RADIOLOGICAL STAGING IN THORACIC ONCOLOGY

Dr. J. Reynolds – Birmingham Heartlands Hospital.

Lung cancer is the second most common cancer in the UK: 14% of the total cancer incidence, in 1999. A male predominance is present with a 7:4, male:female ratio. The incidence in men has been steadily decreasing, reflecting smoking rates. Similarly, mirroring rates of cigarette consumption among women, female lung cancer rates increased through the 70s and 80s until the early 90s, since when they have essentially reached a plateau. Breast cancer has a higher incidence, but there are more deaths from lung cancer [1]. Imaging plays a pivotal role in both the detection and staging of lung cancer.

Detection

Patients commonly present in one of three ways:

i. Symptoms resulting from local disease
ii. Symptoms relating to distant metastases
iii. Non-specific constitutional symptoms.

The first process in diagnosis involves the detection of a suspicious lesion, usually on a chest radiograph. Sometimes the pick up is on CT, performed for other reasons, or following a normal CXR when there is a high suspicion of lung cancer. The second part of the process is to positively identify the lesion, with a histological or cytological diagnosis being required in the majority of cases [1].

The initial imaging technique used is suspected lung cancer is the chest radiograph but this is a relatively insensitive test and cancers of less than 1 cm diameter are rarely detected this way. Eighty five per cent of missed cancers are small peripheral nodules of less than 2 cm diameter and are common in the upper zones where there are numerous overlying structures [2].

On computed tomography, features suggestive of lung cancer include size greater than 3 cm, lobulation, speculation and pleural retraction.

Staging

Having established an imaging diagnosis of likely lung cancer, accurate staging is the next step. This provides prognostic information and determines optimum management and most importantly, whether a lesion is potentially resectable. CT scanning is the primary cross-sectional technique for lung cancer staging and protocols are described in the Royal College of Radiologists guidelines on oncology imaging [3]. For non-small cell lung cancer the TNM International System is used [4].

CT is very good at determining that a lesion is unresectable but less good at indicating respectability. Patients with equivocal imaging findings should be given the benefit of the doubt and not denied potentially curative surgery.

For small cell lung cancer the staging is simpler with two groups:

- Limited stage – tumour confined to one hemithorax, including ipsilateral or contralateral and supraclavicular nodes.

- Extensive disease – beyond these bounds.

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Positron emission tomography (PET) provides metabolic information not available with CT and potentially provides more accurate assessment of mediastinal nodal involvement with tumour and more reliable detection of extra-thoracic metastatic disease. Toloza et al [5] published a meta-analysis assessing mediastinal staging with PET and also the clinical evaluation of metastatic disease. The sensitivity and specificity of PET for nodal disease were 84% and 89% with the corresponding figures for CT being 57% and 82%.

In our local practice we have adopted the NICE guidelines [6] and PET is performed as a final step prior to surgery in all NSCLC cases except those with staging of T1N0M0.

Screening for Lung Cancer

The low resection and cure rates for lung cancer have lead to many attempts to devise a satisfactory screening programme for asymptomatic patients with early stage lung cancer. In one influential study from New York, 1000 high risk cases were screened and 233 lesions were found that required further assessment. 28 patients subsequently underwent biopsy and of these, 27 were malignant [7]. The subject is, however, controversial. Sceptics point out that screening tends to find peripheral, slow growing cancers that patients may have died with and not from. There are various in-built biases in evaluating screened patients. The resources required for such a programme would be huge.

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NOTES

SURGICAL STAGING IN THORACIC ONCOLOGY

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Rational treatment decisions and ultimate prognosis of patients with lung cancer depend largely on the stage of disease at the time of diagnosis.
Surgical or invasive staging techniques will always be required as long as radiological and less invasive techniques are not 100% sensitive or specific in the pre-operative identification of patients most likely to benefit from pulmonary resection. This applies to all three components of TNM staging and no individual should be denied the chance of curative resection based on radiological or clinical findings alone.

