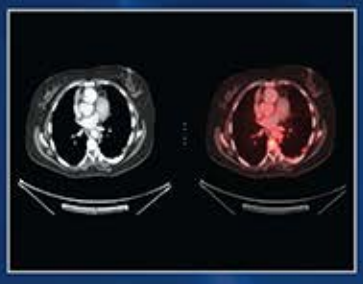
ISSN 2319-1260

January 2017 Volume 5 Number 1

World Clinics

PULMONARY & CRITICAL CARE MEDICINE

Pleural Diseases


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JAYPEE

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World Clin Pulm Crit Care Med. 2017;5(1):153-59.

Pleural Malignancy

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ABSTRACT

Pleural tumors may be solitary or diffuse, and they are mesenchymal in origin. Mesothlioma fall in the category of diffuse pleural malignancy. Solitary pleural tumors may be benign or malignant. They present as solitary, well-defined, discrete mass at the periphery of the lung. The pleural fluid is serous and does not contain any malignant cells. The treatment consists of surgical resection. Diffuse mesothelioma is associated with a history of exposure to asbestos. It presents with chest pain and dyspnea and signs of pleural effusion. The prognosis is poor. The treatment does not slow the downhill course of the disease.

Primary tumors of the pleura may be diffuse or solitary. Mesotheliomas are the examples of diffuse pleural malignancy. Solitary pleural tumors may be benign or malignant.

INTRODUCTION

Pleura can be seat of malignancy. It may be solitary or diffuse. Solitary pleural tumors may be benign or malignant. Diffuse pleural malignancy presents as mesothelioma.

Benign tumors present as solitary fibrous tumors commonly. They arise from the visceral pleura. They are neither related to mesothelioma nor to asbestos exposure. Radiologically benign tumor presents as a solitary, well-defined, discrete mass at the periphery of the lung. It needs surgical resection.

Malignant mesothelioma is often associated with exposure to asbestos. The growth forms a continuous layer of diffuse thick mantle encasing the lung. The presenting symptoms are chest pain or dyspnea. There is evidence of large pleural effusion. It has poor prognosis. There is no satisfactory treatment.

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SOLITARY FIBROUS TUMORS

Solitary tumors are mesenchymal in origin. Majority of them exhibit a benign course and are localized.[1] These tumors were earlier referred to as benign mesothelioma, localized mesotheioloma, supleural fibroma, and localized fibrous tumor of the pleura.[2] Solitary fibrous tumors are not related to mesothelioma.[3] They are not related to asbestos exposure.

Pathology

Benign fibrous mesothelioma arises from the visceral pleura more frequently. They are firm, circumscribed, pedunculated masses. They may invade the lung and chest wall locally.[4] Histologically, they demonstrate uniform, elongated spindle cells with a variable amount of collagen and reticulum fibers.[5]

Clinical Features

Solitary fibrous tumors present with cough, fever, breathe shortness, chest pain, and a feeling of a mass moving within the chest. They may even remain asymptomatic being evident as a mass on routine chest radiograph. Examination may reveal clubbing and hypertrophic pulmonary osteoarthropathy, which is often noted in lesions greater than 7 cm in diameter.[5] There is dullness on percussion of chest and absent breath sounds. Pleural effusion is uncommon.

There can be hypoglycemia and is produced by insulin-like growth factor II released by the tumor.[6]

Investigations

Radiologically, it presents as a solitary, well-defined, discrete mass at the periphery of the lung or related to a fissure.[7] Often it is lobulated. However, it is difficult to distinguish between pleural and parenchymal tumors. Bronchoscopy does not reveal any endobronchial growth. Computed tomography (CT) shows it as a large noninvasive growth and tend to be enhanced by intravascular contrast material due to its high vascularity.

When there is a pleural effusion, it is usually serous and does not contain any malignant cells. The diagnosis is established by a fine-needle aspiration biopsy, and it reveals benign fibrous tissue. The spindle cells are devoid of nuclear pleomorphism and mitoses.[8] CD34 antibody staining gives a positive response in presence of solitary fibrous tumors.[9]

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Treatment

The treatment is surgical resection of the tumor. There is need to remove sufficient amount of lung parenchyma when the growth is arising from the visceral pleura. The prognosis is excellent. Recurrence is unusual.

