Neoplastic Lung Pathology Roadshow

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34 Squamous cell carcinoma, right upper lobe

This 64 year old man with a 40 pack year history of cigarette smoking and long standing chronic obstructive pulmonary disease was found clinically to have an obstructing carcinoma of the right upper lobe with post obstructive pneumonia. He received palliative radiation (3000 rads) to the right lung.

The gross specimen shows extensive involvement of the right upper lobe bronchus by firm tan irregularly-shaped tumor tissue. Most of the upper lobe shows changes of organizing post obstructive pneumonia. There is also a substantial amount of emphysema which can be especially well seen in the right middle and right lower lobes. At autopsy, metastases were present in the kidneys, adrenal glands, and thoracic lymph nodes.
• **35 Adenosquamous carcinoma, right lower lobe: tuberculosis, right upper lobe**

• This 60 year old male with a greater than 200 pack year history of cigarette smoking was noted to have a 2 cm mass in the right lower lobe on the chest x-ray. This patient also had a history of coronary artery disease, abdominal aortic aneurysm, and recurrent pulmonary tuberculosis treated in 1985 with INH.

• The gross specimen shows destructive changes and foci of caseous necrosis in the upper lobe. In the right lower lobe adjacent to the pleura is a tan neoplastic mass measuring 5 cm in maximum dimension. Notice the adjacent thickening of the pleura separated from the tumor by black pigment. Centrilobular emphysema is also present in this specimen.
• 36 Squamous cell carcinoma, right lower lobe bronchus

• This 59 year old man presented with a right lower lobe pneumonia which did not respond to antibiotics.

• He also had coronary artery disease, intermittent claudication, a cerebrovascular accident, and a long history of cigarette smoking.

• The gross specimen shows obstruction of the lumen of the right lower lobe bronchus by a fleshy appearing mass. The entire right lower lobe shows extensive organizing post obstructive pneumonia. Carcinoma should be suspected in any older cigarette smoker with a non resolving pneumonia.
37 Cavitating squamous carcinoma left upper lobe

This 72 year old man with a 100 pack a history of cigarette smoking and severe chronic obstructive pulmonary disease was found to have a mass in the left upper lobe. The patient had undergone a right upper lobectomy in the 1950’s for treatment of pulmonary tuberculosis.

The gross specimen shows a 6 cm cavitating carcinoma in the upper lobe of the left lung. This patient had not received prior radiation therapy (see case 38). Note also the presence of severe centrilobular emphysema.
• **38 Cavitating squamous cell carcinoma, right lower lobe**

• This 55 year old man with a history of hypertension, anemia, seizures, and benign monoclonal gammopathy was found to have squamous carcinoma of the right lower lobe which was treated with radiation therapy. The gross specimen shows an 8 cm mass in the right lower lobe which has undergone cavitation centrally. Squamous cell carcinoma is the most common type of primary lung cancer to undergo cavitation. Cavitation also may be related to prior history of radiation therapy. Note the presence of a moderate degree of centrilobular emphysema especially in the upper lobes.
• 39 Small cell carcinoma, right lower lobe
  
  This 70 year old man had a 30 year history of cerebellar degeneration of uncertain etiology, and presented in December of 1989 with dyspnea and dehydration. Workup demonstrated a small cell carcinoma of the lung, which was treated with radiation and chemotherapy. The patient’s disease progressed, and he died approximately one month from his initial presentation. There was a 20 pack year history of cigarette smoking, although the patient stopped smoking 5 months prior to his initial presentation.

  
  • The gross specimen shows creamy white tumor which appears to be tracking along the pathways of the major lower lobe bronchi. This thickening of the wall of airways by tumor infiltration has been referred to as a pipe stem appearance. This pattern of spread probably is a form of lymphatic metastasis, since the lymphatic pathways of the lung tend to travel with bronchovascular bundles.
• 40 Squamous cell carcinoma, right main stem bronchus

• This 58 year old man with a 60 pack year history of cigarette smoking and chronic obstructive pulmonary disease presented with a pathologic fracture of the left femur. He received 3000 rads of radiation treatment to the sacrum and femoral head, and was found at autopsy to have primary carcinoma of the lung.

