

Focus on treatment complications and optimal management

Surgery

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Organisers



Disclosure slide

- No disclosures
- No conflicts of interests



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Postoperative complications

- cardiac
- respiratory: *pulmonary, pleural*
- wound
- central nervous system
- urinary tract
- other (DVT, diabetic)

Postoperative respiratory complications

- introduction
- *pulmonary* complications
- *pleural* complications
- conclusions

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Postoperative complications

- difficult, complicated subject
- registration important (Δ induction therapy)
- major cause of mortality - morbidity
- who should discuss complications?
- **expert:** a man who has made all possible mistakes in a very narrow field

Top Knife, Hirshberg A & Mattox K, tfm Publishing, UK, 2005

Respiratory complications after pulmonary resection – 3516 pts

	lobectomy n = 2949	pneumonectomy n = 567
30-day †	4 %	11.5 %
30-day morbidity (1 or more complications)	23.8	25.7
pneumonia	11.7	9.7
unplanned reintubation	7.9	10.6
failure to wean > 48 h	6.6	9.3
pulmonary embolism	0.7	1.4

Harpole DH. J Thorac Cardiovasc Surg 1999; 117:969

Postoperative respiratory complications

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Pulmonary complications

- atelectasis
- pneumonia
- respiratory insufficiency
- *postpneumonectomy pulmonary oedema*
- *pulmonary embolism*
- *prolonged air leak, SC emphysema*

Postpneumonectomy pulmonary oedema

- non-cardiogenic, non-infectious pulmonary oedema
- ARDS in remaining lung



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Postpneumonectomy pulmonary oedema

- permeability oedema, diffuse alveolar damage
- incidence: 2-5% after pneumonectomy † 60-90%
- risk factors: R pneumonectomy
excessive fluid load (transfusion)
- Δ/ of exclusion
- R/ diuretics, inotropic drugs, ↓fluid infusion
ventilation (↓ airway pressure, NO)
steroids?

Pulmonary embolism

- DVT: deep venous thrombosis
- TED: thromboembolic disease
- incidence: 1-5% ↑ †
- prevention: *thromboprophylaxis*

elastic stockings

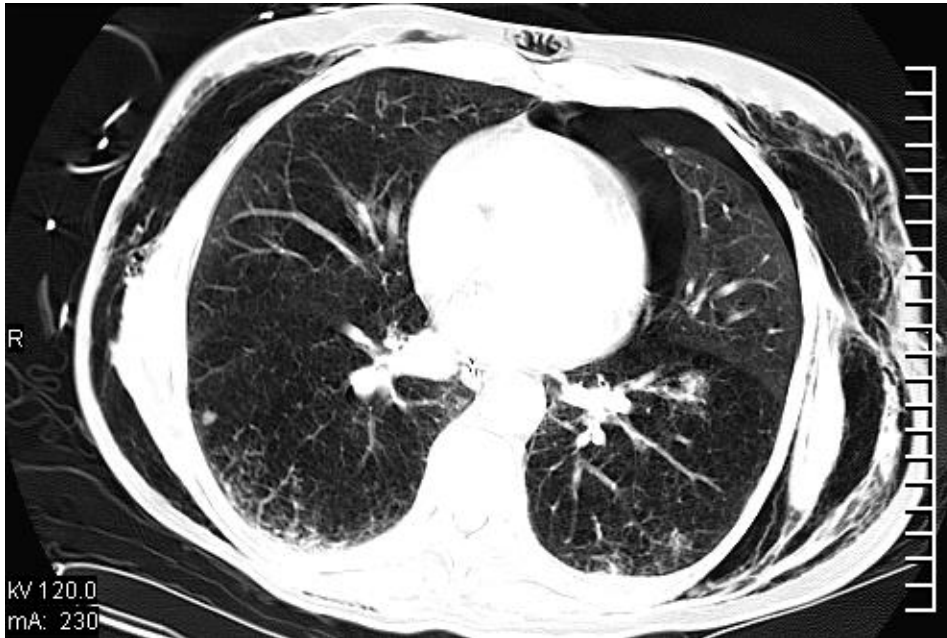
LMW heparin

peroperative pneumatic calf compression

early ambulation

Prolonged air leak

- incidence: 15% (abnormal > 7 days)
→ mediastinal, subcutaneous emphysema (*Michelin syndrome*)