The routine use of positron emission tomography (PET) scanning has redefined the indications for invasive staging of the mediastinum for the detection of N2 nodal involvement. Invasive staging procedures can be omitted in patients with small peripheral tumours and negative mediastinal PET images. However, in case of central tumours, PET hilar N1 disease, low fluorodeoxyglucose uptake of the primary tumour and lymph nodes $\geq$ 16 mm on CT scan, invasive staging remains indicated. PET positive mediastinal findings should always be cyto-histologically confirmed. The use of PET scans as applied to the M stage often requires cyto-histologically confirmation of distant sites of involvement.

Trans-bronchial needle aspiration (TBNA), ultrasound-guided bronchoscopy with fine needle aspiration (EBUS-FNA) and endoscopic esophageal ultrasound-guided fine needle aspiration (EUS-FNA) are new techniques that provide cyto-histological diagnosis and are minimally invasive. Their specificity is high but the negative predictive value is low. Because of this, if they yield negative results, an invasive surgical technique is indicated. They are particularly useful in restaging the mediastinum following neoadjuvant down-staging.

Bronchoscopy
Indications: Endo-bronchial T status of central tumours.
Rule out synchronous tumours in other parts of the bronchial tree.
Vocal cord involvement signifies T4.

Mediastinoscopy
Indications: Access to stations 1, 2, 4, and 7.
Ideally 2R, 2L, 4R, 4L, and 7 nodal stations should all be explored with a lesser but yet acceptable standard of 4R, 4L, and 7 to reduce the likelihood of false negative results. Also used to evaluate proximal main bronchi and medially based right tumours.
Sensitivity = 81% (TP/TP+FN), Specificity = 100 (TN/TN+FP), NPV (TN/TN+FN) =91%.
Complications: Morbidity 1-3%. Mortality 0.08%.

Mediastinotomy (Chamberlain incision)
Used alone or in combination with Mediastinoscopy.
Indications: Evaluation of left nodal stations 5 & 6, central tumours close to A-P window, appropriate T4 (Pericardial involvement) staging on right.
Sensitivity 80-85% (TP/TP+FN), Specificity =100 (TN/TN+FP)

Video Assisted Thoracic Surgery
Indications: T status in large tumours where CT can not accurately differentiate between contact and invasion. Assessment of pleural effusions and involvement (T4) including cytological confirmation.
Access to stations 5 and 6 on left and other N2 nodes not amenable to Mediastinoscopy (8, and 9).

Thoracotomy
Indications: Final and yet important staging tool ideally when all other attempts have been exhausted. During resection, thorough intra-operative staging is essential for prognosis and need for adjuvant therapy.

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Introduction

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STAGE SPECIFIC SURGICAL INTERVENTION FOR NON-SMALL CELL LUNG CANCER

Mr. D. Waller – Glenfield, Leicester.

This lecture will cover the multidisciplinary management of non-small cell lung cancer.
Each stage of the disease will be addressed separately and the following statements will be discussed :

Stage I (T1-2 N0)

In the management of the solitary pulmonary nodule VATS excision biopsy (with intraoperative frozen section) is preferable to preoperative percutaneous biopsy.
Matsugama H et al. Risk of pleural recurrence after needle biopsy with resected early stage lung cancer. Ann Thorac Surg 2005;80:2026-31.
Rivera et al.Diagnosis of lung cancer:the guidelines. Chest 2003;123:129

Routine PET is not justified for all solitary pulmonary nodules
Detterbeck FC et al. Seeking a home for PET. Chest 2004;125:2294-9.