• The gross specimen shows sections of both the right and left lung, with extensive involvement of the right main stem bronchus by tan, irregular and friable tumor tissue. A subcarinal lymph node is also markedly enlarged and grossly replaced by tumor. Post obstructive pneumonia is present in both the upper and lower lobes. This patient has minimal emphysema.
• 41 Residual squamous cell carcinoma of the lung.

• 66 year old African American male with a history of squamous cell carcinoma of the lung, treated with chemotherapy and radiation.

• The tumor within this dual lung specimen is tan-white and firm, with infiltrative borders.
42 Small cell carcinoma, right lung

This 71 year old man presented with a history of progressive fatigue, weight loss, and productive cough. Chest x-rays showed a right hilar mass and endobronchial biopsy revealed small cell carcinoma. The patient was treated with radiation and chemotherapy, but his disease progressed and he died four months after his initial presentation. The patient had a 50 pack year history of tobacco abuse.

The gross specimen shows a large irregular mass of creamy white tumor in the right hilar region extensively involving the major bronchi of the right lung. Hilar lymph nodes and Mediastinal lymph nodes are extensively involved by tumor, which has grown to partially surround the aorta. Small metastatic deposits are noted throughout the right lung.
43 Large cell carcinoma, right upper lobe

This 68 year old man presented in August, 1989 with a 4 month history of Hemoptysis and a 15 pound weight loss. He had a smoking history of greater than 120 pack years. The patient had been treated for squamous cell carcinoma of the nasal pharynx in the 1970’s. It is of interest that a common cause of death for cigarette smokers with carcinomas of the upper respiratory tract is subsequent development of carcinoma of the lower respiratory tract.

The gross specimen shows an irregular, yellow-tan mass in the right upper lobe associated with focal brown areas of hemorrhage. Extensive metastatic deposits are present in the hilar lymph nodes of the right and left lungs, as well as a large mass of subcarnial lymph nodes. In addition, this patient has a severe degree of centrilobular emphysema, which correlates well with his long history of chronic obstructive pulmonary disease.
• 44 Adenosquamous carcinoma, right lower lobe

• This 68 year old man presented to the Durham VA Medical Center Emergency Room with complaints of shortness of breath, nausea and vomiting. The gross specimen shows a creamy white mass in the superior portion of the right lower lobe abutting the fissure between the upper and lower lobes. In addition, there is extensive organizing pneumonia involving the right upper lobe. Note also the presence of centrilobular emphysema.
45 Large cell carcinoma, right upper lobe

This 64 year old man with a 20 year history of insulin dependent diabetes mellitus was found to have a large mass on the chest x-ray. Computed tomography of the abdomen demonstrated that the patient already had metastatic disease to the liver.

The gross specimen shows a 9 cm mass replacing much of the right upper lobe. The tumor can be seen to involve the right upper lobe bronchus near the hilum.
• **46 Spindle cell squamous carcinoma, left upper lobe**

• This 70 year old man was found to have a large left upper lobe mass with rib destruction associated with Hypercalcemia and altered mental status. The patient received radiation treatment to the rib and to the primary tumor.

