Thoracoscopy in the diagnosis of pleural effusion

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Cantó, A., Blasco, E., Casillas, M., Zarza, A. G., Padilla, J., Pastor, J., Tarazona, V., and París, F. (1977). Thorax, 32, 550-554. Thoracoscopy in the diagnosis of pleural effusion. The technique, indications, and complications of diagnostic thoracoscopy are described. Two hundred and eight explorations have been performed in our service in the last seven years. From 137 pleural malignancies we have obtained an unequivocal positive biopsy in 129 (94%) with a minimum number of complications and no mortality. From our experience we conclude that thoracoscopy, when properly performed, is diagnostic in most pleural conditions.

An undiagnosed pleural effusion is often a difficult problem that needs histological study for a definitive aetiological diagnosis. In cases of malignant effusions of the pleura, blind biopsy using a needle (Abrams, 1968) has given a high percentage of negative results in our hands (9/24=37.5%). Three other specimens were of doubtful interpretation. For this reason we started to use diagnostic thoracoscopy in our service.

Thoracoscopy has not been widely used for diagnostic purposes. We collected information on the technique from the following authors: Matson (1936), Lloyd (1953), Delarue and Depierre (1956), Fleishman *et al.* (1956), Touraine (1960), Lagèze *et al.* (1960), Roche *et al.* (1963), Hatch and Decamp (1966), Sattler (1968), Brandt and Mai (1971), Decamp *et al.* (1973), Senno *et al.* (1974), and Lewis *et al.* (1976). We have been impressed by the ease and safety of the procedure.

Material and methods

From January 1970 to January 1977, 208 thoracoscopies were performed (Table 1); in 172 patients to try to determine the cause of a pleural effusion

and in 32 to try to make the histological diagnosis of a pulmonary shadow with negative bronchoscopy associated, in most cases, with a pleural effusion. In another four patients we performed therapeutic thoracoscopies—to remove a foreign body from the pleural cavity in two and to perform pleurodesis for recurrent pneumothorax in the other two.

At first we used a Kremer-Wolf-Zeiss G-10 thoracoscope. For the last five years we have used a single trocar rigid fiberoptic Storz thoracoscope which has a Wolf 5-050 generator with an electronic flash incorporated for photography.

The position of the patient varies according to the location of the pleural condition (Fig. 1). In total pleural effusion we have used an anterolateral thoracic approach through the seventh or eighth intercostal space. Generally we use local anaesthesia; when general anaesthesia was used, controlled ventilation was achieved through a Carlens endotracheal tube. After exploration an intra-pleural drain is inserted and pleurodesis is performed if malignancy is suspected.

Results

The malignant lesions have varied in appearance from a solitary nodule to a widespread generalised carcinomatosis (Figs 2, 3, 4, and 5). Sometimes the pleura looks lumpy with whitish or reddish rugose areas isolated or confluent (as often occurs in mesotheliomas).

When a pulmonary tumour is present we have

Table 1 Indications for thoracoscopy

Pleural effusion	172
Pulmonary shadow ¹	32
Pleural foreign body	2
Pleurodesis for pneumothorax	2

¹In most cases associated with pleural effusion.

Fig. 1 Anterolateral thoracic approach commonly used.

sometimes been able to see the tumour on the lung surface, occasionally associated with white linear or star-shaped dilated lymphatic vessels.

In inflammatory conditions we have seen the following appearances: acute forms with a hyper-aemic pleura sometimes showing areas of

haemorrhage; subacute forms with white or yellow plaques and fibrin deposits; chronic forms showing an opalescent thickened shiny pleura, with little vascularity; tuberculous forms characterised by small, white-grey nodules spread over the pleural surface with or without detectable inflammatory change.

Other benign conditions were: pleural adhesions, cholesterol deposits and calcifications, osteophytes from ribs or vertebrae, thoracic lipomata and partial diaphragmatic eventrations, aneurysms of the great vessels, emphysematous bullae, and pulmonary cysts.

