

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 in 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, spiculation 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 led 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

Mr. K. Papagiannopoulos – St James' Hospital, Leeds.

Introduction

Staging for lung cancer has matured dramatically with the advent of newer technologies in imaging and endoscopic surveillance.

Surgical staging

The procedures employed for surgical staging focuses mainly in the **mediastinum** since N status determines prognosis.

2 distinct group of patients for whom mediastinal staging is important:

1. those were N2 or N3 disease needed be excluded preoperatively
2. those potential surgical candidates following neoadjuvant treatment in whom confirmation of 'sterilisation of the mediastinum is important.

There might be a third group where mediastinal staging could prove important in patients with extrathoracic malignancies, metastasizing to the lung in whom metastatectomies could provide a survival benefit.

- **Mediastinoscopy**

Used over 50 years.

Indications: evaluation of mediastinal lymph nodes, evaluation of mediastinum, evaluation of proximal main bronchi, evaluation of medially based right sided tumours in the upper lobe abutting the parietal pleura.

Results: Sensitivity >0.8 depending on the study, specificity 1

Complications: Morbidity 1%-2,3% Mortality 0%-0.3%.

- **Mediastinotomy (Chamberlain incision)**

Used alone or in combination with Mediastinoscopy.

Indications: Evaluation of nodes in position 5 and 6 according to Naruke map, evaluation of central tumours close to A-P window, inspection of pericardium and intrapericardial inspection for appropriate T staging

Results: Sensitivity 0.8, Specificity 1

Complications: as for mediastinoscopy.

Both procedures have been recently enhanced with the use of Digital Video technology providing better accuracy

- **Video Assisted Thoracic Surgery**

Indications: Mainly used to assess N2 nodes not accessible by Mediastinoscopy, assess pleural disease/involvement and T status in large tumours where CT is not accurate.

- **Thoracotomy**

Indications: it is the final procedure with or without formal resection when all other attempts for surgical staging have been exhausted.

Although there seems to be a greater movement towards the use of non-invasive tools for lung cancer staging, clinicians must still rely on histological confirmation for accuracy of staging.

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NOTES

STAGE SPECIFIC SURGICAL INTERVENTION FOR NON-SMALL CELL LUNG

CANCER - 2007

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 meerbeek 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

NOTES

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-angiogenesis agents such as the monoclonal antibody bevacizumab (Johnson).

References

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NOTES

SURGICAL MANAGEMENT OF OESOPHAGEAL PERFORATION

Mr. R. Steyn – Birmingham Heartlands Hospital

Post-emetic rupture of the oesophagus first described by Herman Boerhaave in 1723.

His patient was Baron Jan von Wassenaer, Grand Admiral of the Dutch Fleet who deliberately vomited after a meal and developed left-sided chest pain, dying 18 hours later. At post mortem the following were found: a tear of the left posterior wall of the oesophagus 5 cm above the diaphragm, surgical emphysema, food in the left pleural space. Today, iatrogenic injury is the most common cause. Rapid diagnosis and management gives the best survival chance; however, commonly delay in diagnosis, resulting in substantial morbidity and mortality occurs.

Even with prompt treatment and advances in surgical technique, the mortality can be very high, varies 5-75% later presentations or delayed diagnosis associated with higher mortality. Higher mortality rates are also associated to Boerhaave perforations (up to 72%), followed by iatrogenic (19%) and traumatic perforations (7%) although this may be confounded by the delays in diagnosis associated with Boerhaave perforations.

Oesophageal rupture occurs after 0.1% of standard endoscopies but after 2% of oesophageal dilatations. Diagnosis requires high index of suspicion. Typical signs and symptoms include chest pain, dysphagia, pyrexia, tachycardia, hypotension, tachypnoea and/or subcutaneous emphysema. Undiagnosed systemic sepsis rapidly develops. Chest x-rays may show suggestive abnormalities in about 90% of cases. Pneumomediastinum and subcutaneous emphysema are often present an hour after the injury. Mediastinal air-fluid levels, pleural effusions (often left sided), free air under diaphragm, pneumothorax, and hydropneumothorax may appear later.

Contrast swallow should be performed. Despite 60-70% sensitivity, a water-soluble contrast agent should be the initial study. A barium study should be undertaken immediately afterward should the initial study show no evidence of perforation.

Barium has a higher sensitivity (90%) for detecting small perforations but may cause a severe inflammatory response or mediastinitis. Studies should be performed with the patient in the right lateral decubitus position. A contrast-enhanced chest CT if swallow is not possible due to patient condition or if the swallow is negative despite a high clinical suspicion. Perforation may be suggested by mediastinal air, extravasated luminal contrast, peri-oesophageal fluid collections, pleural effusions, or actual communication of an air-filled oesophagus with an adjacent mediastinal air-fluid collection.