• At autopsy, the patient was found to have a 15 x 13 x 12 cm mass in the left mid lung region. Microscopically, this tumor had a spindle cell or sarcomatoid appearance. Sarcomatoid carcinomas of the lung may mimic soft tissue sarcomas with regard to their appearance microscopically. These tumors often attain a large size, usually occur in individuals who have a history of cigarette smoking, and similar to other primary carcinomas of the lung, have a poor prognosis.
• **47 Mucinous adenocarcinoma, right lower lobe**

• This 74 year old man has extensive involvement of the lower lobe by a process which grossly resembles organizing pneumonia. This is one of the patterns often seen in patients with mucinous adenocarcinoma of the lung. Note the metastatic deposits of tumor within the large hilar lymph node.
• **48 Adenocarcinoma, left lung**

• This 74 year old male presented with a left-sided malignant pleural effusion. This was due to the presence of a small, approximately 2 cm peripheral adenocarcinoma of the lung which early during its course invaded into the pleura and spread along the surface of the lung. Note the thickening of the pleura by tan tumor tissue and involvement of the interlobar septum. This case illustrates how a small peripheral pulmonary adenocarcinoma can invade the pleura and mimic the pattern which one sees with malignant pleural mesothelioma. Also present in this case is extensive organizing pneumonia of the right lower lobe
• 49 Malignant (diffuse) pleural mesothelioma
• A 43 y/o male construction worker developed cough and right-sided chest pain. Chest x-ray showed a pleural effusion.
• The right lung is encased by a rind of firm white tumor of variable thickness. Note the extension of tumor into the major and minor fissures.
• Epithelioid cells are arranged in tubules and papillary formations. Tumor cells are polygonal in shape, with eosinophilic cytoplasm, centrally placed nuclei, and occasional nucleoli. By electron microscopy, the asbestos content of the lung was found to be elevated.
• **50 Lymphangitic carcinomatosis, primary in kidney**

This 62 year old man presented with bilateral pulmonary infiltrates of unknown etiology. In addition, he had recent onset of a seizure disorder, altered mental status, fever, and leukocytosis.

At autopsy, a 3.5 cm diameter sarcomatoid renal cell carcinoma was identified within the left kidney. The tumor extensively involves the lungs with deposits of creamy colored tumor within the visceral pleura and also within the interlobar fissures. Note the fine delicate arborizing deposits of tumor throughout the lung parenchyma. This is a classic example of lymphangitic spread of tumor within the substance of the lung. Microscopically, the tumor had a spindle cell (sarcomatoid) appearance.
• 51 Small cell carcinoma, left lung
• This 51 year old man with a 60 pack year history of cigarette smoking was found in October of 1981 to have small cell carcinoma at the time of bronchoscopy. The patient was treated with radiation and chemotherapy, but died as a result of complications of local recurrent disease.
• The gross specimen shows extensive involvement of the pleura and the lower half of the lung by recurrent small cell carcinoma. Although chemotherapy and radiation are often initially effective in the management of these patients, local recurrence as occurred in this case may still be a significant and sometimes fatal problem.
• **52 Cartilaginous Hamartoma**

• This patient was found incidentally at autopsy to have a firm, circumscribed, mucoid 1.5 cm lesion in the mid-lung filed. Such an abnormality would show up as a so-called coin lesion on chest x-ray.

• Cartilaginous hamartomas are believed to be benign tumors of mesenchymal origin rather than true hamartomas. Unlike true hamartomas, they are never seen in childhood and can be demonstrated to grow over time. They consist primarily of cartilage with lesser amounts of adipose tissue, smooth muscle, and undifferentiated myxoid spindle cells. The epithelial component is believed to represent entrapped bronchiolar epithelium as the tumor grows and expands the pulmonary interstitium.
53 Primary large cell lymphoma, right lower lobe

This 77 year old man presented with persistent cough, and was found to have a large mass lesion in the right lower lobe on chest x-ray. An endobronchial mass was identified by bronchoscopy, and the patient was thought to have a carcinoma of the right lower lobe. However, histologic and cytologic assessment of the tumor showed that this was a primary large cell lymphoma of the lung.