Prolonged air leak

- risk factors: emphysema
volume reduction surgery
prolonged ventilatory support
- R/ perop. control of bronchial stump
 ↓ suction
 instillation talc, sclerosing agent, autologous blood
 ↑ duration: Heimlich valve
- prevention (peroperative): fibrin glue, sealant
reinforcement staple line (strips)
pleural tent

Postoperative respiratory complications

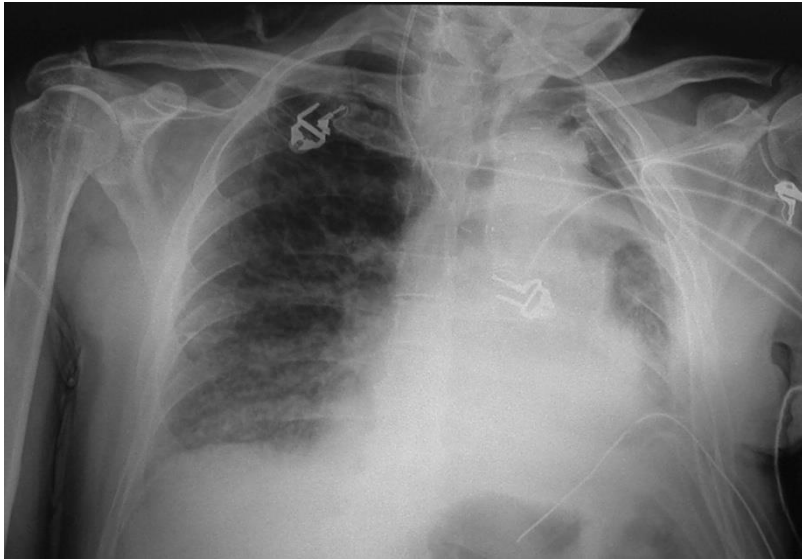
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Pleural complications

- persistent pleural space
- empyema
- bronchopleural fistula (BPF)

Pleural complications persistent pleural space

- remaining space after (bi)lobectomy, mostly apical



Pleural complications persistent pleural space

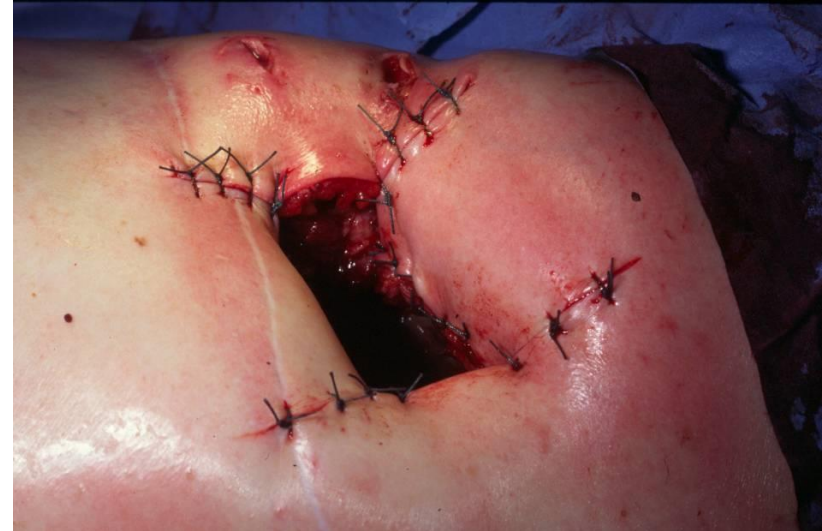
- no standard definition
- risk factors : inflammatory, infectious disease (20%)
 LVRS (air leak), emphysema
 diffuse fibrosis (stiff lung)
- R/ individual basis,
 usually conservative unless infected

Pleural complications empyema

- infected pleural space
- incidence: 2-16% after pneumonectomy
(majority also BPF)
< 2% after lesser resection
- risk factors: ↑ age, cardiopulmonary impairment,
malnutrition, induction therapy, diabetes,
steroids, R pneumonectomy, complex
procedures, pneumonia, mechanical ventilation

Pleural complications empyema

- Δ/ clinical systemic toxicity, ↓appetite
 general deterioration
 lab values: ↑ inflammatory parameters (CRP, leucocytes)
 culture pleural fluid
- R/ chest tube drainage
 thoracostomy
 antibiotics ~ cultures
 irrigation
 closure BPF