Routine mediastinoscopy is not indicated for all stage I tumours.
Canadian Lung Oncology Group. (1995). Investigation for mediastinal disease in patients with apparently operable lung cancer. Canadian Lung Oncology Group. Ann Thorac Surg, 60, 1382-9.
Meyers BF et al, Cost-effectiveness of routine mediastinoscopy in computed tomography and positron emission tomography screened patients with stage I lung cancer. J Thorac Cardiovasc Surg 2006;131:822

In selected stage I tumours Lobectomy may NOT be the gold standard
Ginsberg, R.J. & Rubinstein, L.V. (1995). Randomized trial of lobectomy versus limited resection for T1 N0 non-small cell lung cancer. Lung Cancer Study Group. Annals of Thoracic Surgery, 60, 615-22; discussion 622-3.
Schubert MJ et al, Anatomic segmentectomy in the treatment of stage I non-small cell lung cancer. Ann Thorac Surg 2007;84:926-32

In selected stage I tumours VATS lobectomy is the treatment of choice
McKenna, R.J., Jr., Wolf, R.K., Brenner, M., Fischel, R.J. & Wurnig, P. (1998). Is lobectomy by video-assisted thoracic surgery an adequate cancer operation? Annals of Thoracic Surgery, 66, 1903-8.

Adjuvant chemotherapy is probably not beneficial .

Stage II (T1-2 N1, T3N0)

Primary surgical treatment is advocated for isolated chest wall invasion

En-bloc chest wall resection/reconstruction is mandatory in T3 (chest wall) tumours
Lobe specific systematic lymph node dissection is the recommended method of Intraoperative lymph node management
Graham, A.N., Chan, K.J., Pastorino, U. & Goldstraw, P. (1999). Systematic nodal dissection in the intrathoracic staging of patients with non-small cell lung cancer. Journal of Thoracic & Cardiovascular Surgery, 117, 246-51.

Adjuvant chemotherapy confers a modest survival benefit .
Sedrakyan A, Van derMeulen J, O'Byrne KJ, Prendiville J, Hill J, Treasure T. Postoperative chemotherapy for non small cell lung cancer : systematic review and meta-analysis. J Thorac Cardiovasc Surg 2004;128:414-9

Stage IIIa (T1-3 N2, T3N1)
Clinical IIIa should be further investigated by PET and mediastinoscopy
Mediastinoscopy positive patients should receive induction chemotherapy / chemoradiotherapy
Van meerbeck JP et al. EORTC 08941 trial. J Natl Cancer Inst 2007;99:442-50
Albain KS et al, Intergroup 0139 trial. Abstract No. 7014, Proc ASCO 2005
"Downstaging" should be confirmed pathologically
Only pathologically "downstaged" patients should go on to resection.
De Waele M et al. Nodal status at repeat mediastinoscopy determines survival in NSCLC with mediastinal nodal involvement treated by induction therapy. Eur J Cardiothorac Surg 2006;29:240-3.
Pancoast tumours should receive induction chemoradiotherapy
Anonymous. (1997). Clinical practice guidelines for the treatment of unresectable non-small-cell lung cancer. Adopted on May 16, 1997 by the American Society of Clinical Oncology. Journal of Clinical Oncology, 15, 2996-3018.

Stage IIIb (T4 or N3) / Stage IV (M1)
T4 satellite lesions should undergo resection.
Mountain,C.F. (1997). Revisions in the International System for Staging Lung Cancer.Chest, 111,1710-7.

Truly Oligometastatic disease may be treated by resection of the primary and isolated metastasectomy
ACCP Lung Cancer Guidelines Panel (2003). Diagnosis and Management of Lung Cancer. Chest 123(suppl 1) 1S-338S

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STAGE SPECIFIC TREATMENT OF NON-SMALL LUNG CANCER (NSCLC): NON-SURGICAL ONCOLOGY

