Non-surgical treatment of lung cancer—selection of cases for surgery

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THE sessions this afternoon are devoted to the discussion of lung cancer and its treatment, namely surgery, radiotherapy and cytotoxic drugs. I am going to outline the selection of those patients considered suitable for surgical treatment.

Lung carcinoma can be classified into three main histological types, the most malignant being the oat cell carcinoma, Table 1A. There is a marked tendency for these cases to be treated by radiotherapy in preference to surgery, but the prognosis is poor whichever method is selected. Adenocarcinoma, Table 1B, is a difficult disease to treat, but it is generally considered that if possible, surgical ablation is the treatment of choice. There is of course the undifferentiated cell type, but perhaps the commonest bronchogenic carcinoma is the squamous cell type. Table 1C. This is the lung cancer associated with heavy cigarette smoking. Surgical resection in suitable cases provides the best prognosis.

TABLE 1.

A Oat cell carcinoma	
1.	Most malignant.
2.	Grows rapidly—spreads via lymphatics and blood stream at an early stage.
3.	Prognosis poor.
4.	Most sensitivity to radiotherapy.
5.	Common in young people.
B Adenocarcinoma	
1.	No known aetiological factors.
2.	Incidence in sexes similar.
3.	Spreads locally by implanted seedlings.
4.	May metastasize—bronchogenic seedlings.
5.	May show no increase in size for many months and then spread rapidly.
C Squamous cell carcinoma	
1.	Commonly found in males over 50.
2.	Associated with heavy cigarette smoking.
3.	Varies in malignancy.
4.	Best prognosis after resection.

The aim of surgery is to completely remove the tumour and regional lymph glands. The aim of selection is to eliminate pre-operatively those patients in whom this cannot be achieved, unless a deliberate policy of palliation is embarked upon. An instance of this is the apical upper lobe lesion—the Pancoast

tumour. Such tumours, by direct extension, eventually invade the brachial plexus, for example, producing intractable pain. Another instance when palliative surgery is justified is in patients with pulmonary osteoarthritis (Fig. 1). The lesion may be operable as here (Fig. 2) but every effort should be made to resect the primary tumour as immediate relief of the pain of the arthropathy is produced and ultimate resolution of these changes occurs if the patient survives. It is therefore necessary to be aware of the modes of spread of the tumour, Table 2. Obviously surgery is out of the question if important adjacent organs are affected by direct extension of the primary tumour or involved regional lymph glands, or there is evidence of distant, blood borne metastases. Also, the patient who has poor cardiorespiratory reserve may be unsuitable.

TABLE 2.

<i>Mode of spread</i>	
1.	Direct extension of growth.
2.	Metastases.
(a)	Lymphatic spread.
(b)	Blood borne.
(c)	Bronchogenic.

Selection of patients with lung cancer for surgical treatment begins by taking a careful history. The main symptoms may be any or all of those in Table 3A, all of which occur in other conditions. Attention must be paid also to pain related to the chest wall and bones or joints, headache, digestion—looking for dysphagia—and note taken of any suggestion of recent changes of mood or behaviour. Questions relating to shortness of breath can give an idea of the individual's respiratory function. In fact a complete systematic history is necessary.

Next comes the clinical examination, Table 3B. In the chest, signs may include those suggestive of bronchial obstruction, such as pulmonary collapse or even obstructive emphysema, or merely diminished air entry with or without a persistent rhonchus. There may be evidence of pleural fluid or very few signs at all in the chest. The range of movement of the ribs and diaphragm should be noted in every instance. Search must also be made for evidence of

FIG. 1

FIG. 2.

TABLE 3.

A Main symptoms	
1.	Cough.
2.	Chest pain.
3.	Dyspnoea.
4.	Haemoptysis.
B Physical signs	
1.	Impaired air entry and persistant rhonchus may be caused by partial bronchial obstruction.
2.	Signs of collapse,
3.	Localized emphysema.
4.	Pleural effusion.

distant spread of the tumour such as examination of the neck for glands, the abdomen for liver tenderness or enlargement, bone tenderness and any abnormality in the central nervous system. The cardiovascular system must be carefully assessed.

