Scientific Posters

Posters

1

Sarcoidosis: A Review of the Thoracic and Extrathoracic Manifestations.
Zinck SE, Primack SL (Oregon Health Sciences Univ., Portland, OR 97201, zincks@ohsu.edu)

Sarcoidosis is a common, multisystem disease of unknown etiology. Pathologically, it is characterized by the presence of non-caseating granulomas within various organs. Although almost any organ of the body can be involved, up to 90% of patients will have thoracic involvement during the course of the disease. The natural history of sarcoidosis is highly variable, and clinical symptoms differ depending on the organs involved. Radiologic imaging plays a major role in obtaining the diagnosis. The purpose of this exhibit is to illustrate the characteristic radiographic and CT findings of thoracic sarcoidosis, as well as to provide an overview of the extrathoracic manifestations. The etiology, epidemiology, pathology, and clinical manifestations of sarcoidosis will also be reviewed.

2

MRI Features of Arrhythmogenic Right Ventricular Dysplasia.
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Arrhythmogenic right ventricular dysplasia (ARVD) is a form of cardiomyopathy that likely is more frequent than commonly reported. It is felt to be an important cause of sudden arrhythmic death in young individuals. Clinical features include arrhythmias, syncopal episodes and sudden cardiac death. The current investigative tools used to identify the presence of ARVD include electrocardiographic criteria, echocardiography, nuclear medicine, contrast ventriculography and magnetic resonance imaging.

This pictorial essay attempts to demonstrate the MRI features of ARVD. MRI offers many advantages as an imaging modality including relative noninvasiveness and excellent intrinsic tissue characterization. MRI also offers excellent delineation between fat and myocardial tissue based on ECG triggered T1 weighted spin echo imaging. Additionally, cine gradient echo images can be used to assess wall motion and calculate injection fraction.

MRI features include the presence of intramyocardial fat, focal or diffuse right ventricular wall thinning and associated wall motion abnormalities such as hypokinesis or focal dyskinesis.

This educational exhibit will review the MRI techniques that are valuable in the assessment of ARVD, and will use several cases to demonstrate the various MRI features of ARVD.

3

Pulmonary Embolism Mimics: Alternative Diagnoses and Ancillary Findings. Gilkeson RC, Montgomery, AB. (University Hospitals of Cleveland/CWRU School of Medicine, Cleveland, OH 44106, gilkeson@uhrad.com)

INTRODUCTION: This poster exhibit will present the wide spectrum of disease processes that mimic pulmonary embolism (PE) on CT angiography.
METHODS/MATERIALS: Over 1000 CT angiograms for PE were analyzed. Patients with pulmonary emboli were evaluated for extrapulmonary thromboembolic disease. Patients without evidence of pulmonary emboli were evaluated for alternative diagnoses. These findings fell into five categories: 1) extrapulmonary thromboembolic disease, 2) primary and metastatic thoracic neoplasms 3) cardiovascular abnormalities 4)airway and parenchymal disease.
RESULTS: In patients with PE, clinically unsuspected thromboembolic disease involving the right atrium and right ventricle, subclavian veins, IVC, left atrium and pulmonary veins will be presented. A large number of occult intrathoracic malignancies were diagnosed in patients undergoing CT angioraphy for PE. In patients with known malignancy, unsuspected tumor emboli also mimicked PE. Airway disease, with clinically occult cases of pneumomediastinum, bronchiectasis, tracheomalacia, and Swyer James syndrome, will be presented. Unsuspected parenchymal disease including occult pneumonias, sarcoidosis and hypersensitivity pneumonitis will be shown.
Abnormalities of the heart and great vessels were important mimics of PE in our series. Patients with restrictive pericarditis, lipomatous hypertrophy of the interatrial septum, and hypertrophic cardiomyopathies were all diagnoses first established on spiral CT. Aortic dissections, double aortic arch, Osler-Weber-Rendu disease, and peripheral pulmonary stenosis initially presented as PE.
CONCLUSION: By presenting the wide variety of pathology seen in these cases, this poster illustrates the diagnostic capabilities of CT angiography, and stresses the importance of a thorough evaluation of these studies to aid the referring clinician in the further management of these patients.