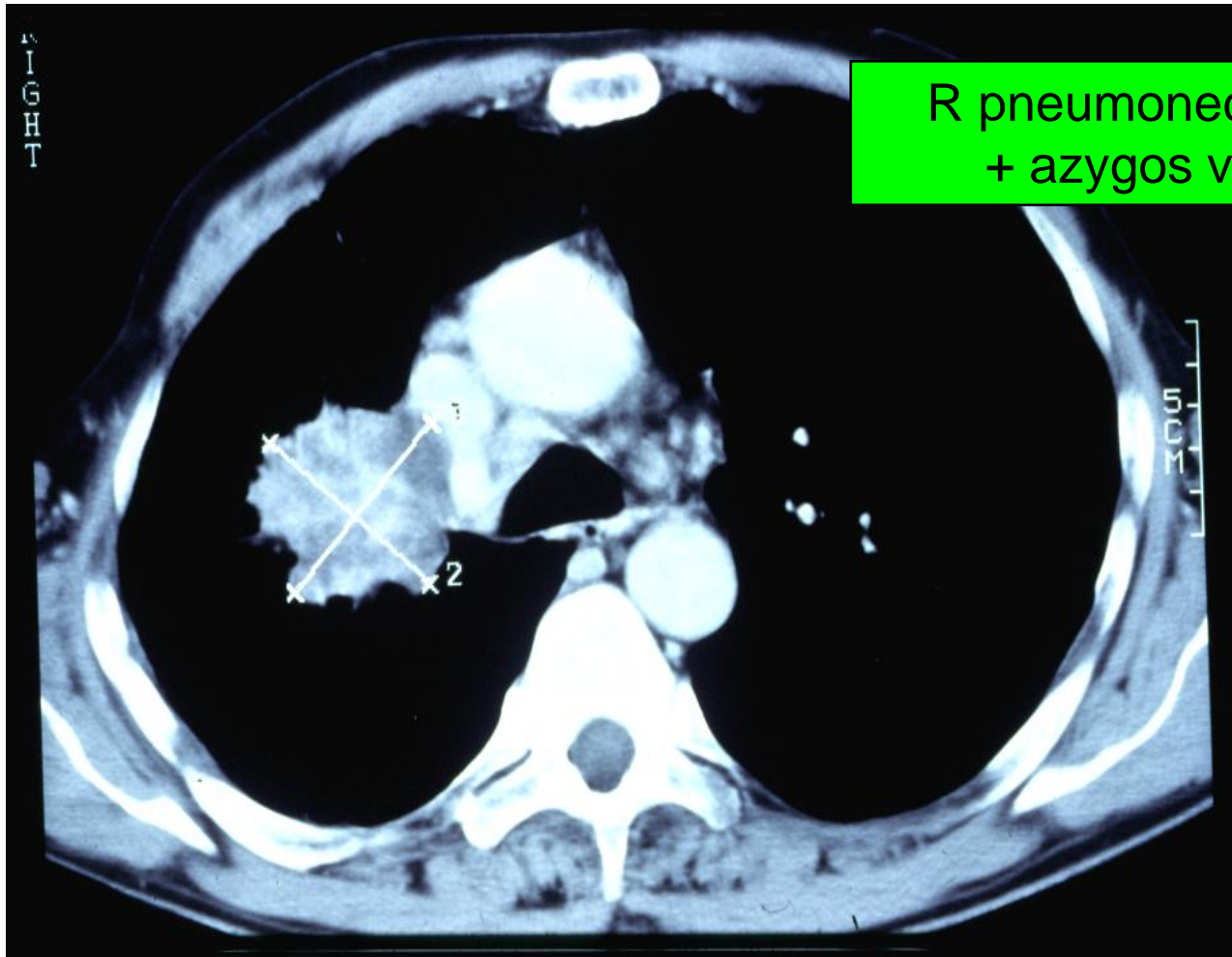
Pleural complications BPF

- incidence: 1-10% overall
- minor problem (small BPF)
 - life-threatening catastrophic event
- † 16-72% (sepsis, respiratory insufficiency)
- early (<7 days): technically poor closure
 - late (> 7 days): failure of healing, infection