Dr. D. Farrugia – 3 Counties Cancer Network

The non-surgical management of NSCLC has three major components: chemotherapy, radiotherapy and more recently biological therapies. Chemotherapy has established a role in the treatment of all stages except very early resectable disease (T1-2N0M0). Pre-operative chemotherapy in resectable tumours downstages disease and may contribute to higher cure rates although this has not been shown to be superior to post-operative chemotherapy yet, and must still be considered experimental (Nicolson). Pre-operative chemotherapy or chemo-radiotherapy in locally advanced (IIIA) disease appears to downstage tumour making surgery feasible, but its effect on overall outcome remains unquantified and must also be regarded as experimental. Post-operative chemotherapy has conclusively been shown to confer an overall survival benefit of 5% at 5 years and this is now standard of care for node positive disease (Le Chevalier, Hotta). In localised non-resectable disease, best results are obtained with either CHART radiotherapy or combined chemo-radiotherapy using standard fractionation. In advanced disease (stages IIIB and IV), platinum based treatments using combinations of Cisplatin or Carboplatin and another agent are the treatments of choice (Schiller). Docetaxel and Pemetrexed have modest activity in the second line setting in patients with good performance status (Hanna).

Radiotherapy still has no established role in the post operative setting in completely resected patients (PORT). In patients with locally advanced disease radiotherapy using CHART or combined chemoradiotherapy with standard fractionation are suitable alternatives. Both techniques are superior to conventionally fractionated radiotherapy used alone. Several randomised trials backed by a Cochrane metanalysis showed that concurrent chemo-radiotherapy is superior to sequential chemo-radiotherapy but that the former is associated with greater toxicity, leading many UK centres to adopt sequential therapy as standard of care.

We are now entering the era of biological therapies. Gefitinib (Iressa) and erlotinib (Tarceva) are two examples of small molecule tyrosine kinase inhibitors being developed in this role. Despite promising results from single agent studies of Gefitinib in relapsed disease, combination of gefitinib with chemotherapy in the first line setting failed to improve outcome (Giaccone). When Erlotinib was studied as second line therapy, it was also associated with a survival benefit, but in the first line setting with chemotherapy, no overall survival benefit was seen (Herbst). Other biological therapies in clinical testing include antibodies towards EGFR such as cetuximab (Lilenbaum) and anti-angiogensis agents such as the monoclonal antibody bevacizumab (Johnson).

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NOTES

MANAGEMENT OF PNEUMOTHORAX (PTX)

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Pathophysiology

Simple

- Commonest type, self limiting, air leak stops as lung collapses
- Most cases symptomatic but patients are usually relatively well
- Pleural pressure negative, no mediastinal shift, no cardiorespiratory compromise

Tension

- Medical emergency
- Air leak continues after full collapse of lung
- Pleural pressure positive, mediastinal shift to opposite side
- Clear evidence of acute cardio-respiratory failure
- Kinking of great veins and inability to ventilate opposite lung
- Death due to asphyxia and low cardiac output

Primary Spontaneous PTX

Air in pleural cavity due to rupture of sub-pleural bleb

Natural history:-

- Usually settles within 72 hours with non-surgical therapy allowing uneventful discharge
- After 1 episode, 20% chance of 2nd PTX
- After 2 episodes, 70% chance of 3rd PTX
- After 3 episodes, 90% chance of 4th PTX, etc

Increased risks with air travel, scuba diving, family history

Indications for surgery

A Elective:-

1. Two or more ipsilateral episodes
2. One episode on each side (synchronous or metachronous bilateral PTX)
3. One ipsilateral episode in certain occupations, patient preference, geographical locations

B Urgent/emergency:-

Air leak after > 72 hours on appropriate drainage

Secondary PTX

Air in pleural space arising from diseased underlying lung (emphysema, bullae, ARDS, pneumonia, malignancy)

More often dealt with a non-surgically, as compared to primary PTX

Surgical treatment of PTX

1. Staple/suture the site of air leak

2. Pleural space obliteration
    a. Parietal pleurectomy
    b. Chemical pleurodesis
    c. Abrasive pleurodesis

3. VAT or open techniques?
    a. Lower recurrence rate with open surgery, perhaps due to limited visualisation of potential air leak sites
    b. Less pain with VATS
    c. 50/50 split between the two techniques amongst UK surgeons

TUBERCULOSIS

Mr. S. Barnard – Freeman Hospital, Newcastle upon Tyne.

