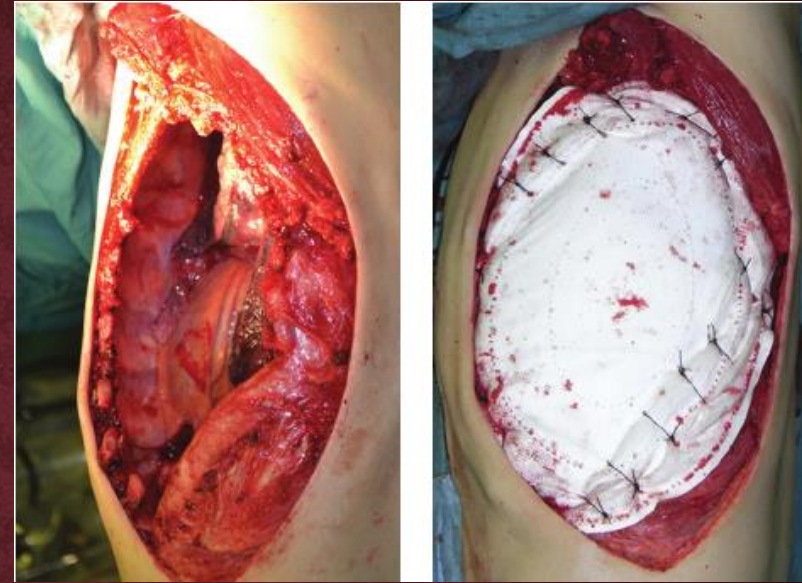
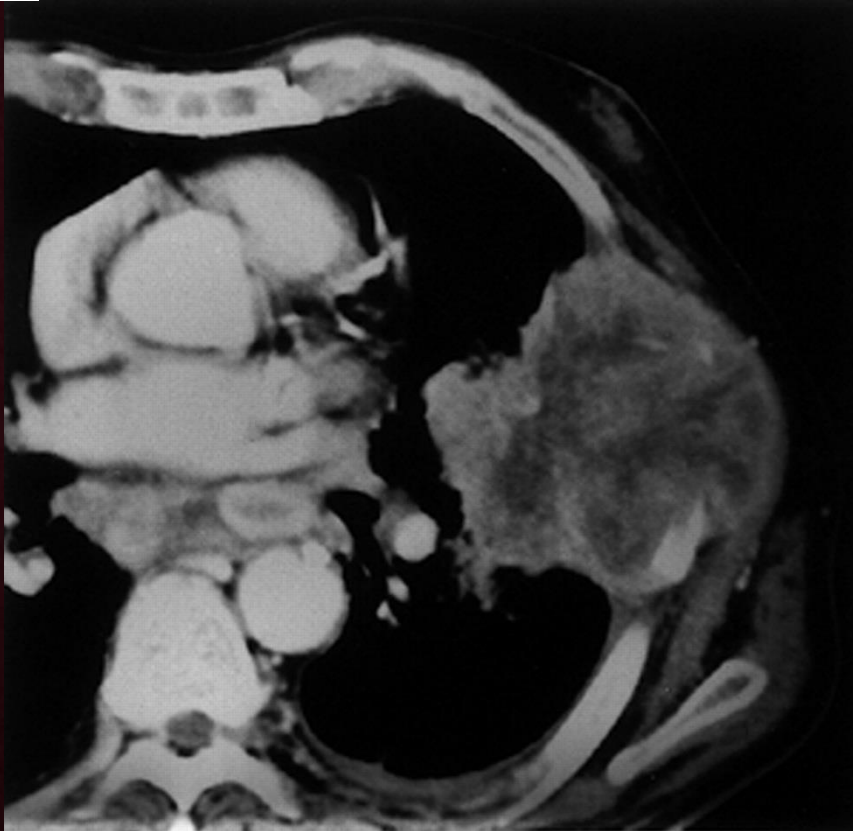
Wasting, pain, paraesthesia,  