Pleural complications case BPF

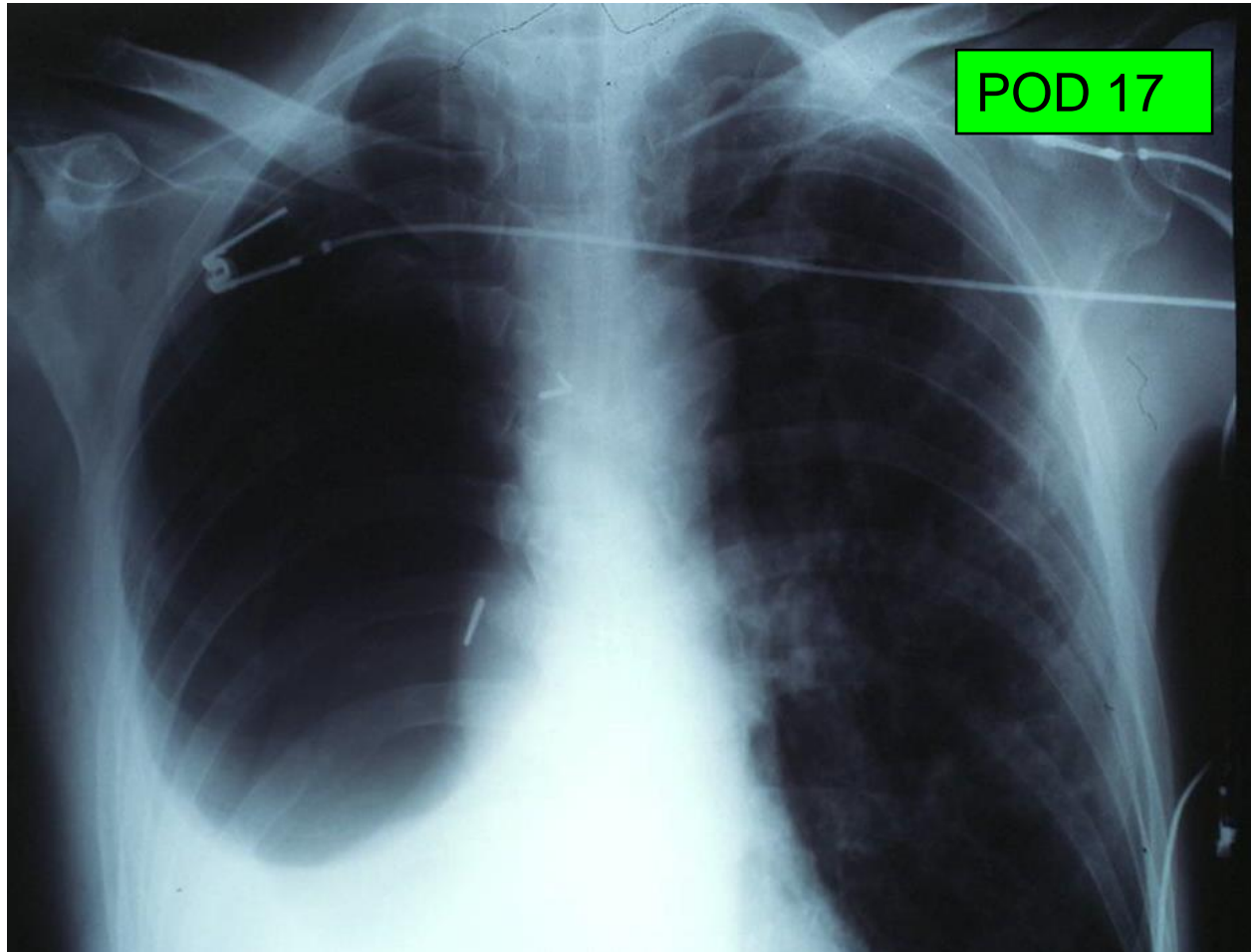
- 56-year-old psychiatric patient
- COPD , haemoptysis
- centrally located tumour R upper lobe