In Table 2 the histological diagnosis of the biopsies is shown, and in Table 3 the relation between the thorascopic appearance and the histological report is studied. In considering the result of explorations, we have related the visual aspect of the lesion and the histological report to the subsequent follow-up of the patient. From 137 pleural malignancies we have obtained 129 positive thorascopic biopsies (94%). In eight cases, although the appearance and histology failed to

Table 2 Histological diagnosis

Acute pleurisy	37	Squamous cell carcinoma	10
Chronic pleurisy	24	Clear cell tumour	5
Tuberculous pleurisy	7	Bronchiolar cell tumour	2
Pneumonitis ¹	5	Unspecified carcinoma	14
Mesothelioma	8	Malignant cells	3
Adenocarcinoma	47	Lymphoma	3
Undifferentiated, including oat cell carcinoma	37	No biopsy taken ²	6

¹Biopsy of normal visceral pleura and a piece of lung.

²Four were therapeutic thorascopies.

Fig. 2 Thorascopic appearance of secondary pleural tumour nodules: N=nodules; P=pericardium; D=diaphragm.

Fig. 3 Generalised pleural carcinomatosis: L=lung; N=tumour nodules.

Fig. 4 Tumour of pleura with lymphatic vessels coursing over the edge of the lung and adhesions: L=lung; LE=lymphatic vessels; N=nodules; A=adhesions; D=diaphragm.

demonstrate a tumour, these patients died later of generalised carcinomatosis and the result given by the exploration was considered to be a false negative.

In non-malignant conditions histological study of the biopsy specimen was useful in confirming a benign cause but was usually not helpful in clarifying the real cause of a pleural effusion, except in patients with pleural tuberculosis.

Our experience has made us reluctant to make a diagnosis before the result of the histological study is available as we have often obtained a histological report of malignancy when we thought the lesions were inflammatory, and *vice versa*.

We have had seven nonfatal complications (7/208=3%). Three patients with large amounts of fluid and three with persistent air leaks de-

Fig. 5 Tumour and inflammatory changes seen in same field: F=fibrin deposits; N=nodules; L=lung; D=diaphragm.

Table 3 Relation between thoracoscopic appearance and histological report

Suggested diagnosis from thoracoscopic appearance	Histology						
	Normal pleura	Acute pleurisy	Chronic pleurisy	Tuberculosis	Mesothelioma	Carcinomatosis	Other tumours
Normal pleura	5	6	—	—	—	—	—
Acute pleurisy	—	12	—	2	—	—	—
Subacute or chronic pleurisy	—	19	9	—	—	7	—
Tuberculosis	—	—	—	5	—	—	—
Mesothelioma	—	—	14	—	8	—	—
Carcinomatosis	—	—	1	—	—	111	3
Other conditions	—	—	—	—	—	—	6 ¹

¹Two foreign bodies, two bullae, one pulmonary aneurysm, one hydatid cyst.

veloped empyemas. In one case the tumour infiltrated the thoracoscopic scar. We had no mortality directly related to the exploration.

Discussion

We think that thoracoscopy is the best method of making a histological diagnosis in patients with pleural effusions. After considering the clinical findings, the radiological examination, the thoracoscopic appearances, and the pleural biopsy we can obtain a definitive diagnosis more frequently than with other methods.

It is essential to have a free pleural cavity in order to perform thoracoscopy. The existence of a large pleural effusion confirms that the pleural cavity is free from adhesions. When there is a bilateral effusion we first aspirate the smaller

effusion and then perform thoracoscopy on the contralateral side.

Our indications are : (1) pleural effusion of uncertain aetiology; (2) effusions associated with lung tumours (in order to establish the existence of pleural metastasis); (3) effusions during or after post-resection radiation therapy or malignant tumours of breast or lung, to detect recurrence of the tumour; and (4) occasionally in order to remove foreign bodies from the pleural cavity or to perform pleurodesis in spontaneous pneumothorax.

Thoracoscopy is contraindicated when thick adhesions are present. Advanced age and respiratory insufficiency are usually not contraindications. In these patients local anaesthesia is used.

We have had few complications. One tumour recurred at the thoracoscopy site. In six patients

empyemas occurred due to unduly prolonged pleural drainage of a malignant effusion. Biopsy taken from the visceral pleura did not increase the complication rate. We consider that thoracoscopy has the following advantages over blind needle biopsy: (1) the exact place for biopsy can be seen through the thoracoscope (see Figs 2–5) and this gives the maximum chance of diagnosis; (2) biopsies are larger and less traumatised; (3) pleurodesis can be performed; and (4) pleural complications due to pneumothorax are minimal because the pleural cavity is drained.

We conclude that thoracoscopy, when properly performed, can confirm an uncertain diagnosis in most patients with pleural effusion.

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