Endoscopy can be used to visualize perforations (especially traumatic) but is not indicated when small mucosal tears are suspected, as insufflated air can cause further dissection of the perforation.

Common misdiagnoses are acute coronary syndrome, aortic aneurysm or dissection, pericarditis, cardiac tamponade, gastritis, Mallory-Weiss tear, peptic ulcer disease, pancreatitis, pneumonia, empyema, pneumothorax, pneumomediastinum or pulmonary embolism.

Immediate management requires large-bore intravenous access, supplemental oxygen as necessary, cardiopulmonary monitoring, broad-spectrum intravenous antibiotics, nil by mouth, nasogastric drainage. Analgesics, antiemetics and fluid resuscitation may be required. If effusion is present chest drainage is indicated with culture of pleural fluid.

Conservative management may be appropriate if early diagnosis or delayed diagnosis with contained leak, no distal obstruction or tumour, no signs or symptoms of sepsis or systemic symptoms, experienced thoracic surgeon and contrast imaging available. Failure of conservative management will need surgery.

The surgical management principals for thoracic perforations include: control oesophageal leak, eradicate mediastinal / pleural sepsis, re-expand lung, prevent gastric reflux, nutritional and pulmonary support, antibiotics, drainage of residual septic foci. If operated on within 24 hours mortality is 5-10%. If operation delayed more than 48 hours mortality is more than 50%.

Surgical methods of treatment

- Primary closure with buttress or patch
- Exclusion and diversion
- T-tube fistula
- Thoracic drainage and irrigation
- Resection
- Decompression gastrostomy and feeding jejunostomy
- Stenting

Complications include pneumonia, mediastinitis, sepsis, empyema, and adult respiratory distress syndrome. Because of improved management, a significant number of patients now survive; recurrent spontaneous ruptures of the oesophagus may occur. Oesophageal injuries secondary to penetrating trauma often involve adjacent structures such as the spinal cord and trachea.

<http://www.emedicine.com/EMERG/topic176.htm>

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Vial CM, Whyte RI: Boerhaave's syndrome: diagnosis and treatment. *Surg Clin North Am* 2005 Jun; 85(3): 515-24, ix

SURGERY FOR BENIGN OESOPHAGEAL DISEASE

Mr. J. Duffy – Nottingham City Hospital.

Involvement of cardiothoracic surgeons has declined over the last 20 years. The reasons for this are multifactorial but include the specialisation of general surgeons in upper GI surgery, the advent of laparoscopic techniques and the shortage of thoracic surgeons in the UK.

Nevertheless there is still a need for the cardiothoracic surgeon to have an understanding of benign oesophageal disease. Those surgeons practicing oesophageal surgery will clearly have an interest in oesophageal disease. They will need to embrace laparoscopic techniques whilst maintaining their skills in transthoracic surgery which upper GI surgeons will have little experience in. They will be involved in the management of complex cases and elective reoperative surgery. The cardiothoracic surgeon needs an understanding of the basic principles of management of reflux disease and motility disorders since although he may not be undertaking the primary surgery he may be asked to help deal with complicated cases. He will also need to be able to deal with those situations which might present to a cardiothoracic surgeon as an emergency.

It is not possible to cover all of benign oesophageal disease in a short lecture so the following topics will form the core of the lecture:

Surgery for gastroesophageal reflux

- pathophysiology
- principles of treatment and surgical options
- new techniques
- Barrett's oesophagus its significance and management

Paraoesophageal hernia

- pathophysiology
- complications
- treatment – open and laparoscopic techniques

Oesophageal perforation

- pathophysiology
- treatment options

Motility disorders of the oesophagus

- pathophysiology
- diagnostic features
- management

Further information

Surgery of the oesophagus in Surgical Clinics of North America 77(5) October 1997 Eds Hunter JG and Pellegrini CA

Laparoscopic oesophageal surgery Surgical Clinics of North America 80(4) 1213-42 2000

Watson DI, Jamieson GG
Antireflux surgery in the laparoscopic era
BJS 85(9) 1173-84 1998

Arts J, Tack J, Galmiche JP
Recent advances in clinical practice: endoscopic antireflux procedures
Gut 2004; 53:1207 – 1214

Shaheen N, Ransohoff DF
Gastrooesophageal reflux, Barrett esophagus, and esophageal cancer. Scientific review
JAMA 2002; 287, 15:1972- 1981

Brinster CJ, Singhal S, Lee L et al
Evolving options in the management of esophageal perforation
Annals Thoracic Surgery 77(4): 1475-83 2004

Whyte RI, Iannettoni MD, Orringer MB
Intrathoracic perforation. The merit of primary repair.
JCTS 109(1): 140-4. 1995

CTS net website – Experts Techniques section: laparoscopic treatment of achalasia, reflux and paraoesophageal hernia

Complete (cPR) versus partial (pPR) responders

Only logical to avoid surgery in those with a complete pathological response (cPR), but this is difficult to ascertain without surgery!