& paresis of arm & hand







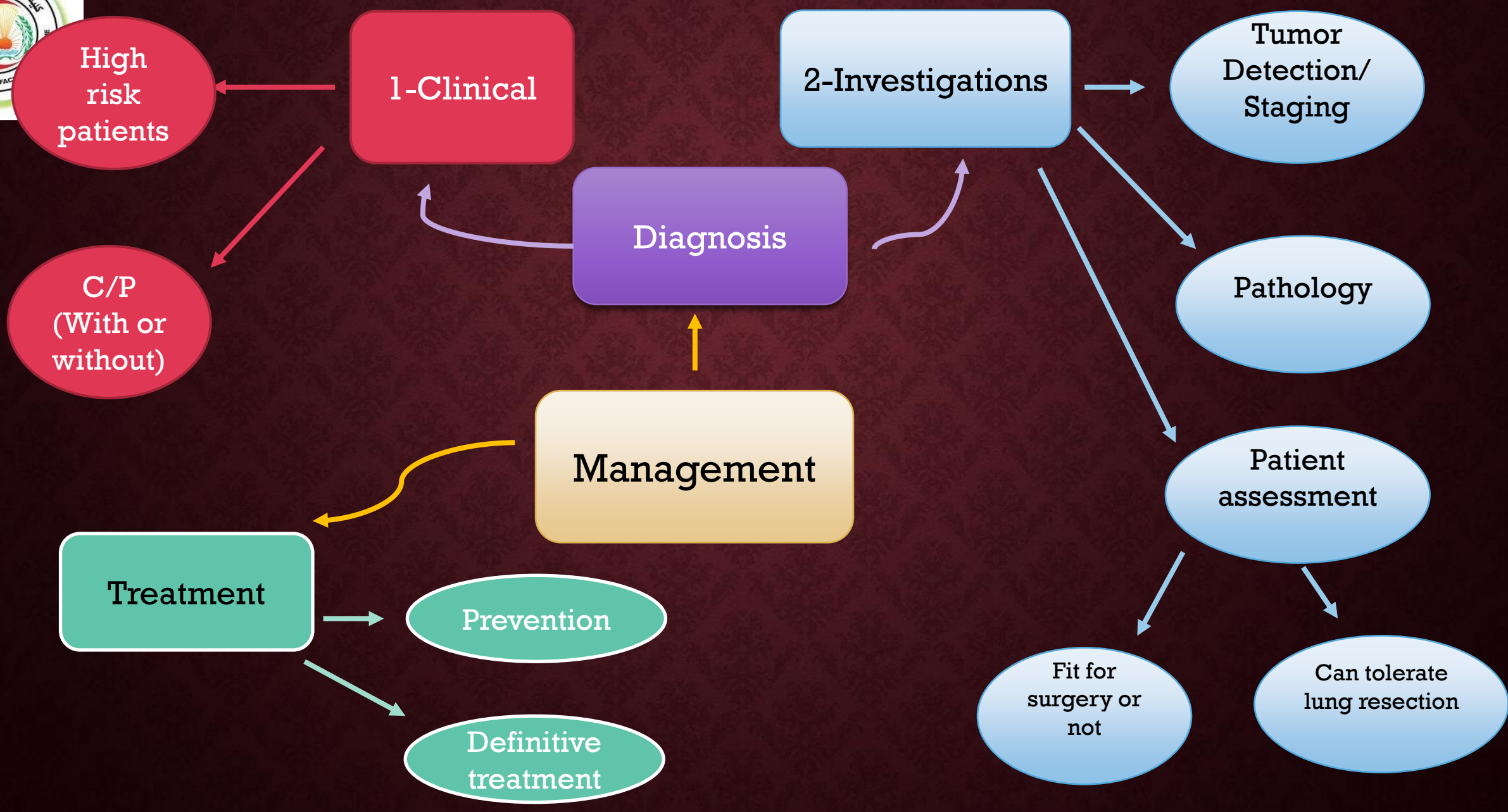
# Chest wall invasion







