relieved the tamponade. In support of this was the action of isoprenaline, which has no vasoconstrictor action but which also maintained the pressure. Although it might be thought that an increase in arterial pressure would predispose to further bleeding, a high arterial pressure after the dissection does not appear to influence the prognosis (Hirst *et al.*, 1958).

After the initial period of shock the peripheral vessels did not appear unduly constricted, despite the low arterial pressure; it is possible that aortic baroreceptor stimulation by the dissection led to peripheral vasodilatation in addition to inappropriate vagal slowing of the heart, and thus aided tissue survival, despite the low perfusion pressure, by preventing extreme vasoconstriction. Bradycardia is unusual in dissection of the aorta and occurred in only 4% of the cases of Hirst *et al.* (1958). The increase in pulse rate caused by atropine suggests that a vagal mechanism was involved.

In Sherman's series of 143 recent dissections death occurred within 12 hours in 77 patients. The cause of death in 89% of these acute cases was pericardial tamponade. If anything surgical is to be attempted in this grave condition (and the results of De Bakey *et al.* (1961) are encouraging in this respect), then a close watch should be kept for signs of pericardial tamponade, and facilities should be available for its relief. In the present case a direct surgical approach under local anaesthesia was considered preferable to attempted aspiration. This had the advantage of unequivocal confirmation of the diagnosis, and it was possible to leave a drain in position in case of further bleeding.

Summary

A case of dissecting aneurysm presenting with acute circulatory collapse due to pericardial tamponade is described. The diagnosis was made clinically and confirmed by arterial pressure recordings. The beneficial effects of noradrenaline and isoprenaline are reported, and the uncomplicated recovery from three to four hours' severe hypotension is discussed. Surgical relief of the pericardial tamponade appeared to be life-saving.

I am grateful to Dr. Alastair Hunter and Mr. Charles Drew for permission to publish this report, to Professor A. C. Dornhorst for the arterial-pressure records and much helpful advice, to Dr. R. G. D. Lowe for suggesting the trial of isoprenaline, and to Dr. A. G. Leatham for criticizing the manuscript.

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Preliminary Communications

Mediastinoscopy

Brit. med. J., 1965, **1**, 1167–1169

"Les ganglions bronchiques sont comme le miroir du poumon"—Parrot (1876).

Many of the pathological processes inside the chest involve the lymph nodes. The lymphatic drainage of the lungs passes from the bronchopulmonary nodes to those in the hilum of the lung and from there to the tracheobronchial nodes. It then proceeds upwards to the scalene nodes, via the paratracheal lymph nodes. Daniels (1949) showed the diagnostic value of scalene-node biopsy. Mediastinoscopy, as first practised by Carlens (1959), enables us to obtain a biopsy very much nearer to the lung root than a scalene-node biopsy. This procedure avoids many unnecessary thoracotomies in cases of bronchial carcinoma, and for this reason has gained considerable popularity on the Continent (Palva and Viikari, 1961; Reynders, 1963). The purpose of this paper is to report my experience with this method.

Surgical Technique

The operation is carried out under general anaesthesia. A 1½-in. (4-cm.) incision is made in the suprasternal notch, as for a low tracheostomy. The dissection is carried down to the pretracheal fascia, which is incised. With blunt finger dissection a tunnel is made downwards into the mediastinum, keeping the dorsum of the finger all the time in contact with the anterior surface of the trachea. The pleura is separated on either side.

The plane of dissection is depicted in the diagram by an arrow. The pulsation of the innominate artery in front and the arch of the aorta on the left can be felt quite distinctly. The diagram also shows why anterior mediastinal tumours are not really accessible by this method, as they lie anterior to the large vessels.