Background

Tuberculosis is one of the oldest diseases known to man, with skeletal evidence appearing about 8000 years ago, and written descriptions of the infection from over 2500 years ago. Its first appearance coincides with mans transition from hunter gatherer to domesticator of animals, and links through *Mycobacterium Bovis* have been postulated on that basis, but gene analysis has cast doubt on that hypothesis. It is *Mycobacterium Tuberculosis* that causes the greatest burden of disease in the past and at present. It is a disease of poverty.

Epidemiology

Worldwide the incidence of tuberculosis is 8.8 million a year (141/100,000) with about 1.6 million deaths. Africa has the highest incidence with 343/100,000. The number of cases in the UK is much lower, with 8113 cases in 2006, an incidence a magnitude lower (14/100,000) than the worldwide incidence. The situation now seen in Africa was similar to that in this country in 1880, when 11% of all deaths were caused by tuberculosis with an incidence of the disease in that year of 308/100,000. Currently in the UK, at least 40% of the cases are from the London area, with the Brent area having an incidence 8 times that of the UK as a whole (114/100,000)

The disease has declined through the latter half of the 20th century but increased since 1987 to remain a major world health problem. Some of this is due to the AIDS epidemic, and in subSaharan Africa, 31% of new adult TB cases were in patients with preexisting HIV (2002 figures).

Risk factors for the disease include overcrowding (including prisons), immunosuppression, certain ethnic groups and alcoholism, but HIV has become the strongest risk factor for the disease. Being a contagious disease, contact with a known case of TB is a strong risk factor: it is estimated that a patient with active TB will go on to infect 20 patients.

Molecular studies on strains of *Mycobacterium Tuberculosis,* suggest that, in high incidence areas, exogenous reinfection is a significant contributor to disease, in addition to reactivation of latent disease.

Microbiology

Gram positive curved rods, but stain poorly with this method. Non sporing and aerobic. They are acid fast: retaining arylmethane dye even when treated with acid. There are 62 lineages within the MTB group, e.g .the Beijing subtype, of interest particularly to community epidemiologists. The infection is usually passed on via droplets.

Pathology

Primary infection occurs in the alveoli, with macrophages ingesting the bacilli. The macrophages undergo transformation to multinucleated giant cells and in the majority (90%) of primary infections, healing takes place. In 5-10% the infection persists and can spread to the lung (producing miliary tuberculosis) and other organs including bone. Even if healing takes place the disease may remain dormant and a reactivation may occur if the balance of tubercle growth against destruction by cell mediated immunity is altered e.g. by immunosuppression.

Clinical Presentation

Cough, fever and weight loss, particularly in conjunction with one of the risk factors mentioned above or a contact history with a known case of tuberculosis, is suspicious of tuberculosis infection. Sputum smear staining, the Tuberculin skin test and sometimes Interferon γ release assay are used to confirm the diagnosis.

Treatment

Standard treatment is 6 months of combination (usually quadruple) treatment with Rifampicin, Isoniazid, Pyrazinamide and Ethambutol. Compliance is a major issue in the developing world and amongst some of the high risk groups. Under very favourable conditions (compliance, no drug resistance) 90% of patients can be cured of their tuberculosis[1].

Surgery

Surgery for tuberculosis can be considered under 4 headings:

1. Diagnosis
2. Treatment to eradicate infection
3. Treatment for complications
4. Management of spaces-usually from collapse treatment in the past.

1. **Diagnosis**-This is probably most frequently performed in the UK by mediastinoscopy. Mediastinal widening noted on a chest X-ray is further investigated by CT and enlarged nodes demonstrated. There is usually a contact history or the patient is in a high risk group. In a study from Lille, 6% of isolated mediastinal lymphadenopathy was due to tuberculosis (the majority were sarcoid). Lung biopsy and pleural biopsy are occasionally used to establish a diagnosis of tuberculosis-a study from Nagano in Japan found 5% of SPN to be due to tuberculosis.