Pleural complications case BPF



R pneumonectomy
+ azygos vein

Pleural complications case BPF



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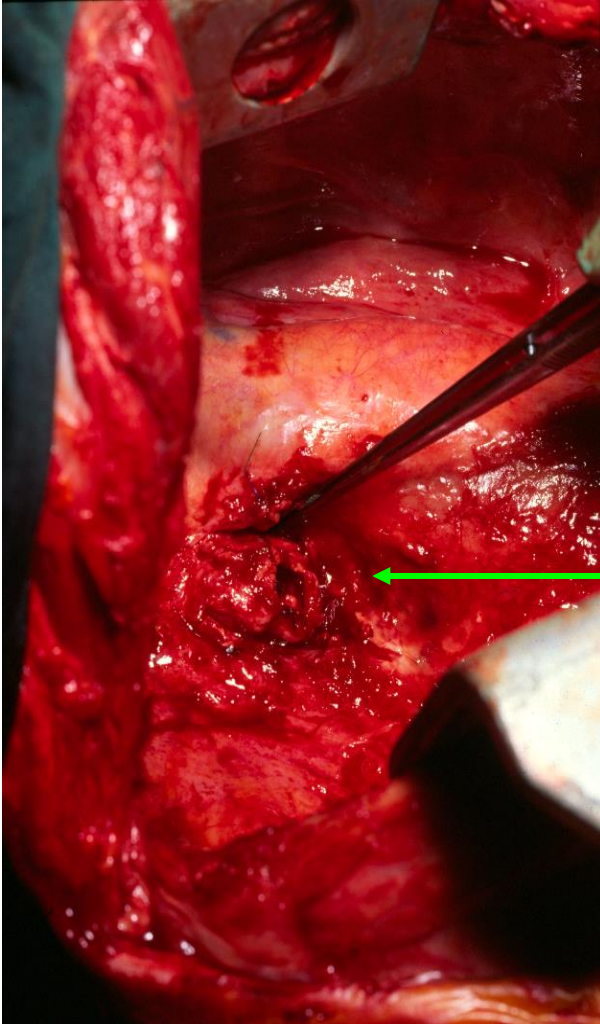
Pleural complications case BPF

POD 18 rethoracotomy

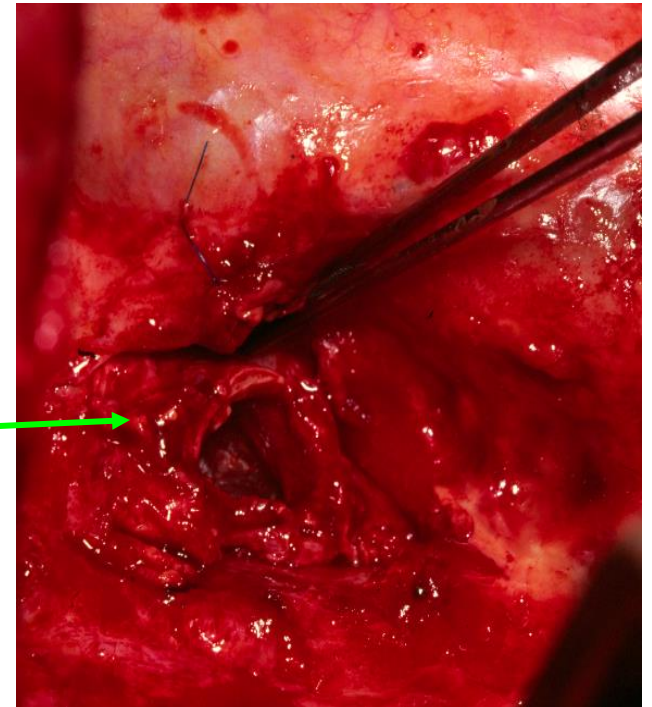
repeat section + closure bronchial stump
covered with serratus anterior muscle flap