The origin of each main bronchus can be palpated by feeling for the superior tracheobronchial angles. Much information

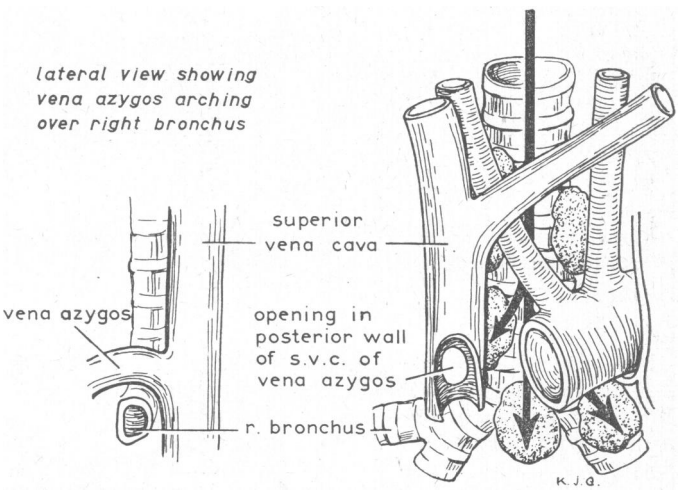

Diagram showing the relation of the mediastinal structures to plane of dissection (arrow) and the close association of the vena azygos to the right superior tracheobronchial nodes.

can be obtained by this palpation alone. The next step is the introduction of a laryngoscope into the prepared tunnel. There are specially designed mediastinoscopes, but I have found the Negus laryngoscope satisfactory. Before a biopsy is taken, aspiration of the tissue is carried out. For this purpose I use a long needle with attached syringe borrowed from a thoracoscopy set. The biopsy itself is best achieved with Brock's short (28 cm.) cupped bronchoscopy biopsy forceps. A crocodile forceps is also useful for carrying small swabs, for blunt dissection, and for grasping nodes. The procedure does not upset the patient and is not difficult.

Complications.—Reynders (1963) reports the following complications encountered in a series of 164 mediastinoscopies: recurrent laryngeal palsy in 3, haemorrhage in 2, subcutaneous emphysema in 2, wound infection in 2, metastases in scar in 2, and pneumothorax in 1. Serious haemorrhage in two of the early patients (Cases 12 and 32) was the only complication. In each instance the lymph node chosen for biopsy was very adherent to the vena azygos as it enters the superior vena cava. After packing the mediastinum with swabs a right thoracotomy was carried out. In one patient with Hodgkin's disease a hole was found in the vena azygos and the situation was retrieved by ligature of this vein ; in the other patient, with an inoperable bronchial carcinoma, a large tear in the superior vena cava had to be repaired. This patient died two days later of anuria. The risk of haemorrhage in this procedure cannot be denied, but in both cases considerable traction was used while taking the biopsy. This is now carefully avoided.

RESULTS

Mediastinoscopy was carried out in 100 patients. The findings are summarized in Tables I and II. Mediastinoscopy has not been a routine investigation in every case of bronchial carcinoma and this may account for the high proportion of positive mediastinal biopsies in this series. In 36 of the 76 patients with bronchial carcinoma the mediastinal biopsy was positive, while in 15 it was the only way in which a histological diagnosis could be made.

TABLE I.—*Analysis of 100 Cases*

Diagnosis	No. of Cases	Mediastinoscopy Findings
Carcinoma of bronchus	76	36 positive biopsy. 23 cases considered operable, of which 20 were subsequently resected
Hodgkin's disease ..	6	4 positive biopsy
Sarcoidosis	8	7 „ „
Undetermined lung lesions	2	No abnormality detected
Teratomatous cyst ..	1	Green fluid aspirated, biopsy not taken
Thymic tumour ..	1	Not accessible
Right-sided aortic arch with left descending aorta	1	Diagnosis made by palpation
Pericardial cyst ..	1	Completely aspirated
Lung abscess	1	No abnormality detected
Carcinoma of oesophagus (widened mediastinum)	1	Positive biopsy of lymph node
Carcinoma of prostate (hilar enlargement)	1	„ „ „ „ „
Talcum pneumoconiosis	1	Doubly refractile bodies of talc in lymph nodes visible

TABLE II.—*Biopsy Results in 76 Cases of Bronchogenic Carcinoma*

Positive mediastinoscopy and negative bronchoscopy ..						15	cases
„	„	„	positive	„	.. ..	21	„
Negative	„	„	„	„	.. ..	18	„
„	„	„	negative	„	.. ..	22	„

Five patients with radiological evidence of a mass in the superior mediastinum were regarded as operable at mediastinoscopy and in four of these resection was possible. Of the 40 patients with negative mediastinoscopy findings, 23 were, after taking all factors concerning operability into account—for example, general condition, respiratory reserve—submitted to thoracotomy. In only three cases was it found impossible to resect the tumour.

