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Pulmonary Resection for Infarction Simulating Bronchogenic Carcinoma

WILLIAM E. NEVILLE, M.D., F.C.C.P., and C. WALKER MUNZ, M.D., F.C.C.P.
Cleveland, Ohio

Uncomplicated pulmonary infarction is one of the benign lesions in the pulmonary tree for which resection is not performed under ordinary circumstances. However with carcinoma of the lung definitely increasing in man and the curability rate remaining so low, it is little wonder that occasionally a resection will be performed unnecessarily for a benign condition simulating this dread disease. It is the purpose of this paper to review two cases where pulmonary resection was successfully performed for infarction after exhaustive preoperative studies still left one in doubt as to the correct diagnosis. Both patients had all of the clinical signs, symptoms, x-ray and bronchoscopy findings to support the diagnosis of bronchogenic carcinoma. In each instance pulmonary infarction was not considered in the differential diagnosis. In this respect, they are similar to the cases reported by Perkins and Bradshaw.6

Case 1: Mrs. A. H. a 64 year old woman was admitted to St. Alexis Hospital on November 22, 1950, complaining of pain in the right chest, chronic productive cough with hemoptysis, dyspnea, chills and fever. The symptoms had been progressive and of six to eight weeks duration. Physical examination revealed a white, slightly cyanotic critically ill female. There were numerous rales throughout the right lower chest. There was no evidence of phlebitis. Her blood pressure was 78/56, temperature 102.4 degrees, pulse 92 and respirations 46. She was given oxygen and put on S. R. penicillin 1 cc. intramuscularly every 12 hours and aureomycin 250 mgm. every four hours. An x-ray film of the chest revealed a localized pathological process in the midportion of the right lung which was interpreted as either a lung abscess or a
**FIGURE 1**

Lesion in the right chest. Progressive x-ray films showed no change in the size of the mass.

**FIGURE 2**

Roentgenogram demonstrating atelectasis of the posterior segment of the right upper lobe.

**FIGURE 3**

Bronchogram showing a round mass near the hilum with obstruction of the bronchus to the posterior segment of the right upper lobe.
carcinoma with early cavitation (Fig. 1). Dyspnea was much relieved with the oxygen but her temperature remained between 101 and 102 degrees. At the end of two days aureomycin was discontinued and streptomycin 500 mgm. every six hours was begun along with the penicillin. Her temperature still remained elevated but there was clinical improvement. Subsequent x-ray films showed no subsidence of the pathological process. On December 8, bronchoscopy was performed which showed slight shift of the carina to the right but there was no evidence of an intraluminal lesion. It was felt that there was some narrowing of the lower lobe bronchus. Bronchial washings were negative for tumor cells. In view of the fact that neoplasm was still the best possibility, exploratory thoracotomy was deemed advisable. This was performed on December 14, 1950.

The chest was opened through a posterior lateral incision resecting the right sixth rib subperiosteally. The right lower lobe was densely adherent to the diaphragm. In the periphery of the basal segment of the right lower lobe was a firm mass approximately 4 cm. in diameter with puckering over the overlying visceral pleura. One was unable to determine whether this was a carcinoma grossly. There was another mass palpated in the superior segment of the right lower lobe and still another in the midportion of the basal segment. In view of the fact that one was unable to determine if these were malignant, a right lower lobectomy instead of wedge resections was deemed indicated. The basilar segment was gradually freed from the diaphragm. The basilar artery was isolated and tied proximally and distally with black silk. It was transfixed and cut between. The inferior pulmonary vein was isolated and treated in like manner. The superior segmental artery was isolated, clamped, cut and tied. The basilar bronchus and the superior segmental bronchus were both isolated, clamped and sutured over with interrupted black silk. The entire lower lobe was removed. The chest was then closed in layers with interrupted black silk leaving a large catheter in place for under water drainage.