culture : *Streptococcus pneumoniae*

Pleural complications case BPF



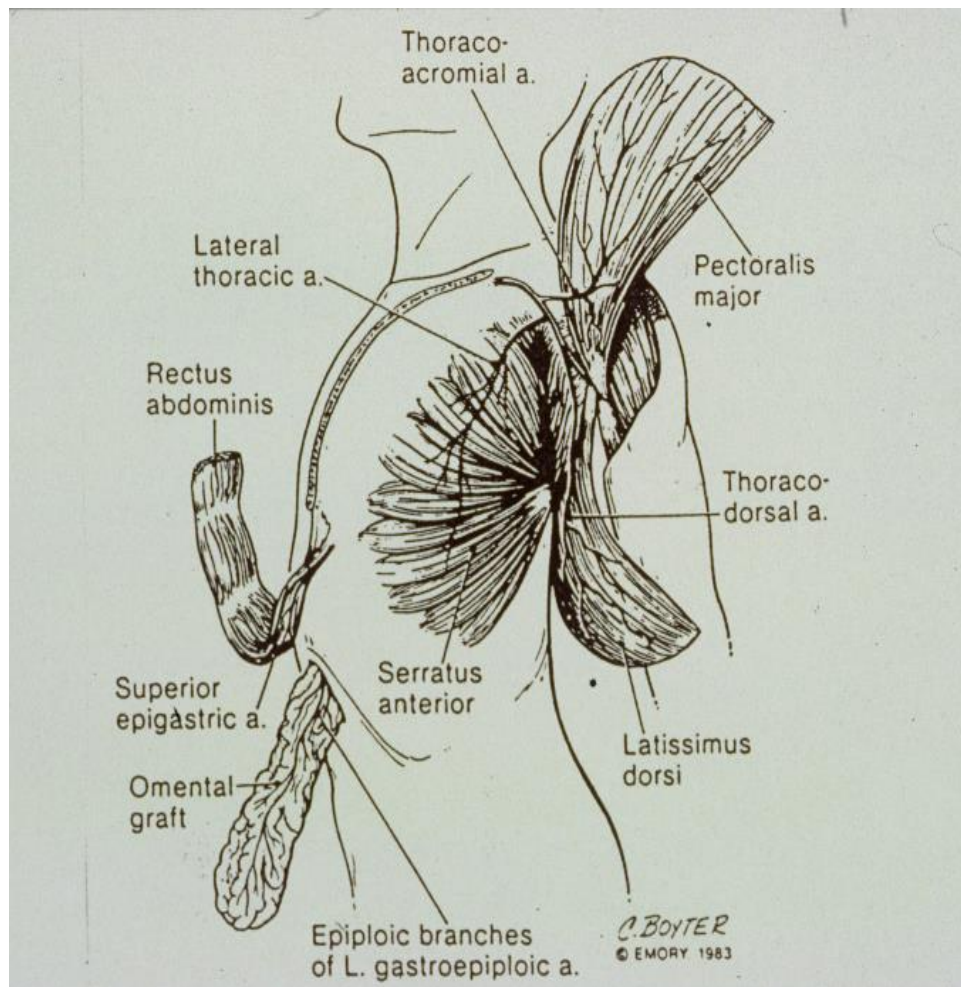
bronchial
stump



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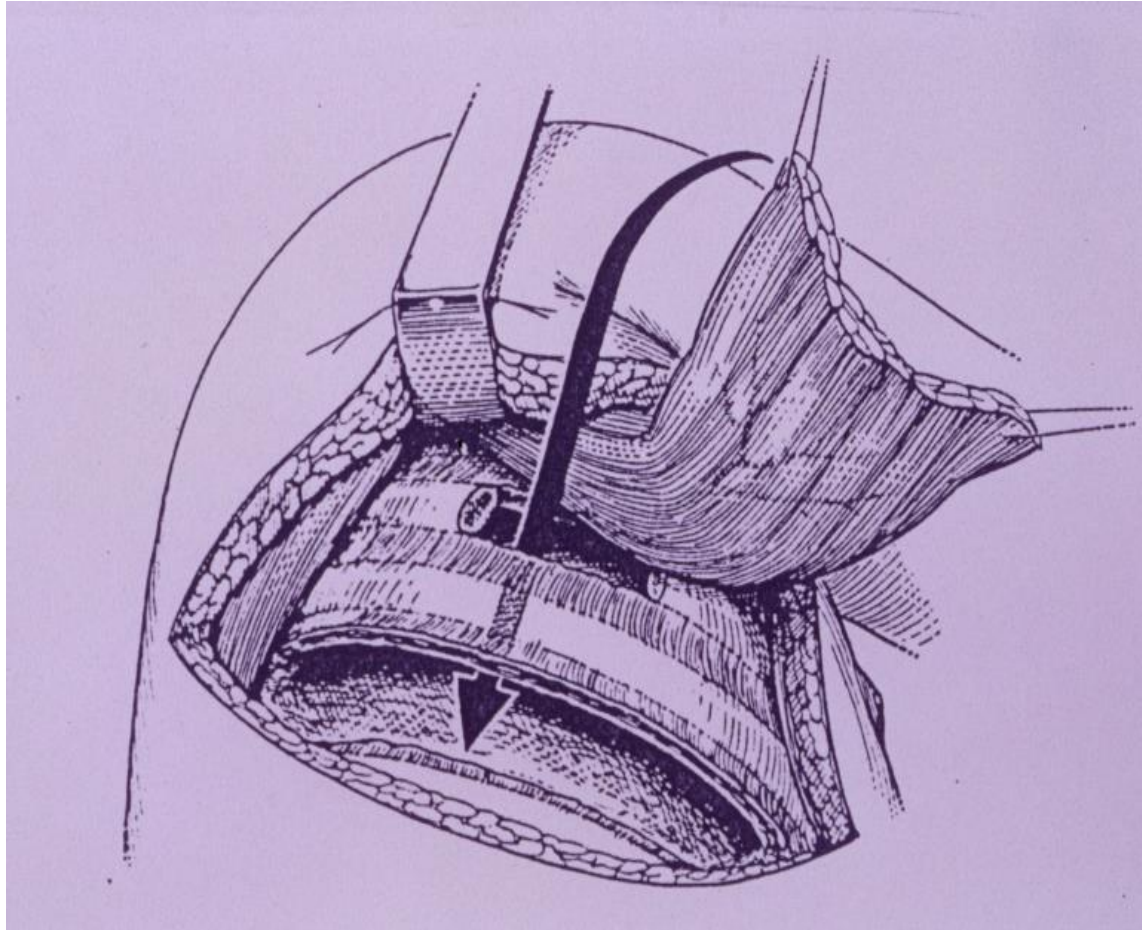
Pleural complications case BPF



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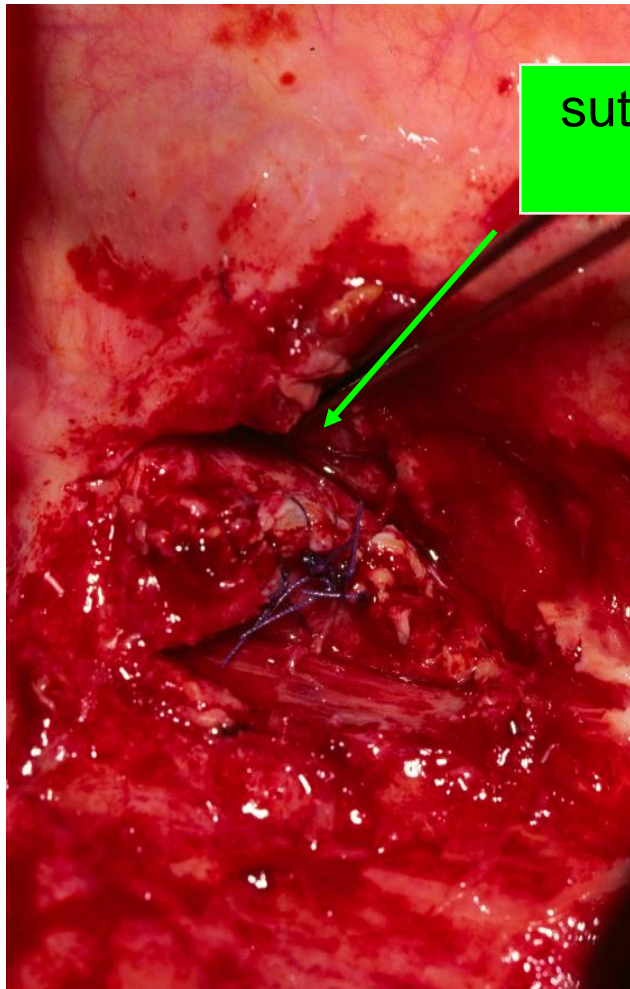
Pleural complications case BPF



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Pleural complications case BPF



sutures bronchial
stump

serratus
anterior
muscle



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Pleural complications case BPF

- POD 25** small recurrent BPF
 fibrin glue
 culture: Xanthomonas maltophilia
 Proteus mirabilis
- POD 30** large recurrent BPF
 rethoracotomy: resuturing bronchus
 repositioning muscle flap
 thoracotomy left open, daily dressings