2. **Eradication**- This includes failed medical treatment of "standard" tuberculosis, eg through poor compliance and the more common indication of Multiple Drug Resistant (MDR) tuberculosis, (defined as resistance to Isoniazid and Rifampicin) which has a low incidence in the UK of 0.7% [1] (in previously untreated patients) but is higher in previously treated cases. It is a huge problem, in numeric and percentage terms, in certain parts of the world such as Eastern Europe, where there may be 30,000 new patients/year with TB, 10% of these cases have MDR TB[2]. These patients would be treated medically with second line antibiotics but a significant number come to surgery.

   The surgical principles include:

   1. There should be localised disease
   2. Fitness for surgery: preoperative sputum negativity preferred especially in MDR TB
   3. Wide resection including pneumonectomy
   4. Care and reinforcement of the bronchial stump: pneumonectomy BPF rate of up to 25%
   5. Postoperative treatment with antibiotics (second line therapy) for up to three years in the case of MDR TB.

   The surgery can be technically taxing due to fibrosis and obliteration of fissural planes[4]. In MDR TB, there are now a number of case series of lung resection, with low mortality and excellent outcomes with conversion to sputum negativity in 85-90%[6].

Most recent surgical figures from SCTS data in 2002: there were 37 resections for tuberculosis, of which 6 were pneumonectomy, three combined with thoracoplasty.

3. **Management of spaces**-usually from collapse treatment in the past. Various materials used to effect collapse of the lung which promoted healing. Although artificial pneumothorax was popular, surgical methods such as thoracoplasty were widely used. A more straightforward operation was plombage, the insertion of foreign materials to aid collapse of the lung. Lucite balls were preferred and are made of methacrylate. However they could erode through the chest wall or into mediastinal structures and removal may be required. There are very few patients with plombage balls in situ as it fell out of favour at the beginning of the Streptomycin era around 1950[5].

   Management of the residual space left from artificial pneumothorax can be difficult, should the space become infected, and if simple drainage fails to improve the situation, myoplasty or even thoracoplasty may need to be considered.

4. **Treatment of complications**-eg (i)bronchostenosis from fibrosis: dilatation and stenting may be required.

   (ii)Lobectomy for Aspergillus infection, bronchiectasis

   (iii)Haemoptysis-usually erosion into a bronchial artery. Embolisation can be tried.

   (iv)Bronchial obstruction by nodes-can respond to steroids

   (v)Pericarditis-1-4% get effusions which may require a pericardial window or even full pericardectomy: however, initial management is medical unless there is tamponade.

   (vi) Empyema-for small effusions, medical treatment is indicated. Drainage, including rib resection may be required-a decortication may not be successful due to the diseased underlying lung.

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PULMONARY INFECTIONS: BRONCHIECTASIS, LUNG ABSCESS AND ASPERGILLOMA

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In the past few years with increasing drug resistance, growing number of immunocompromised individuals and increasing older population has led to resurgence of pulmonary infections like bronchiectasis, lung abscess and aspergilloma being referred for surgical management.

Bronchiectasis

Bronchiectasis is characterized by chronic necrotising infection of bronchi and bronchioles resulting in abnormal permanent dilatation of subsegmental airways (second to fourth order). The proximal bronchi are less affected as they contain more cartilage and are more rigid. The pathogenesis of this disease involves various congenital and acquired predisposing factors, the acquired infections being the most common. Endobronchial obstruction with distal infection is causative factor with obstruction being either intrabronchial (retained secretions, foreign body or neoplasm) or extrabronchial in origin (enlarged lymph nodes or anamolus blood vessels). It is classically divided into three groups – cylindrical, varicose and saccular.