Pathological Description of the Lung

The specimen in formalin consists of a right lower lobe of lung weighing 235 gms. and measuring 14 x 11 x 5 cms. About the main bronchus the tissue is roughened due to previous sectioning over an area 6 x 5 cms. The pleurae are thin and glistening except along the infero-lateral margin over an area 7 x 4 cms, where they are slightly thickened by fibrous adhesions. There is also slight thickening and puckering of the pleura in the anterior midportion. Section through this latter region reveals a rounded encapsulated mass of tissue resembling lung tissue except that it is firmer and noncrepitant and has pinkish brown cut surfaces. This mass has a maximum diameter of 2 cms. Section through the thickened pleura at the infero-lateral portion of the lung reveals another encapsulated mass which is pyramidal in shape with its base at the pleural surface and its apex pointing toward the hilum. The tissue of this mass likewise resembles lung tissue but is firmer and noncrepitant. Centrally it is softer than the previously described mass and reddish brown. The main bronchi have been previously partially opened. There is slight saccular dilation of some of the bronchi and some longitudinal ridging. A few of the bronchi contain what grossly appears to be blood clot. A pulmonary artery 6 mms. in diameter leading toward the infero-later portion of the lower lobe is filled with a cylindrical mass grossly resembling thrombus. This is not adherent. Two sections, one of thrombus alone and one of thrombus within the artery and adjacent bronchus. Beneath the pleura on the antro-inferior portion of the specimen is an ovoid mass which is encapsulated and 15 mms. in maximum diameter and similar to the infero-lateral mass previously described. One section to include pleura on two sides. Serial sections of the lung tissue reveal light pinkish brown, subcrepitant lung tissue of normal consistency except that as noted in
the previously described masses. One section. There is a small zone of atelectasis 2.5 cms. in diameter in the midlateral portion of the lobe. Microscopic diagnosis: Organizing infarcts (3) of lower lobe of right lung. Emboli in pulmonary arteries to lower lobe of right lung.

Her postoperative course was uneventful until the sixth postoperative day at which time she developed left superficial phlebitis. This gradually subsided and at the time of her discharge on the 16th postoperative day her legs were entirely normal. At no time was there any evidence of deep phlebitis. It has now been almost four years since her operation and she has remained entirely asymptomatic.

Case 2: Mr. P. S. (No. 169024) a 66 year old man was admitted to Lakewood Hospital on June 13, 1950, complaining of hemoptysis. He stated that he had been well until 24 hours before admission when he coughed up a teacupful of bright red blood. His only other symptom was a pulling sensation under the lower sternum when coughing. Physical examination revealed a normal male of stated age lying comfortably in bed in no apparent distress. His blood pressure was 110/70, with a pulse rate of 80. His respiratory rate was 20 per minute. Auscultation revealed bilateral coarse rales. The remainder of his examination was negative. An x-ray film of the chest (Fig. 2) showed atelectasis of the pectoral segment of the right upper lobe suggesting chronic bronchial obstruction. A bronchogram (Fig. 3) showed a lack of filling of the pectoral branch of the right upper lobe. On June 14, bronchoscopy was performed at which time blood clots were removed from the right upper lobe bronchus. Bronchial washings were obtained which were suggestive of tumor cells. Observing that there was no change in the roentgenogram and with all the evidence pointing toward the lesion in the lung being a bronchogenic carcinoma, he was operated upon June 23.

The chest was opened through a posterolateral incision by resecting the fifth rib subperiosteally. The right upper lobe was found to be involved in a process which made it look and feel like liver. Right upper lobectomy was performed by the individual ligation technique and the chest was closed in layers leaving two catheters in for under water drainage.

Pathological Examination. The specimen in formalin consists of one lobe of the lung. In the lower portion of this lobe there is an area measuring 9 x 5 cm. which is more firm than the remaining lung tissue. The cut surface is moist and bloody fluid escapes from it. No gross evidence of tumor is found.

Microscopic Description. Sections of the lower portion of the lobe reveal a marked degree of hemorrhage with some necrosis of the parenchyma. The area of necrosis is rather poorly defined and the hemorrhage extends well beyond the necrotic portion.

Diagnosis: Infarct of the lung, recent—As soon as diagnosis was established he was placed on anticoagulant therapy (Herapin). This was discontinued in three days when bloody pleural effusion developed. After thoracentesis he had no re-accumulation of fluid and the remainder of his convalescence was uneventful. In this case, with the pectoral branch of the right upper lobe bronchus blocked and bronchial washings which suggested tumor cells, there was even more evidence to support a diagnosis of bronchogenic carcinoma.