Investigations include, Table 4, a chest radiograph, both PA and lateral views. If further information regarding the character of a radiological shadow is required, tomography is useful. Bronchography is of limited value in the assessment of a patient with lung carcinoma.

TABLE 4.

Investigations

1. Chest X-ray.
2. Tomograms.
3. Bronchography.
4. Bronchoscopy.
5. Sputum cytology.
6. Pleural biopsy.
7. Lymphnode biopsy.
8. Aspiration lung biopsy.
9. Thoracotomy.

Bronchoscopy is essential for both diagnosis and the assessment of operability. Biopsy of the tumour will give the histological type. In the absence of a visible tumour, examination of the sputum samples for cell content can reveal, in skilled hands, malignant cells and the cell type.

In the presence of an effusion, cytological examination of the fluid and pleural biopsy are necessary to establish whether the effusion results from malignant involvement of the pleura. In this case the lesion becomes inoperable. If necessary thoracoscopy and inspection of the pleura with direct vision biopsy can be done.

Lymph node biopsy has been superseded by mediastinoscopy in which the regional glands can be inspected and biopsied.

High speed drill biopsy of the lung or pleura, as opposed to aspiration biopsy, may prove valuable in instances of peripheral lung or pleural shadows.

In a few cases thoracotomy is required to establish the diagnosis as well as to treat the lesion.

Some thoracic surgeons perform mediastinoscopy routinely at the time of the diagnostic bronchoscopy. I tend to reserve this for cases with right upper lobe lesions because of the pattern of lymphatic drainage from this area, or where I strongly suspect, on radiological grounds, the presence of enlarged paratracheal glands. Lymphatic spread of tumour to the paratracheal glands converts an operable lesion into only a possibly resectable one, the procedure then being only palliative. Mediastinoscopy has only in recent years become a routine method of investigation, Fig. 3. It is possible to reach and biopsy bronchial and subcarinal glands if necessary. This involves considerable dissection and I believe that one can assess the status of the subcarinal glands and the potential operability of the lesion at bronchoscopy. If the carina is widened, it invariably means that the glands are involved and adherent, making the lesion inoperable. If the carina is normal but the glands prove to be involved, it is entirely justifiable to resect the lesion with a block dissection of the glands in the usual way.

Other factors to be considered in assessing the operability are the presence of a left recurrent laryngeal nerve paralysis. In the majority of instances

FIG 3.

this finding is related to inoperability, as the nerve is invariably involved by tumour under the arch of the aorta in close proximity to the left main pulmonary artery. I say the majority of instances, because this brings to mind a 39-year-old patient who presented with a squamous cell carcinoma of her left upper lobe and a left cord paralysis. In view of her age I elected to do a thoracotomy and found the tumour operable, though of course the nerve was involved and had to be divided proximal to the tumour. That was 3 years ago and she remains well.

This brings another factor to our attention—age. There is a tendency to be more aggressive with younger patients, but with one who has reached his three score years and ten, a thoracic surgeon is likely to be very selective indeed, only agreeing to operate if the lesion is potentially curable and the patient otherwise very fit.

Phrenic nerve paralysis must also be mentioned. A right-sided lung carcinoma with a right phrenic nerve paralysis is likely to be inoperable as the superior vena cava is probably involved also. On the left side, however, the nerve may be affected as it passes down on the surface of the pericardium. As a considerable proportion of the pericardium can be safely excized, a left phrenic nerve paralysis does not necessarily indicate inoperability.

Everything I have said, however, is immediately invalidated if it is obvious clinically and on scientific grounds of respiratory function tests, that the patient's respiratory or cardiac reserve is not adequate to withstand major chest surgery, or that, by the inevitable resection of normally functioning lung tissue during the surgical treatment of lung cancer, the patient will be turned into a respiratory cripple.