The gross specimen consists of the resected right lower and middle lobes. The right lower lobe is essentially replaced by an 11 cm tan mass with central cavitation and ill-defined borders. Primary lymphomas of the lung are considerably less common than primary carcinomas of the lung. About half of these patients will respond very well to local resection and/or radiotherapy, whereas the remaining half will progress to systemic involvement by lymphoma.
54 Lymphomatoid granulomatosis

This 19 year old man presented with a history of cough, wheezing, and dyspnea on exertion, and was found to have multiple nodules on chest x-ray. A diagnosis of lymphomatoid granulomatosis was made based upon tissue obtained at time of open lung biopsy. The patient was treated with Cytoxan and prednisone, followed by radiation, but died with progressive disease.

The gross specimen shows multiple tan nodules up to 4 cm in maximum dimension in both the upper and lower lung zones. Microscopically, lymphomatoid granulomatosis is a lymphoproliferative disorder which is characteristically angiocentric and angiodestructive.
• 55 Diffuse large cell lymphoma with secondary involvement of the lungs

• This 57 year old man was found to have a large cell lymphoma involving the inguinal lymph nodes by biopsy in 1981. The patient had received radiation and combination chemotherapy with little response, and finally succumbed to recurrent episodes of sepsis and meningeal carcinomatosis.

• The lungs show large ill-defined areas of consolidation resembling that seen with pneumonia. Microscopically, this consisted of replacement of the lung parenchyma by sheets of lymphoma cells. The lungs are frequently a site of involvement in patients with disseminated large cell lymphoma.
• 56 Diffuse large cell lymphoma with secondary involvement of the right lung

• This 25 year old man presented with the superior vena cava syndrome in September of 1984 and was found to have a large cell lymphoma of the mediastinum. The patient was treated with combination chemotherapy, but died as a result of the complications of widespread tumor involvement.

• The gross specimen shows extensive replacement of the hilar structures and portions of the adjacent right lower lobe by tan colored, poorly circumscribed tumor. Note the involvement of the hilar lymph nodes with effacement of nodal architecture. The lungs are a common site of secondary involvement by widespread lymphoma.
• 57 Cutaneous T cell lymphoma with secondary involvement of the lungs

• This 66 year old man was diagnosed in 1976 to have a T cell lymphoma involving the skin and bone marrow with circulating Sezary cells. The patient had been treated with chemotherapy and radiotherapy on numerous occasions, and finally died with systemic involvement including the lungs.

• The gross specimen shows two fairly well defined tan nodules of tumor at the periphery of the lung in the mid lung zones.
58 Cutaneous T cell lymphomas with pulmonary involvement

This 53 year old man had a history of cutaneous T cell lymphoma with Sezary syndrome diagnosed in April of 1990. The patient’s clinical course was complicated by disseminated candidiasis involving the lungs, trachea, kidneys, prostate, and gastrointestinal tract. The patient developed adult respiratory distress syndrome requiring intubation and high levels of oxygen.

The gross specimen shows extensive involvement of the medial basal area of the lung by T cell lymphoma. The remainder of the lung is firm and has a mottled appearance, and these changes are consistent with late progressive adult respiratory distress syndrome. In addition, especially in the upper lobes, scattered small white punctate lesions measuring approximately 1 mm in maximum dimension and with a dark hemorrhagic border may be seen, and these represent foci of infection by Candida organisms.
59 Lymphangitic carcinomatosis

This 51 year old man had a history of atherosclerotic cardiovascular disease and a 35 pack year history of cigarette smoking. He presented with a history of cough and clear sputum production, and was found on chest x-ray and computed tomography of the thorax to have unresectable carcinoma of the lung. The patient received radiation and chemotherapy for his tumor, but died with progressive disease.