Until Chemo+DXT can achieve consistently high rates of locoregional control, surgery should remain an integral part of the multi-modality treatment of oesophageal cancer.

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J Clin Oncol 2005,23:2310-2317

NOTES

MINIMALLY INVASIVE RESECTIONS

Mr. A. Thorpe – St. James' Hospital, Leeds.

In 1992, Prof, Cuschieri in Dundee described 'Endoscopic oesophagectomy'. Since then attempts have been made by various groups to adapt thoroscopic and laparoscopic techniques to oesophageal resection. A variety of techniques are currently performed (see attached table) which complicates interpretation of the data. Minimally invasive oesophagectomy is technically feasible and can be performed as safely as conventional 'open' oesophagectomy. These operations should be seen as novel and 'on trial'.

The long term results have yet to be published.

The current literature and the recent UK 'Exeter Experience' (Berrisford and Wajeed) however describe several advantages in hospital stay, respiratory function, pain and outcome. If this operation has benefits similar to VATS lobectomy then genuine progress will have been made.

Nguyen and Luketich advocate that minimally invasive oesophagectomy should be performed in centers with large experience in oesophagectomy and by surgeons with extensive open experience.

Tabel 4.

Published series	No.	Procedure	Blood loss (ml)	Mean operative time (hrs.)	Mean Hospital Stay (d)	Mortality (%)	Leak rate (%)	Conversion rate (%)
DePaula, 1995	12	LTE		4.3	7.6	0	8.3	8.3
Swanstrom, 1997	9	LTE	290	6.5	6.4	0	0	0
Watson, 2000	7	TM/LE	200	4.4	12	0	28.5	14.2
Nguyen, 2003	46	LTE,TM/LE	297	6.0	11.3	4.3	4.7	0
Luketich, 2003	222	TM/LE		7.7	7	1.4	11.7	7.2
Palanivelu, 2005	130	LTE,TLE,LEG	150	3.5	8	0.77	4.62	0

LTE - Laparoscopic Transhiatal Esophagectomy, TLE - Thoraco-laparoscopic Esophagectomy, LEG - Laparoscopic Esophagogastrrectomy
TM/LE - Thoracoscopic Mobilization/Laparoscopic Esophagectomy.

References.

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Luketich JD, Alvelo-Rivera M, Buenaventura PO, et al. Minimally invasive esophagectomy; outcomes in 222-patients. Ann Surg 2003; 238(4); 484-494.

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PALLIATION OF OESOPHAGEAL CANCER

Mr. D. Prakash – Hairmyers Hospital, Glasgow.

The prognosis in oesophageal cancer is largely due to the fact that less than 10% of patients are suitable and fit for radical resection.

A small group of maybe half have radical radiotherapy and chemotherapy. All of the rest of the patient have a downwards spiral culminating in death usually within a year. Patients who get radical surgical resection may develop recurrence of metastases of both at a later date and may require palliative care later on. Patients treated with radical radiotherapy may end up with a tight fibrous stricture with or without residual cure and these may need palliation, however patients without any specific radical treatment from the large cohort of patients needing palliative treatment.

Systems needing palliative treatment

1. Destructive dysphagia, aspiration pneumonitis.
2. Oesophago-tracheal or bronchial fistula, aspiration pneumonitis.
3. Cachexia, loss of appetite, failure to thrive, dehydration, anaemia.
4. Pain- intra scapula due to x-ray oesophageal extension of tumour.
5. Symptoms caused by treatment – vomiting, constipation etc.
6. Symptoms due to metastases – bone (pain), liver (jaundice) etc.

Palliation of dysphagia

Palliative oesophagogastrectomy and palliative oesophago-gastric or oesophago-jejunal bypass were done in the past but are not recommended at the present time. They are major high risk procedures might to provide palliation that can now be better achieved by simpler means. Balloon dilation of the malignant stricture can be done safely with radiological control even at the time of diagnosis. If the scope can be passed through the tumour bearing area laser ablation of the tumour as the scope is redrawn is a safe and effective means of palliation which may need to be repeated at 2-3 months in as the tumour continues to grow.