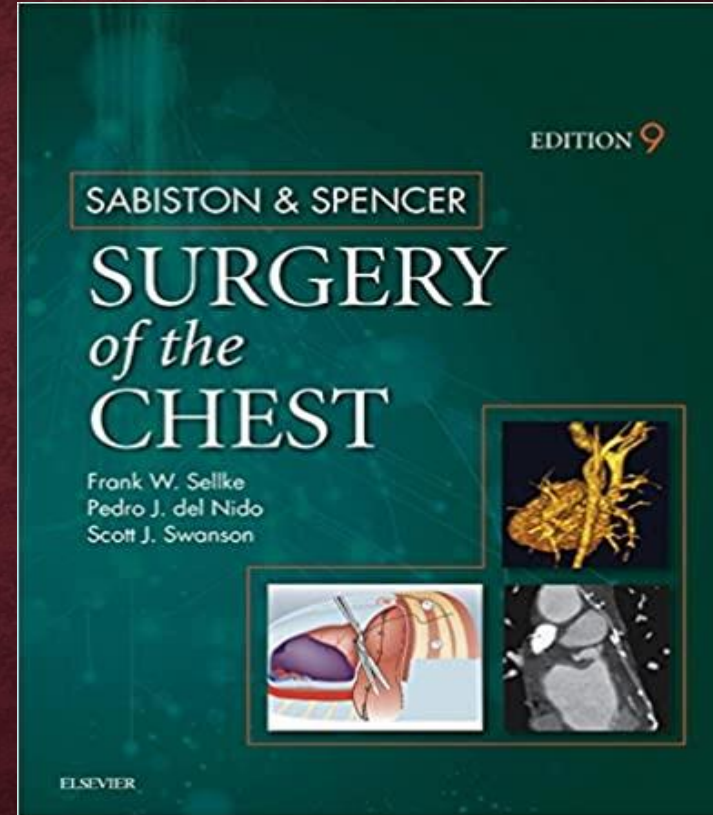
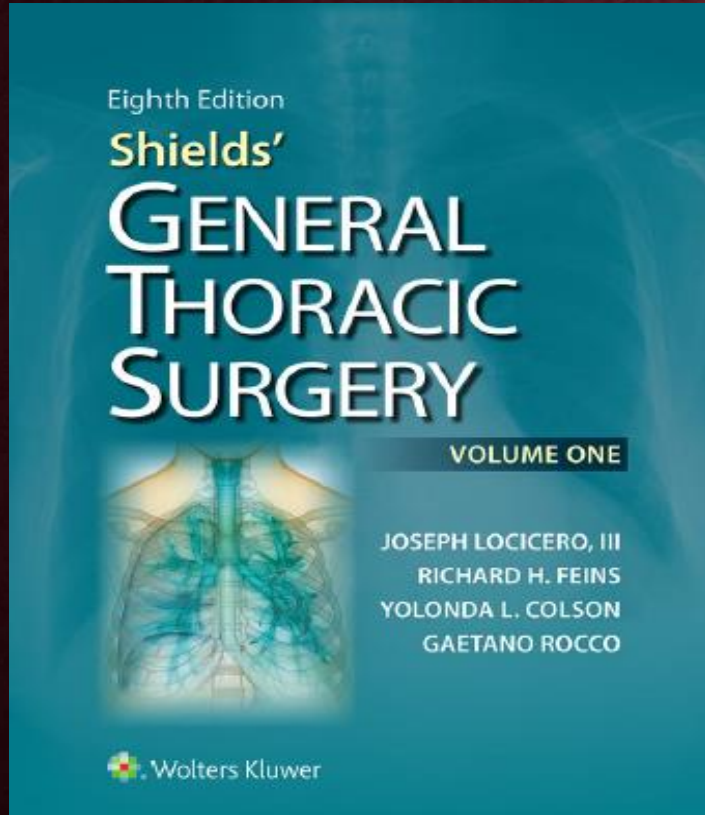
# Conclusion.....







## References:





Thank you