DIFFUSE MESOTHELIOMA

Etiology

Mesothelioma arises from the mesothelial cells that line the pleural cavities. They are associated with a history of exposure to asbestos in most cases.[10] Asbestos is a fibrous silicate. Mostly, the condition is caused by long fibers (more than 5 μm) of amphibole (crocidolite). Crocidolite fibers are straight and move along the stream of the airflow and may reach the pleura. They require many years to get cleared from the lungs.[11] There appears to be greater risk of development of mesothelioma in persons working in manufacturing industries than in mining due to greater exposure to asbestos. However, there is no relation between the degree and duration of exposure and development of mesothelioma. The exposure may have been brief. Strangely, the condition has been observed in spouses and children of asbestos workers and in persons residing near asbestos mines. Many patients do not show radiographic evidence of asbestos exposure. The condition is not related to tobacco smoking. The average latent period from first exposure to the development of pleural tumor varies from 20 to 40 years.[12]

Other fibers having physicochemical properties similar to asbestos (zeolite in the volcanic rock) may induce development of mesothelioma of the pleura.[13]

Pathology

Initially, the condition makes a beginning as an isolated discrete nodule, but soon becomes multiple on visceral or parietal pleura. They become progressively thicker and nodular giving a cobblestone effect. The expanding growth coalesces to form a continuous layer of diffuse thick mantle encasing the lung and cause contraction of the affected hemithorax. Later, the growth infiltrates the pericardium, diaphragm, chest wall, and even the peritoneal cavity. It metastasises to the regional lymph nodes. Hematogenous dissemination is unusual, however, the metastatic lesions are usually silent.

Histologically, the tumors are classified as epithelial, mesenchymal, and mixed varieties.[14] In the epithelial variety, the cells are uniformly cuboidal with vesicular nuclei. In mesenchymal variety, the cells are spindle-shaped with elongated nuclei. The mixed form exhibits features of both the epithelial and mesenchymal forms. Among different cell types, epithelial varaiety is frequent.

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Clinical Features

The presenting features in most patients are chest pain or dyspnea.[15] The chest pain is nonpleuritic aching and is often referred to the upper abdomen or shoulder due to involvement of the diaphragm. With the progress of the disease, there is loss of weight, dry cough, and progressive dyspnea. Clinically, there are signs of pleural effusion. With the progress of the disease, the tumor surrounds the ipsilateral lung and leads to shift of the mediastinum to the side of effusion. Pleural effusion may get loculated.

Investigations

Chest radiograph reveals presence of a unilateral large pleural effusion obscuring the tumor. Lobulated pleural masses may be noticed above the fluid or after aspiration of the fluid. There may be diffuse pleural thickening up over the apex and down along the mediastinum. There is contraction of the affected side of the chest. Computed tomography scan helps in determining the extent of the disease. It demonstrates thickening of the pleura with an irregular internal margin. The changes are more marked at the base of the lung. The major interlobar fissure also exhibits marked thickening. The spread of the tumor to the chest wall, diaphragm, pericardium, and to the abdomen can be recognized by CT.[16]

The pleural fluid is an exudates. It is straw-yellow or serosanguinous with a pH less than 7.2, glucose less than 50 mg/dL, and presence of malignant cells.[17] The fluid may be viscid due to presence of large amount of hyaluronate.

Diagnosis

The occurrence of pleural effusion with pleural thickening and a decreased volume of ipsilateral hemithorax in middle aged or elderly males with persistent chest pain or dyspnea and a history of asbestos exposure suggest the likelihood of pleural mesothelioma. Often it is difficult to establish the diagnosis. Cytologic smears, needle biopsies of the pleura, and sections from cell blocks of pleural fluid help in the diagnosis. Many a times, there is difficulty to distinguish between metastataic adenocarcinoma and pleural mesothelioma. Thoracoscopic biopsies or thoracotomy and open biopsies are necessary to obtain adequate specimen for histologic examination. It helps in establishing the pattern of cellular abnormality and invasion of chest wall structures.