Among non-malignant conditions, a right-sided aortic arch passing behind the oesophagus to descend on the left side was an interesting finding. A large teratomatous cyst yielded green fluid on aspiration. Biopsy was not attempted for fear of flooding the visual field. A large pericardial cyst, simulating a mass in the right mediastinum, was completely aspirated. In one patient who had worked in a rubber factory the suspected diagnosis of talcum pneumoconiosis was verified by finding the doubly refractile particles of magnesium silicate in some of the mediastinal nodes.

Eight cases were suspected of having sarcoidosis ; in seven the biopsy established the diagnosis. A positive biopsy was obtained in four out of six cases of Hodgkin's disease.

DISCUSSION

In this series of patients mediastinoscopy was found to be another useful procedure in the diagnosis of intrathoracic disease, especially when all other diagnostic methods had failed to yield results. But even more useful has been its value in assessing the operability in many cases of bronchial carcinoma. Since this method was adopted the number of patients with bronchial carcinoma found to be inoperable at thoracotomy has been reduced considerably. In this respect palpation is especially valuable because it will detect not only enlarged mediastinal nodes but also carcinomatous involvement of the bronchus at its origin. Cotton (1959) showed that peribronchial lymphatic spread had occurred in 64 out of 100 resected specimens. This form of involvement is not always appreciated at bronchoscopy and is a contraindication to resection.

Enlarged paratracheal nodes are not a bar to resection if they are mobile. At mediastinoscopy fixed nodes may be distinguished from mobile ones. Contralateral spread, which is common (Onuigbo, 1962), can also be detected by this investigation, and was present on five occasions.

Oat-cell carcinomata are known to cause early mediastinal lymph-node invasion (Nohl, 1962) and for this reason a mediastinoscopy is recommended in all patients in whom the bronchial biopsy reveals this form of growth. To attempt resection in the presence of mediastinal lymph-node involvement by oat-cell carcinoma is most unrewarding.

Mediastinoscopy is especially of value in the investigation of any case of mediastinal lymphadenopathy, such as sarcoidosis or Hodgkin's disease. In these conditions a high percentage of positive biopsies can be expected. Bergh *et al.* (1964) report that mediastinal biopsy was positive in all their 33 patients with sarcoidosis. In four of these cases scalene-node biopsy had previously failed to establish the diagnosis. The experience of Reynders (1963) is similar—that is, a positive mediastinal biopsy after a negative scalene-node biopsy in five patients.

Thymic growth and other anterior mediastinal tumours cannot be safely approached by this method for the anatomical reason already mentioned. The arch of the aorta, however, is easily seen and blood has been aspirated on several occasions to convince myself that left heart catheterization or coronary arteriography under vision is possible by this approach, Radner (1953, 1954) has used a blind suprasternal puncture technique for studies of the left heart flow.

SUMMARY

Mediastinoscopy was carried out in 100 patients. It is a useful diagnostic procedure which yields a high percentage of positive biopsies in all cases of lymphadenopathy. Valuable information is obtained by this means in cases of carcinoma of the bronchus, allowing better assessment of operability and thus saving many unnecessary thoracotomies. This investigation is not distressing to the patient.

Anterior mediastinal tumours cannot be safely approached by this method because of their relation to the large vessels in the anterior mediastinum.

I wish to thank Dr. L. H. Capel and Dr. A. H. James for helpful criticism, and Miss K. J. Graham, medical artist, Hillingdon Hospital, for the diagram.