Finally, I will leave you with a few statistics. Only about 20% of all lung cancer patients are suitable for surgical assessment. The overall operative

mortality is about 3%. The post-operative survival overall is 34.8% at 3 years, 27.3% at 5 years and 16.6% at 10 years. If the lesion is confined to the lung the 3 years survival after pneumonectomy is 48% and after lobectomy is 65%. If, however, the disease has spread beyond the lung the 3 year survival after pneumonectomy plummets to 17.9% and that after lobectomy is halved—at 32.2%.

Lung cancer is a very difficult disease to treat successfully and from these figures it will be apparent that surgery has a limited part to play in its treatment.

Discussion

SESSION 3

Chairman: DR M. W. McNICOL

(Physician, Central Middlesex Hospital and Willesden Chest Clinic)

DR F. H. SCADDING (Brompton Hospital): One of the hazards of aspiration lung biopsy frequently seen is implantation secondaries in the needle tract. This does not matter very much when there is no question of surgery. What is the risk of aspiration biopsy? I tend to avoid this if the case seems otherwise operable.

MISS SHEPHERD: Yes, I think this is a very real risk if the lesion proves to be a neoplasm. A case comes to mind of a lady of some 40 years who had a peripheral right upper lobe lesion and it was difficult to establish its pathology. She was not a suitable candidate for surgery, and the social circumstances were such that it would be extremely valuable to know whether this was a neoplasm or not. Fortunately for her I did a drill biopsy and it turned out to be tuberculous, and in this particular case I do agree there is a risk of implantation.

DR SCADDING: You are saying it is better not to do it if the case seems otherwise operable?

MISS SHEPHERD: One could certainly put a very strong argument on this line. The other problem, though, in the case of a mesothelioma which is not quite a lung carcinoma, is that again, if it is necessary to make a diagnosis, it is far safer to do a drill biopsy than do an open pleural biopsy. One has to weigh it up.

DR T. DEELEY (Velindre Hospital, Cardiff): I wonder if I might answer Dr Scadding's question also. I have now done a considerable number of drill biopsies of the lung and I have no evidence at all of aspiration seedlings. I have done some 4000 biopsies of malignant tumours and I think only one, a carcinoma of the breast which was just under the skin, grew through the drill biopsy.

DR McNICOL: Seeing this has been raised, has any one else experience of this?

MR J. W. JACKSON (Gerrards Cross, Bucks): I have never had any evidence of recurrence of tumour along the tract of the drill but I have had evidence of tumour in the tract of the biopsy using the Abram's needle and I have also had tubercle coming out of the tract after an Abram's needle biopsy, but I have never had either when using the high speed drill.

MISS SHEPHERD: When Dr Scadding asked the question actually he used the phrase aspiration needle biopsy. When I was speaking of drill biopsy I referred to the high speed drill. I wonder whether this is a significant factor?

MR JACKSON: Several radiologists are using this technique now, and using it more and more, with a simple needle, not the Abram's needle.

MISS SHEPHERD: I was meaning the Steele high speed drill. This is the type of biopsy needle which I would use in this particular instance, and I think Dr Deeley uses it also.

DR DEELEY: I was talking about the high speed drill which is our own drill rather than the Steele drill which is a larger bore.

DR McNICOL: Can we clarify this? We are talking about high speed drill biopsy, and so far no-one appears to have any evidence of implantation along the drill tract. Now, I think you were going to say something about this, Dr Steele, is that right?

DR S. J. STEELE (London Chest Hospital): I have done 300 biopsies, not all tumours it is true, but a good proportion of those have been tumours, and I have never had any spread along the trace using a high speed drill with a larger trephine than the one Dr Deeley uses, and I also know that the man probably with the widest experience of this in aspiration biopsy is Nordenstrom of Sweden. He has done well over 1000 cases and has had no definite spread along the tract. He has published that and also confirmed that more recently when I spoke to him. But I think in actual fact if you search the literature and actual recorded cases which have spread along the tract are very few indeed.

DR McNICOL: Thank you. Any other comments? Miss Shepherd, I was astonished at your figure of operability. Did I hear you say 20% or 30% of cases?

MISS SHEPHERD: Of these cases presented for assessment for surgery only about 20% are proved to be operable. This indicates, taking the disease as a whole, how limited surgery is.