Bronchiectasis is characterized by recurrent episodes of pulmonary infections associated with fever, purulent, foul smelling expectoration and haemoptysis. The haemoptysis result from anastomosis between bronchial arteries and pulmonary circulation in the diseased lung.
The CT scan and specifically HRCT has replaced bronchography as a diagnostic modality and is as effective with no risk to the patient. Bronchoscopy helps to delineate the anatomy of diseased segments, obtain uncontaminated secretions for culture and provide good airway toilet.
The treatment of bronchiectasis is largely medical comprising prevention and control of infection, mechanical removal of purulent secretions by coughing, postural drainage and bronchoscopy. If this is unsuccessful after several months and significant symptoms persist, then surgical therapy should be considered. This is especially true if the disease is localized to a one specific area or segment of the lung. Operation must incorporate careful anaesthetic management, including double lumen tube or blockers to protect the normal lungs form spillage of secretions. The aim of surgery is to remove all the suppurative segments preserving as much normal lung as possible.

Lung Abscess

By definition, lung abscess is a localized area of suppuration and cavitation in the lung. It can be primary lung abscess resulting from anaerobic aspiration or specific pneumonia or it could be secondary to pre-existing lung diseases or conditions which suppress the natural defences of the body. The differential diagnosis include cavitating lung neoplasm (usually squamous), tuberculosis or fungal infection or empyema with bronchopleural fistula.
The patient typically has a history of upper respiratory tract infection with fever and is often toxic. Haemoptysis and expectoration of purulent and putrid sputum commonly follows. The resolution of abscess can occur if the bronchocavitary fistual allows evacuation of contents, expansion of lung and collapse of the cavity. A chronic abscess results from inadequate drainage of the cavity, formation of thick fibrotic wall and epithealization of the lining of the abscess cavity. The symptoms improve when periodic erosion or drainage occur into the bronchiole. Secondary lung abscess occur at extreme of age and with predisposing conditions like immunosuppersion. In these patients the abscess are multiple and majority are acquired in the hospitals. Radiologically, an area of dense pneumonic consolidation precedes the appearance of characteristic air fluid level filled cavity in the lung parenchyma. The bronchoscopy is indicated to obtain specimen for culture, rule out intraluminal lesion and drain abscess through appropriate bronchiole.
The treatment of primary lung abscess is prolonged antimicrobial therapy after identifying the organisms. Operative treatment is required in 10 – 15% of cases, in patients with uncontrolled acute disease, rule out malignancy and complications of lung abscess like empyema, haemoptysis and bronchopulmonary fistula.

The spectrum of intervention procedures include percutaneous tube drainage, open drainage, bronchial arterial embolization for haemoptysis and extensive pulmonary resection.

Aspergilloma

Aspergilli are fungi, saprophytes and result in three distinct clinical entities grouped as aspergillosis. These are allergic bronchitis, invasive or disseminated necrotising bronchopneumonia and aspergilloma. Aspergilloma is a fungal ball usually involving upper lobes with evidence of pre-existing chronic lung disease. Aspergillomas are of surgical interest, if symptoms are present. Most of them remain asymptomatic and may infact resolve spontaneously. Invasion and dissemination from aspergillomas rarely occur.
The diagnosis is usually radiological with characteristic opacity of fungal ball with air crescent (Monad's sign).

The prophylactic resection in asymptomatic patients is not indicated because of significant complication rate after the procedure. The patients presenting with haemoptyis and not candidate for surgical resection can be offered bronchial arterial embolization. The surgical procedures include resection and cavernostomy in selected patients with complex thick walled aspergillomas.

Further reading:

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Boyce FF. Principles and practices in lobectomy (including segmental resection) and total pneumonectomy for bronchiectasis and chronic lung abcess. Chest 1950;17:206-225
CH Lee, YH Liu, MS Lu, MJ Hsieh, YC Wu, PJ Ko. Pneumonotomy: An alternative way for managing lung abscess. ANZ Journal of Surgery 2007;77:852-854
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SURGERY FOR INTERSTITIAL LUNG DISEASE

Mr. R. Steyn – Birmingham Heartlands Hosptial.

