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Bronchiolo-Alveolar Carcinoma Presenting as Pericardial Effusion with Tamponade

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WE WISH TO DRAW ATTENTION to several occurrences of large, life-threatening pericardial effusion which have turned out to be the first major clinical manifestation of unsuspected or undiagnosed lung cancer, particularly the type referred to as bronchiolar adenocarcinoma. Three case summaries, with autopsy findings, are presented.*

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Reports of Cases

CASE 1. A 55-year-old Caucasian man, a smoker, presented with a six-week history of exertional dyspnea, worsening of a chronic cough and increase in severity of chronic intermittent back and chest pain. On admission he was noted to become dyspneic on walking more than a few steps. The patient was in moderate distress with dyspnea, cough, back and lower chest pain. The neck veins were engorged. An increased anteroposterior chest diameter was noted as were a prolonged expiratory phase and diffuse rhonchi. The working diagnosis was chronic obstructive pulmonary disease with acute exacerbation of chronic bronchitis and severe myalgia secondary to cough.

Cardiomegaly and left upper and lower lobe infiltrates were seen on x-rays of the chest. On the seventh hospital day, tachycardia, tachypnea, cyanosis and pallor developed. The systolic pressure dropped to a pronounced degree, with a narrow pulse pressure. Shortly thereafter the patient died. Clinical impression of the cause of death was pneumonia due to chronic obstructive pulmonary disease.

At autopsy pleural fluid was noted bilaterally. The right lung weighed approximately 1,000 grams and there was a deep stellate central retraction on the anterior surface of the upper lobe. Microscopic sections through this area showed partially papillary adenocarcinoma, consistent with bronchiolar type, lining and permeating the crevices of an old hyalinized, partially-cavitated scar and extending into adjacent alveoli. The

pericardium was distended and the heart was surrounded by approximately 500 ml of fluid. Roughened patchy excrescences up to 2 cm in diameter were scattered over the epicardium. Viewed microscopically these areas were seen to be composed of secondary adenocarcinoma. The coronary arteries and myocardium were normal. Final cause of death was congestive heart failure due to pericardial carcinomatosis with effusion and chronic tamponade, due to metastatic bronchiolar carcinoma.

CASE 2. A 57-year-old Caucasian woman had complaint of nausea, vomiting and ankle swelling. She had recently been discharged following a stay in hospital for left lower lobe pneumonia and recurrent hepatitis. X-ray films of the chest made at that time showed left middle and lower lobe infiltrates. A diagnosis of healing pneumonitis was made and the patient was treated with supportive care without significant improvement. Several days later a rapid thready pulse, diaphoresis and venous distention developed. Systolic blood pressure dropped to 60 mm of mercury and the heart tones were weak. On electrocardiograms, nonspecific changes and a decrease in QRS voltage compared with earlier tracings were seen. Shortly thereafter the patient died. Clinical impression of cause of death was myocardial infarction or possible pericardial effusion, or both. Significant autopsy findings were limited to the thorax. On the left upper lobe of the lung there was "an area of firmness with yellow-tan cut surface." Each pleural space contained about 800 ml of serosanguinous fluid. The pericardium was notably distended and contained 1,000 ml of grossly bloody fluid. The epicardium was studded with tumor nodules up to 1 cm in diameter which were shown microscopically to consist of poorly-differentiated adenocarcinoma. There was no evidence of myocardial infarction.

On microscopic examination of the lungs, bilateral permeation of interstitial tissues, bronchial walls, lymphatics and other vessels by adenocarcinoma consistent with bronchiolo-alveolar type was noted. Final cause of death was cardiac tamponade, due to pericardial effusion from pericardial metastasis of bronchiolar carcinoma.

CASE 3. A 33-year-old Caucasian man, a smoker, presented with cough, nausea, vomiting and epigastric pain. He had recently recovered from an upper respiratory infection with associated 15 pound weight loss. He was dyspneic and had right upper quadrant tenderness and guarding. The liver was enlarged. On an x-ray film of the chest, cardiomegaly, a prominent right hilar shadow with surrounding infiltration suggestive of pneumonia, and a soft tissue hilar node were noted.

Increased dyspnea, cyanosis and distended neck veins developed, as well as rales and a paradoxical pulse. Dramatic symptomatic improvement was noted following the removal of approximately 200 ml of pericardial fluid. Findings on tests of the fluid showed adenocarcinoma, as did findings on biopsy of an axillary node. Before this, tumor had not been suspected.

Radiation therapy was begun in an attempt to prevent recurrent effusion. The patient remained quite comfortable for a few days until he died in a chair by his bed.