Stenting (cell expanding metallic stents – SEMS)

These are the modern and effective means of palliating dysphagia. They can be inserted at endoscopy or by the radiologist in the x-ray department and in both cases the procedure is carried out under screening both for safety and to ensure satisfactory placement of the stent. The top and bottom ends of the malignant stricture should be established endoscopically or by Barium swallow to select the stent of adequate length. Stents with a non return valve at the bottom maybe used to prevent reflux, and then the oesophageal gastric junction is crushed. Modern SEMS are covered on the inside to prevent tumour in growth and rough on the outside to grip the tumour and prevent migration.

Technique of SEMS.

The top and bottom ends of the tumour are marked on the skin radiologically. A guide wire is passed and negotiated through the irregular tumour into the stomach under screening. The selected stent of appropriate length is drain loaded under the guide wire and the bottom and top stent markers are confirmed to be at least 2cm below and above the skin markers. One should bear in mind that the stent may foreshorten by a centimetre in each direction when it is deployed. The stent deploys from the lower upwards. After deploying the distal 2cm of the stent gentle traction is put on the stent mechanism to hitch the stent against the tumour while the rest of the stent is deployed. At the end of the procedure the bottom and top stent markers are confirmed to be well above and below the skin markers. The open stent will take a further few hours to open fully. The patient can drink shortly after the stent is placed and eat if he has no pain with drinking fluids.

The care of SEMS

The swallowing is good once the stent is deployed properly but the patient should avoid large chunks of meat or vegetable that could easily block off the stent. After eating the stent should be washed down with water or a fizzy drink. If the stent crosses the OG junction anti reflux measures such as elevating the head end of the bed and eating small amounts frequently are sensible. Occasionally the stent may need unblocking at endoscopy. After about six months the lining of the stent may deteriorate and the stent can be removed and replaced if necessary.

Oesophago-tracheal fistula.

A middle third oesophageal cancer has a tendency to erode the trachea or the left main bronchus which is immediately anterior to it and cause an oesophago-tracheal fistula. This causes catastrophic aspiration of the tracheal bronchial tree with saliva, drink and food and severe pneumonitis will follow which is often pre terminal. However, an occasionally patient may have weeks to live and good palliation may be afforded by putting in a SEMS and allowing the patient to swallow his food whilst treating his pneumonia.

General symptoms needing palliation.

Patients coming for other surgical procedures may exhibit symptoms such as anorexia, constipation, pain or dehydration. The surgeon should be aware of these general symptoms which cause the patient great anxiety and he should treat/palliated adequately. "Megace" for anorexia, treatment of constipation, fluids for dehydration and Maxolon for nausea/vomiting are standards strategy for management. The surgeon should have a good multi-disciplinary team around him to tackle troublesome problems. However a surgeon is not only there for surgical treatment and should deal with other problems as they arise, or else he will quickly lose friends and referrals will soon dry up.

Non surgical palliation

Brachy therapy:

This is high dose radiotherapy given locally and is used for especially trouble some upper third tumours.

External beam radiotherapy:

This is useful for palliating pain but can be used in conjunction with chemotherapy for more survival benefit.

Combination therapy:

Balloon and dilation can be combined with laser ablation of tumour.

Laser ablation can be combined with Brachy therapy.

Stenting of the oesophagus can be followed by external beam radiotherapy.

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NOTES

RADIOLOGY OF LUNG METASTASES

Dr. G. McGann – Cheltenham Hospital, Gloucestershire.

This lecture will start with a glossary of some of the confusing terms used in chest radiology. The typical and less usual features of pulmonary metastases will be described and illustrated ¹. Ways of attempting to distinguish between the appearances of metastases and the effects of treatment and immunosuppression will be discussed ^{2,3}. The potential for rare conditions such as Wegener's granulomatosis and pneumoconiosis to cause significant diagnostic errors will be explored.

The use of CT in the staging and biopsy of tumours of unknown primary presenting as chest metastases will be explored ⁴.

Newer techniques in imaging metastases such as PET scanning, virtual bronchoscopy will be briefly mentioned ^{5,6}.

¹ *Radiologic Clinics of North America*, Vol 43. 3. May 2005, pp481-495

² *Imaging in Oncology* 2nd ed. Ed Husband and Reznick, Taylor and Francis, 2004. pp1023-1040. 'Effects of treatment in the chest', p 1263, 'The immunocompromised host: chest', p 1337

³ Libshitz H I, Shuman L S, 'Radiation-induced pulmonary change, CT findings'. *JCAT* 1984, 8, 15-19

⁴ Van de Woow A.J. et al 'Epidemiology of unknown primary tumours, incidence and population-based survival of 1285 patients in Southeast Netherlands', 1984-1992. *Eur J of Cancer* 2002;38, 409-13

⁵ Rades D et al. 'Localised disease in carcinoma of unknown primary, value of PET'. *Annal. Oncol.* 2001;12, 1605-09

⁶ *High Resolution CT of the Lung*, 3rd ed. Lippincott Williams, Wilkins. 2001. ed Webb, Mueller and Naidich.