Interstitial lung disease guideline: the British Thoracic Society in collaboration with the Thoracic Society of Australia and New Zealand and the Irish Thoracic Society
A U Wells, N Hirani and on behalf of the British Thoracic Society Interstitial Lung Disease Guideline Group, a subgroup of the British Thoracic Society Standards of Care Committee, in collaboration with the Thoracic Society of Australia and New Zealand and the Irish Thoracic Soc
Thorax 2008;63;v1-v58

Surgical lung biopsy in interstitial lung disease

- In prospective and retrospective studies, surgical lung biopsy has been shown to yield pathological diagnosis in 37–100% of cases.
- Two key considerations impact upon the decision to pursue a surgical lung biopsy in a patient with interstitial lung disease: (1) the risk associated with a surgical approach and (2) the recognition that histological assessment in interstitial lung disease has limitations and that the multidisciplinary integration of clinical and HRCT data, perhaps with the addition of transbronchial biopsy or bronchial lavage, is often sufficient to yield a confident diagnosis.
- Surgical lung biopsy, when required, should be performed before the initiation of treatment.
- A confident pathological diagnosis of interstitial pulmonary fibrosis or the other interstitial pneumonias can only be made if a surgical lung biopsy is obtained.
- A confident clinical diagnosis of interstitial pulmonary fibrosis can be reliably made in the presence of characteristic HRCT and clinical findings.
- If a surgical biopsy is performed in cases of suspected interstitial pneumonia, more than one biopsy specimen must be taken from more than one site, preferably from different lobes.
- Multiple multilobe lung biopsies are technically easier by video-assisted thoracoscopy (VATS) than by open lung biopsy.
- VATS is also associated with less early postoperative pain than open lung biopsy.
- It is recommended that the precise biopsy sites are based on HRCT appearances.
- In patients with suspected IIP, areas of intermediate abnormality or comparatively normal lung adjacent to areas of established honeycombing should be targeted with the specific aim of identifying UIP if present.

Referral for lung transplantation

- Patients should fulfil established selection criteria for transplant, thus generally excluding those over the age of 65 years and/or those with significant comorbidity.
- Referral to a transplant centre should be made if the disease is advanced (TLCO ,40% predicted) or progressive (>10% decline in FVC or >15% decline in FVC during 6 months of follow-up).

Seminar- OESOPHAGUS

Mr. E. Black – Nottingham City Hospital.

Investigation of oesophageal disease

- Section II;Investigation of esophageal disease

  In Esophageal Surgery Eds Pearson, et al 2nd ed Chapters 4-7

Barrett's oesophagus

- Drug and Therapeutics Bulletin 2006;44:(9)5-8

  A Report of the Working Party of the British Society of Gastroenterology 2005
  http://www.bsg.org.uk

Boerhaave's syndrome

- Boerhaave's syndrome: a review of management and outcome.

  Interact Cardiovasc Thorac Surg. 2007;6:640-3

Staging of Oesophagogastric Cancer

- The role of staging laparoscopy in oesophagogastric cancers

  EJSO 2007;33:988-992

Neoadjuvant chemotherapy

- Does neoadjuvant chemotherapy improve survival in patients with resectable thoracic oesophageal cancer? Interact CardioVasc Thorac Surg 2007;6:661-664

- Australasian Gastro-Intestinal Trials Group. Survival benefits from neoadjuvant chemoradiotherapy or chemotherapy in oesophageal carcinoma: a meta-analysis. Lancet Oncol 2007; 8:226–234

- Medical Research Council Oesophageal Cancer Working Group. Surgical resection with or without preoperative chemotherapy in oesophageal cancer: a randomized controlled trial. Lancet 2002; 359:1727–1733

Post oesophagectomy leaks

- Surgical treatment of anastomotic leaks after oesophagectomy

  Eur J Cardiothorac Surg 2005;27:337-343