Pleural complications case BPF

- POD 34 recurrent BPF
flap pectoral muscle
- POD 37 intact bronchial stump
- POD 47 cardiac arrest, bradycardia
hypotension, †

Pleural complications BPF

- risk factors: R or completion pneumonectomy
infectious, inflammatory disease
high-dose radiotherapy
prolonged mechanical ventilation
empyema, infected postresection space
residual tumour at bronchial stump
technical factors (early): devascularisation
incomplete closure

Pleural complications BPF

- Δ/ \sim empyema, expectoration of dark brown fluid

chest X-ray: \downarrow fluid level

bronchoscopy, ventilation scan

injection of methylene blue

Pleural complications BPF

- R/ difficult, prolonged!

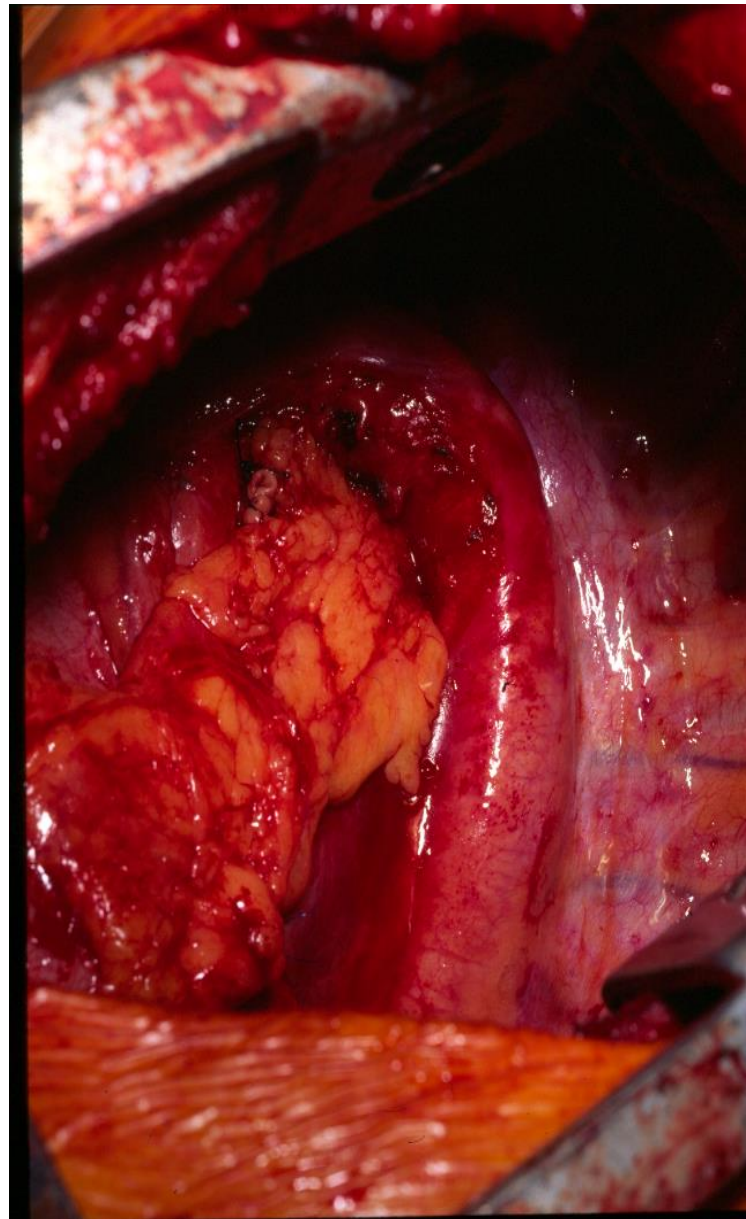
expectoration: operated side down, head elevated

R/ of empyema: open drainage, thoracostomy, antibiotics
closure of fistula, coverage viable tissue

(muscle, omentum, pericardium)

irrigation, antibiotic solution in thoracic cavity

prevention BPF!



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Postoperative respiratory complications

Conclusions

- wide variety of postop. respiratory complications
- range minor → life-threatening
- prevention, early detection essential
- important role of respiratory physician and physiotherapist in prevention and treatment
- international registries necessary for comparative studies