Prognosis

The prognosis is poor. The mean survival time varies from 4 to 12 months after diagnosis.[18] The course is usually relentlessly downhill. The factors given in table 1 suggest poor prognosis.

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Table 1: Poor Prognostic Factors

- Advancing age
- Low pleural fluid glucose (<50 mg/dL)
- Low pleural fluid pH (<7.2)
- Stage III disease
- Involvement of regional lymph nodes
- Mesenchymal variety of tumor

Women, young persons, low grade malignancu, and epithelial tumors exhibit relatively a better prognosis.[19]

Treatment

Buchart and colleagues have classified diffuse malignant mesothelioma into 4 stages (Table 2).[20]

There is no evidence that any treatment (surgery, chemotherapy, or radiotherapy) slows the course of the disease. Patients with stage I tumor of the epithelial type under the age of 60 years may undergo radical pleuropneumonectomy with removal of the pleura, lung, lymph nodes, ipsilateral pericardium, and diaphragm. However, only a very small percentage of patients may get benefit from such a radical surgery.[21]

Among medications, doxorubicin has shown some effect in causing regression of tumor.[22] It is worth trying in inoperable tumors. Radiotherapy is ineffective. As a palliative therapy, repeated thoracocentesis and later pleurodesis are indicated in recurrent pleural effusion. Chest pain is often disabling due to inflammation and neuropathic components. Opiates, percutaneous cervical cordotomy to interrupt pain perception, and radiotherapy when pain is secondary to bone erosion or secondary cutaneous tumor nodules are advocated. Prophylactic radiotherapy is advised to prevent seeding with painful chest wall masses along the tracks of aspiration biopsy or chest drain tubes.[23]

Table 2: Pathologic Staging Stage Features

I	Tumor limited to parietal pleura
II	Tumor involving chest wall or mediastinum
III	Tumor spreading to regions below diaphragm opposite pleura and lymph node involvement outside chest
IV	Hematogenous dissemination

SOLITARY MALIGNANT MESOTHELOMA

The localized malignant mesothelioma exhibits low grade malignancy and is potentially resectable.

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CONCLUSION

Primary pleural tumors may be diffuse or solitary. The former presents as mesothelioma and the latter as benign or malignant tumor. Mesothelioma arises from the mesothelial cells lining the pleural surfaces. Often, there is a history of exposure to asbestos. The expanding growth forms a diffuse, thick mantle encasing the lung and there is contraction of the affected hemithorax. There is evidence of an exudative, serosanguinous, large pleural effusion. The course of the condition is usually relentlessly downhill and treatment does not slow the course of the disease.

Solitary tumors may be benign or malignant. Benign fibrous tumors arise from visceral pleura. They appear as firm, circumscribed, pedunculated mass. It is to be treated by surgical resection. The prognosis is excellent. Malignant variety exhibits low grade malignancy and is potentially resectable.

Editor's Comment

Malignant mesothelioma is a malignant tumor involving the pleura associated with previous asbestos exposure. The condition arises from the mesothelial cells that line the pleural cavities. A history of occupational exposure or indirect exposure to asbestos is available in majority of cases. The condition makes a beginning as an isolated discrete nodule and soon becomes multiple on visceral or parietal pleura. They become progressively thicker and nodular giving a cobblestone effect. The expanding growth coalesces to form a continuous layer of diffuse thick mantle encasing the lung and cause contraction of the affected hemithorax. The presenting features in most patients are chest pain or dyspnea. Chest radiograph reveals presence of unilateral large pleural effusion obscuring the tumor.

The occurrence of pleural effusion with pleural thickening and a decreased volume of ipsilateral hemithorax in middle aged or elderly males with persistent chest pain or dyspnea and a history of asbestos exposure suggest the likelihood of pleural mesothelioma. The disease is unilateral. The course of the disease is variable. Generally, the prognosis of the disease is poor. There is no evidence that any treatment (surgery, chemotherapy, or radiotherapy) slows the course of the disease.

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ISBN 978-93-86150-83-7