Discussion

Carcinoma of the lung may masquerade on the roentgenogram under various types of shadows. We are all beginning to become suspicious of any inflammatory lesion in the lung which does not readily clear on medical therapy. Too many patients were treated in the past and unfortunately
too many are even being treated today for an inflammatory lesion in the lung while carcinoma is the underlying cause. Antibiotics will clear the peripheral manifestations but will do nothing for the neoplasm.

Since carcinoma of the lung may imitate any of the benign pathological entities then the reverse is true. Hampton and Castleman\(^4\) correlated post-mortem chest x-ray films with autopsy findings in 400 patients diagnosed as carcinoma of the lung. In this group, three cases of pulmonary infarction were found. They point out that clinical signs and symptoms of infarction are also present in carcinoma. It is commonly believed that infarcts are triangular with the apex pointed toward the heart but in their studies it was more apt to be oval or triangular with the apex toward the periphery. The shape of the infarct is dependent entirely upon the shape of the part of the lung it involves.

Krause,\(^4\) and \(^5\) found on a review of 344 instances of aseptic hemorrhagic infarction of the lung seen at autopsy at Cleveland City Hospital and correlated with the pre-mortem x-ray film findings that in only 22 per cent in which this was directly the cause of death, was the correct diagnosis made.

Pulmonary infarction occurs more often in the ambulatory patient than one realizes. It is commonly seen in the sixth and seventh decades of life and can easily be misdiagnosed unless the condition is thought of. Eleven ambulatory patients in Homans\(^2\) series developed pulmonary infarction as the result of quiet thrombosis in the lower limbs. This same situation apparently existed in our second case although a positive diagnosis of phlebothrombosis was never made.

Although an unnecessary resection may occasionally be performed by adhering to the criteria of performing an exploratory thoracotomy for undiagnosed suspicious pulmonary lesions, many lives will be saved. Johnson, Clagett and Good\(^8\) found that in 114 patients of a series of 384 it was necessary to resort to exploratory thoracotomy before a definite diagnosis could be made. Of these, 55 per cent proved to have malignancy. It is better to resect a lung for a benign disease than to watch the patient die of a cancer by wishfully thinking the lesion will disappear.

**SUMMARY**

1. Two cases of lobectomy for pulmonary infarction simulating bronchogenic carcinoma are reviewed.

2. In both cases the signs, symptoms, x-ray and bronchoscopy findings were similar to those commonly seen in pulmonary malignancy.

3. In its protean manifestations, pulmonary infarction may mimic almost any other lung disease.

4. It occurs more in the ambulatory patient than is generally realized.

5. Despite the occasional unnecessary pulmonary resection, one should not deter from exploratory thoracotomy on all undiagnosed, suspicious, pulmonary lesions.
RESUMEN

1. Se revisan dos casos de lobectomía por infarto pulmonar que simulaban carcinoma broncogénico.

2. En ambos casos los signos, los síntomas y los hallazgos radiológicos y de broncoscopía, eran similares a aquellos que se ven comúnmente en tumores malignos pulmonares.

3. En sus manifestaciones proteicas el infarto pulmonar puede simular casi todos los otros padecimientos pulmonares.

4. Ocurre más comúnmente en el paciente ambulatorio de lo que se cree.

5. A pesar de estas resecciones pulmonares ocasionales innecesarias, no debe uno dudar en hacer una toracotomía exploradora en todas las lesiones pulmonares sospechosas no diagnosticadas.

RESUME

1. Les auteurs présentent deux cas de lobectomie pour infarctus pulmonaire ayant simulé un cancer bronchique.

2. Dans les deux cas les symptômes cliniques, radiologiques et bronchoscopiques étaient ceux que l'on a l'habitude de constater dans les tumeurs pulmonaires malignes.

3. Dans ces manifestations, l'infarctus pulmonaire peut simuler pratiquement toutes les affections du poumon.

4. Il survient plus souvent qu'on ne le pense généralement chez les malades qui gardent leur activité normale.

5. Malgré la possibilité d'une exérèse pulmonaire inutile, il ne faudrait pas négliger la thoracotomie exploratrice dans tous les cas de lésions pulmonaires suspectes non diagnostiquées.

REFERENCES