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Medical Memoranda

Diabetic Retinopathy and Haemochromatosis

[WITH SPECIAL PLATE]

Brit. med. J., 1965, 1, 1169

It has been stated that cases of diabetes caused by haemochromatosis rarely develop diabetic retinopathy (Finch and Finch, 1955). Moreover, important reviews on haemochromatosis fail to mention that a retinopathy can occur (Sheldon, 1935 ; Beutler, Fairbanks, and Fahey, 1963). The following report shows the development of a retinopathy, indistinguishable from diabetic retinopathy, in a case of haemochromatosis.

CASE REPORT

The patient, a 57-year-old white man, has no family history of diabetes or haemochromatosis. His illness began in 1936, when he lost weight from 11 st. 7 lb. (73 kg.) to 7 st. 8 lb. (48 kg.). At the same time he became pigmented and noticed loss of hair from the arms, chest, and genitalia.

In 1950 he was referred to Hammersmith Hospital complaining of polyuria and polydipsia. The signs at this time were loss of hair over the axilla, chest, and pubis. He had pigmentation of the skin and testicular atrophy, and the prostate gland was small on palpation. The liver was enlarged but no spleen was palpable. Biopsy specimens were taken from the liver, skin, and testicle ; and each specimen contained an excess of haemosiderin ; in addition the liver showed cirrhosis. As the patient had glycosuria a glucose-tolerance test was performed ; this showed a diabetic curve (fasting blood sugar 237 mg./100 ml. ; highest blood sugar after 50 g. of oral glucose, 506 mg./100 ml.). A diagnosis of haemochromatosis was therefore made. It was noted at this time that he had no retinopathy.

In March 1963 it was observed in the out-patient department that he had signs of a diabetic neuropathy, with absent ankle reflexes and impaired sensation to touch, vibration, and positional movements below the knees. In addition he had a retinopathy.

The photograph (Special Plate) of this is of the right inferior temporal quadrant. It shows a cluster of microaneurysms in the upper segment. These changes did not interfere with his vision and he could read Jaeger 6 with both eyes.

The serum iron values and serum iron-binding capacities throughout this illness were:

	Serum Fe (mg./100 ml.)	Iron-binding Capacity as % Fe Saturation
Normal	120–175	... <30
March 1955	303	... 76
October 1956	252	... —
March 1963	198	... 74

An E.C.G. in 1963 showed low-voltage QRS complexes with flattened T waves. This suggested there was myocardial haemochromatosis.

DISCUSSION

This patient showed the classical tetrad of haemochromatosis —namely, skin pigmentation, diabetes, cirrhosis, and myocardial involvement (Finch and Finch, 1955). He also had a retinopathy which showed microaneurysms.

The most characteristic feature of diabetic retinopathy is the microaneurysm (Ashton, 1959 ; Dollery, Hodge, and Scott, 1963). However, fluorescein studies of the retina have revealed microaneurysms in cases of both benign and malignant hypertension, though these features are usually invisible with the ophthalmoscope (Dollery and Hodge, 1963). In this patient no blood-pressure has been recorded over 150/80 mm. Hg since his first attendance at hospital in 1950. Moreover, his microaneurysms were visible by ophthalmoscopy. His retinopathy was therefore almost certainly diabetic in type.

It remains to show that the patient's diabetes was due to haemochromatosis. From the clinical history the time relations would suggest this. The haemochromatosis began in 1936 and diabetes developed suddenly 14 years later. By this time there was sufficient iron deposition in his testes to cause hypogonadism ; his liver biopsy showed cirrhosis and excessive deposition of haemosiderin, though there was no laboratory evidence for impaired liver function (a usual finding, see Finch and Finch, 1955). Assuming that iron deposition occurred at the same rate in the pancreas as in the other tissues (Pollycove, 1961), it is likely that the sudden onset of diabetes in 1950 was in fact due to haemochromatosis. This being so, the diabetic retinopathy developed within 14 years from the onset of diabetes, the diabetes occurring as a complication of haemochromatosis.

The probable reason why this has rarely been described before is that in most instances of haemochromatosis the diabetes is present for less than one decade before death, so that the late degenerative sequelae of diabetes are rare.

I am indebted to Professor R. Fraser for permission to publish this case ; I also wish to thank Dr. C. T. Dollery for permission to use the retinal photograph.

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