Shortness Of Breath In A Lung Cancer Patient
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Citation

Abstract
A 53 year old male with known metastatic non-small cell lung cancer was admitted with a one-week history of increasing shortness of breath. During the four months prior to his admission he had been treated with cisplatin-based chemotherapy, and had undergone left sided thoracenteses at 3-4 week intervals, the most recent, 4 weeks prior to admission.

On admission, the patient was dyspnoeic, his pulse rate was 110/min, respiratory rate 28/min, and blood pressure 130/80 mmHg. He had moderate jugular venous distension and diminished breath sounds in the lower half of his left lung. Heart sounds were relatively loud and no murmurs were evident. The abdomen was soft and the liver moderately enlarged. There was mild oedema of both lower extremities.

ECG revealed a sinus tachycardia with normal voltage.

The chest X-ray prior to the last thoracentesis is shown in figure 1, and that from the current admission in figure 2.
WHAT IS THE DIAGNOSIS?

In spite of the reduced left pleural effusion on the admission film, the right heart border can be seen to be shifted markedly to the right. Echocardiogram confirmed the presence of a very large pericardial effusion with evidence of tamponade. A pericardiocentesis resulted in the removal of 1100 cc of serosanguinous fluid, and the patient’s shortness of breath improved.

Pericardial metastases are more common than primary cardiac tumors and are generally associated with a poor prognosis. Tumour may involve the heart and pericardium via one of four pathways: by retrograde lymphatic extension, haematogenous spread, direct contiguous extension, or transvenous extension. Metastatic involvement of the heart and pericardium may not be discovered until post-mortem examination is carried out. Review of more than 3000 autopsies has shown that pericardial effusions are present in up to 21% of patients with cancer and in a third of these cases the underlying malignancy is carcinoma of the lung. This is due both to the proximity to the heart and to the prevalence of this tumor. Other cancers commonly associated with cardiac metastases are breast cancer (25%), and haematological cancers (15%).

How accurate are a detailed history, physical examination, and basic diagnostic tests for arriving at this diagnosis?

The clinical features of a malignant pericardial effusion are non-specific and variable. The most common presenting symptoms are dyspnoea, cough, chest pain, and orthopnoea. Tachycardia, jugular venous distension, hypotension, hepatomegaly, peripheral oedema and cyanosis may be present on physical examination; in addition, Kussmaul’s sign and pulsus paradoxus may also occur. Some patients, especially those with pre-existing hypertension, may even have a raised blood pressure in association with cardiac tamponade.

The electrocardiogram and chest radiograph will usually both support the diagnosis of a large pericardial effusion causing tamponade. Depending on the size of the effusion, however, the chest radiograph may be normal, or may show an enlarged, globular cardiac silhouette and/or an epicardial fat stripe or “double lucency” sign on lateral views. Shortness of breath may be in excess of that expected from the radiographic findings in patients with pericardial effusion, and may be the result of an associated pleural effusion.

Roy et al have reviewed the accuracy of the history, physical examination, and basic diagnostic tests for the diagnosis of cardiac tamponade. The most common findings in patients with cardiac tamponade were tachycardia, raised jugular venous pressure, and pulsus paradoxus, with pooled sensitivities ranging from 76% to 82%. Hypotension and diminished heart sounds were insensitive indicators (26% and 28%, respectively). Electrocardiographic findings lack sensitivity in cardiac tamponade, the pooled sensitivity of low a QRS voltage being only 42%. Cardiomegaly on chest x-ray was useful in the diagnosis of cardiac tamponade, with a pooled sensitivity of 89% (95% CI, 73%-100%).

WHAT IS THE MOST USEFUL ADDITIONAL TEST TO CONFIRM THE DIAGNOSIS?

Echocardiography is the diagnostic test used most frequently to confirm cardiac tamponade when it is clinically suspected. While echocardiography is the non-invasive test par excellence for the diagnosis of pericardial effusion, the mere presence of an effusion is not in itself pathognomonic of cardiac tamponade. Rather, when occurring together, several echocardiographic findings, including right atrial systolic collapse, right ventricular diastolic collapse, inferior vena caval plethora, and exaggeration of the respirophasic changes in flow velocities across the tricuspid and mitral valves, are indicative of tamponade physiology and make the...
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diagnosis almost certain when the probability prior to echocardiography is high.(

WHAT ARE THE ACCEPTABLE TREATMENT OPTIONS FOR THIS CONDITION?

The management of pericardial effusion is directed towards the relief of symptoms and the prevention of reaccumulation of fluid in the pericardial sac once drainage has been performed. Simple pericardiocentesis may be a lifesaving procedure, but is seldom adequate in the longer term, as recurrence is frequent. To counter this there has been some support in the literature for the creation of a pericardial window, accessing the pericardium either by thoracotomy, the subxyphoid route, or thoracoscopy.(8)

Alternative treatment options to prevent reaccumulation of the effusion include small-bore tube drainage without the formation of a window, followed by intrapericardial sclerosis. The agents most widely used in the treatment of malignant pericardial effusions are tetracycline, doxycycline, bleomycin, and mitomycin C which have been demonstrated to prevent or reduce the recurrence of effusion in up to 80% of patients. (8)

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