At autopsy, there is extensive involvement of the lung by metastatic carcinoma. A few spherical nodules can be identified within the lung parenchyma, but the most striking finding is the marked accentuation of the secondary lobular septa of the lung due to the presence of extensive tumor metastases within lymphatic channels. This pattern is typical for lymphangitic carcinomatosis. This type of spread of tumor can occur with primary tumors of the lung as well as tumors from distant sites.
• 60 Metastatic adenocarcinoma, colon
• This 68 year old man presented with a history of 60 pound weight loss and obstruction of the large bowel. A left hemicolecctomy was performed in October, 1988 for a 7 cm tumor mass in the sigmoid colon. Although the tumor had not penetrated through the muscular wall of the colon and there was no evidence of lymph nodal metastasis, the patient had multiple pulmonary nodules on chest x-ray at the time of surgery which was suspected to be hematogenous metastases. The patient died 2 ½ years later from progressive pulmonary disease. The gross specimen shows a massive yellow necrotic lesion in the lower lobe, measuring some 10 cm across. Such lesions have the appearance on chest x-ray of cannonballs, and have been referred to as “cannonball” metastases.
61 Metastatic Embryonal cell carcinoma, right testis
This 30 year old man was noted in March 1981 to have a mass in the right testis. Further workup indicated that the tumor had already spread to the lung, liver, and abdominal lymph nodes. The patient underwent multiagent chemotherapy (including bleomycin), but died with progressive disease, including brain involvement.

The lung specimen appears small, and the lower one-third of the lung parenchyma is largely replaced by nodules of metastatic tumor. Necrotic tumor can also be identified within the hilar lymph nodes and within the lumen of the main stem bronchus. The lung parenchyma is also firm, which is due to interstitial fibrosis of the lung parenchyma secondary to bleomycin pulmonary cytotoxicity. The predominance of tumor masses within the lower lobe of the lung is characteristic of hematogenous dissemination of tumor, which is a consequence of the greater blood flow to the lower lobes of the lung.
62 Metastatic adenocarcinoma of the breast; cavitary tuberculosis

This 74 year old man was found to have adenocarcinoma of the breast with multiple metastases to the lymph nodes and bones. The patient received radiation therapy to the bones and Tamoxifen therapy for metastatic carcinoma. The patient was found to have bilateral pleural effusions. Examination of the pleural fluid demonstrated the presence of acid fast bacilli. The patient then received therapy with rifampin, INH, and pyridoxine, but died secondary to complications from terminal hypotension.

The gross specimen of the lung shows a cavitary lesion in the lower lobe with necrotic material adherent to the wall of the cavity. Some caseous necrosis can be identified in association with the wall of the cavity, and this lesion microscopically was found to consist of granulomatous inflammation with acid fast bacilli identified on special stains. Also present within the specimen is a 7 mm subpleural deposit of metastatic breast carcinoma. Breast carcinomas are unusual in males, and account for approximately 1% of all breast cancer cases.
63 Metastatic melanoma

This unfortunate 27 year old white male had a diagnosis of malignant melanoma of the right thigh in February, 1993. He underwent several surgical resections as well as chemotherapy and radiation therapy. The patient nonetheless developed extensive metastatic disease involving skin, brain, liver, urinary bladder, kidneys, lungs, and multiple lymph nodes.

The gross specimen shows multiple sharply circumscribed spherical nodules within the lung parenchyma, which are somewhat more numerous in the lower lung fields. The appearance is typical for hematogenous spread of tumor of the lungs. Some of the nodules show necrosis centrally, and some contain areas with dark pigmentation. Malignant melanoma is an extremely aggressive cancer, typically resulting in widespread metastases to a variety of organs.
64 Metastatic renal cell carcinoma

This 51 year old man presented with pathologic fractures of the left humerus and the lumbar vertebrae. The patient had received radiation therapy to the sites of boney metastasis, and was found at autopsy to have a renal cell carcinoma of the right kidney.

The gross specimen shows numerous white nodules throughout the lung which measure 1 to 3 mm in size. This appearance is similar to that of miliary tuberculosis. However, a few larger nodules, measuring up to 7 mm in maximum dimension, are noted in the lower lobes and would be most unusual for miliary tuberculosis. Note also the pigmentation of the lung associated with traces of centrilobular emphysema.