Grossly recognized tumor was found only in the left hilar area. The pericardial sac was thickened and distended with 800 ml of fluid. Microscopic sections of lung showed carcinoma permeating the perivascular lymphatic channels, and extending into several bronchi. A specific site of origin could not be identified, but the tumor was considered morphologically consistent with bronchiolar carcinoma. Thickened areas in the pericardium proved to consist of poorly-differentiated epithelial tumor suggestive of glandular type. Death appeared to be caused by the resulting effusion and cardiac tamponade.

Discussion

In a search for pertinent titles in recent English literature, we have been able to find only one previously-reported case of bronchiolar carcinoma in which pericardial effusion appeared and was recognized as the first major clinical event.[1] In this instance a 33-year-old Caucasian woman presented with dyspnea. Pericardiocentesis was carried out twice, with the cells proving to be normal. Because of a second recurrence of effusion, a pericardectomy was done; microscopic examination showed a poorly-differentiated tumor. At autopsy adenocarcinoma was found growing in and around an old right upper lobe lung scar. The patient died after a total illness of only six months.

All three of our patients presented with cough or had a recent history of cough. Clinical course was as short as two months and possibly as long as ten months. In each case, laboratory findings were essentially noncontributory. Two patients had dyspnea as a prominent complaint, as did the patient reported by McFadden and Dawson, while

two patients also had prominent gastrointestinal complaints, probably due to visceral congestion. In all three patients there seemed to be a sudden worsening in clinical course at some time during the stay in hospital, and tachycardia, tachypnea, venous distention and decreased blood pressure occurred. In our third case a correct diagnosis of effusion was made and the patient survived comfortably for several days following removal of pericardial fluid. Similar improvement also occurred in the quoted case. In the second patient the tentative preautopsy suggestion of possible effusion was made only after death, while in Case 1 the presence of pericardial effusion came apparently as a surprise. While two of our patients were in their middle to late 50's, one was only 33, the same age as in the quoted case. Both the younger patients related a history of upper respiratory infection about two months before onset of the symptoms for which they sought aid.

The tumor in Case 1 appears to be a representative of so-called "scar cancer." Such lesions are now recognized as a distinct entity.[1] Much has been written about possible causes of scarring and theories of induction of tumor in these scars, but the clinical presentation and course of these tumors have seldom been described.[1] The frequency of scar cancers has been estimated to be as high as 25 percent of all lung carcinoma.[1] At least half of bronchiolo-alveolar carcinomas occur in relation to scars of the lung.[2] The histology of these tumors is typically mucin-producing adenocarcinoma, but other varieties occur.[3]

Many differences of opinion exist about certain facets of bronchiolo-alveolar carcinoma. Even its very existence as a separate entity has been questioned by some. Much interest in this tumor has been generated by the uncertainty of its precise cell of origin. Of great interest to us is the fact that in our cases this poorly-defined, peculiar, glandular, papillary tumor—with tendency toward air-passage embolization and endobronchial spread as well as preservation of alveolar walls—seemed to have a propensity for spreading to the pericardium, and for presenting initially with massive pericardial effusion and tamponade.

The incidence of metastatic disease to the heart or pericardium from all primaries has been reported most commonly as around 10 percent, although rates varying between 6 and 21 percent have been quoted.[4] Such metastases originate most commonly from lung and breast, accounting for 48 percent of metastatic disease to the heart in one series.[4] Onuigbo[5] reported 27 percent pericardial involvement in 100 consecutive autopsies of lung carcinoma. Other investigators have found as high as 31 percent involvement of heart or pericardium.[6] Scott and Garvin[7] found heart or pericardial involvement in about a third of all lung and breast carcinomas. Such invasion is generally asymptomatic, or at least is overshadowed by concurrent tumor effects elsewhere.[6] Suspicion of neoplastic pericardial effusion may be worthwhile in known lung cancer patients in whom otherwise unexplained evidence of congestive heart failure develops.

However, the point illustrated in the instances reported here is that when the classical signs of tamponade are absent, or obscured in the company of the usual cardiac disabilities expected in persistent and obstructive lung disease, and the neoplasm in the lung has the often indistinct radiological character so possible in bronchiolar-alveolar carcinoma, not only the presence of pericardial effusion but the tumor process itself may be unsuspected.

Accordingly, we have regarded these experiences as an indication for an increased level of sensitivity to clues suggesting tamponade, such as paradoxical pulse, quick, distant heart sounds, pronounced venous engorgement and, possibly, confirmatory echocardiographic findings. Also indicated may be higher index of suspicion of lung carcinoma, particularly a poorly defined or undetectable bronchiolo-alveolar type, as the underlying cause.

Summary

Several instances of fatal or life-threatening pericardial effusion, presenting clinically without known cause, have been shown by biopsy or autopsy to result from unsuspected lung cancer with pericardial metastasis. The tumor is typically a bronchiolar adenocarcinoma, without obvious distinctive radiological features.

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