LUNG METASTATECTOMY SURVIVAL BENEFIT – IS IT THE EFFECT OF SURGERY OR SELECTION?

Mr. P. Rajesh – Birmingham Heartlands Hospital

The lung is the first capillary bed draining most primary sites, with tumor cells usually depositing in the periphery. A small percentage of patients with pulmonary metastases have disease confined to the lungs (more commonly with sarcomas)

The four principles to Patient Selection for surgery are

- 1) Resection should only be performed if removal of all disease is possible
- 2) The patient must have adequate pulmonary reserve to tolerate resection
- 3) Local control of the primary
- 4) Absence of metastases elsewhere in the patient

Wedge resections should be performed wherever possible to preserve parenchymal tissue. Manual palpation is preferred to identify all nodules

Bilateral disease may be treated either by staged bilateral thoracotomy/ thoracoscopy or median sternotomy

The International Registry of Lung Metastases published the long-term results of 5206 pulmonary metastasectomies (en

Mean follow-up was 46 months. The actuarial survival after complete metastasectomy was 36% at 5 years, (median 35 months); the corresponding values for incomplete resection were 13% (median 15 months). Among complete resections, the 5-year survival was 33% for patients with a disease-free interval of 0 to 11 months and 45% for those with a disease-free interval of more than 36 months; 43% for single lesions and 27% for four or more lesions. Multivariate analysis showed a better prognosis for patients with germ cell tumors, disease-free intervals of 36 months or more, and single metastases. However each of these factors is in itself a marker of tumor biology, hence one cannot be categorical and state surgical excision has prolonged life. There is no randomized data to support this.

However when considering surgery cure may not be the only goal, diagnosis, specifically of a solitary nodule or viability, persistence of nodules following chemotherapy are important indications.

Colorectal cancer warrants special mention since at the time of surgery many primary tumors are advanced relating to the broader indications for surgery.

The NICE guidelines (2004) state that patients with colorectal cancer with metastases confined to limited areas of the liver or lung should be referred to the appropriate specialised multidisciplinary team for an

opinion. The expected benefits are set out as follows: "Surgery for patients with metastases confined to the liver or lung can be curative when carried out by specialists with experience of this type of work. Although such resection is only appropriate for a minority of patients, it can improve five year survival from close to zero to over 30%." The reference cited relates to untreated liver metastases not patients with lung metastases. All of the major case series published to date are thwarted by the same problems of selection bias as the registry data. It is likely that a randomized controlled trial is forthcoming to assess the patients in the zone of uncertainty'

Two further developments are of interest:

1. The use of PET to exclude extra thoracic spread is likely to prevent patients undergoing futile surgery
2. The 10 % incidence of mediastinal node involvement adds important insight into tumor biology namely that metastasis can disseminate

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IMAGING IN MALIGNANT PLEURAL MESOTHELIOMA

Professor I. Lyburn – Cheltenham Imaging Centre.

Imaging plays an important role in the diagnosis, staging and follow up of patients with malignant pleural mesothelioma (MPM). Definitive diagnosis involves a combination of clinical presentation, imaging findings and histological appearances.

The presence of a pleural abnormality is usually suggested following a chest radiograph. A number of other imaging modalities are available for further characterization. Image-guided percutaneous core-needle biopsy may be used to sample the pleura with a high sensitivity for diagnosis.

Accurate staging can identify patients who are potentially surgically resectable from those requiring palliative therapy. Computed tomography (CT) in addition to assessing pleural abnormalities may identify pulmonary involvement typically manifested as nodules or masses and demonstrate underlying lung disease often caused by prior asbestos exposure. Magnetic resonance (MR) imaging and (18)F fluoro-deoxyglucose (FDG) integrated positron emission tomography computed tomography (PETCT) have emerged as modalities that can provide additional important diagnostic and prognostic information. MR imaging can improve the detection of tumour extension to the chest wall and diaphragm. PETCT provides both anatomic and metabolic information and detects more extensive disease involvement than that shown by other imaging modalities; it is particularly useful in identifying occult distant metastases. A drawback is that false-positive findings may occur at sites of inflammation.

This presentation will illustrate these points with images from several clinical cases.

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