4

Near drowning: Chest radiographic and thin-section CT findings in six adult patients

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Objective: The aim of this exhibit was to describe and illustrate the chest radiographic and thin-section CT findings of near drowning.
Subjects and Methods: Radiologic findings of six patients with near-drowning (six man, ranging 18-64 years in age) were retrospectively reviewed. All CT scans were obtained within five days (mean 1.8 days) after submersion episodes. Clinical severity obtained with review of medical records was compared with the pattern and the extent of abnormal findings on CT scan and time interval for radiologic resolution of the parenchymal opacity.
Results: Thin-section CT findings included bilateral areas of ground-glass attenuation (n=6) or air-space consolidation (n=2) of which distribution was predominantly central (n=4), diffuse (n=1) and upper zonal (n=1). Thin-section CT showed geographic pattern of ground-glass attenuation (n=3), fine intralobular reticular opacity within the areas of ground-glass attenuation ("crazy-paving" appearance) (n=4), or interlobular septal thickening (n=1). Spontaneous pneumomediastinum (n=2) was associated. Radiographic opacity in four patient with ground-glass attenuation of central predominance on CT resolved within 6 days, which were more rapid than in the remaining two patients.
Conclusion: Thin-section CT findings of near drowning commonly include ground-glass opacity of geographic pattern and central zonal predominance, and are frequently associated with crazy-paving appearance. These findings resolve rapidly, which may be useful to exclude the underlying or superimposed pulmonary diseases.

5

Pericardial Disease in Lung Cancer Patients and the Relationship with Treatment
By: Backus S. and Hurst J. (West Virginia Univ, Morgantown, WV 26506-9235, sbackus1@gateway.net)

Introduction: One out of three patients diagnosed with lung cancer will have metastatic disease involving the pericardium at autopsy. However, pericarditis is a well recognized side effect of radiation therapy. Pericardial effusion or thickening could be a sign of either radiation pericarditis or neoplastic involvement. This study is designed to determine if pericardial disease is significantly linked to radiation therapy to the chest.

Methods and Materials: A retrospective analysis of 278 patients who were diagnosed or treated with lung cancer from 01/1997 to 10/22/1999 at our institution was performed. We reviewed the patient's CT scans for pericardial disease and compared their treatment regimens.

Results and Conclusions: In our population of lung cancer patients studied 46 developed pericardial disease. Approximately fifty percent of these patients were treated with radiation therapy in the chest. We evaluated these for temporal relationship with radiation therapy course and evolution of pericardial disease to determine patterns that suggested radiation vs malignant pericardial disease.

6

Educational

The Radiologic Spectrum of Pulmonary Langerhans Cell Histiocytosis.
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The radiologic spectrum of Pulmonary Langerhans Cell Histiocytosis will be presented in pictorial essay format .The etiological theories, radiologic appearance, complications, and treatment will be reviewed.

Materials and Methods: Multiple examples of both chest radiographs and computed tomographies of open lung biopsy proven Pulmonary Langerhans Cell Histiocytosis cases are reviewed and presented. The evolution of the pulmonary lesions with granulomatous micronodules/nodules that are later replaced by cysts will be presented.

Discussion: Pulmonary Langerhans Cell Histiocytosis is an uncommon idiopathic disease that is secondary to inappropriate proliferation and infiltration of Langerhans cell histiocytes resulting in granulomatous formation. Over time, the infiltrative cellular immune response wanes and fibrous tissue replaces the areas of hyperimmune celluarity. It has a characteristic radiologic appearance ranging from micronodules (diameter <5mm) in a centrilobular distribution early in the disease to larger nodules that may be spiculated or cavitated. Eventually cysts characterize the later stages of the disease. The distribution is consistent with other smoking related pulmonary diseases, located predominantly in the mid to upper lung regions. Complications include pneumothorax in 15% of patients and fibrosis in 20%. Its course is variable. Functional and radiographic improvement is seen in 50% of patients. It is stable in 30% and in another 20% of patients, there is progressive airflow obstruction, impairment of diffusing capacity, and respiratory failure. Treatment consists of corticosteroid administration and smoking cessation, however, the arrest of pulmonary disease and symptoms are also variable and inconsistent.

7

Contrast Enhanced Magnetic Resonance Imaging by Using 100% Oxygen. Ohno Y, Takenaka D, Kojima Y, Motoyama A, Adachi S, Sugimura K (Univ of Kobe, Kobe, 650-0017, yosirad@kobe-u.ac.jp.)

Introduction: The purpose of this study was to evaluate differences between healthy volunteers and patients with pulmonary emphysema or bronchogenic carcinoma by using 100% oxygen-enhanced Magnetic Resonance (MR) imaging.
Methods/Materials: We studied five healthy volunteers and seven patients with pulmonary emphysema or bronchogenic carcinoma. An inversion recovery single shot Turbo Spin Echo sequence with an echo time of 4.0 msec and inversion time of 720 msec was used for data acquisition. Patients and healthy volunteers were breathed room air and pure oxygen alternatively with the following paradigm: 21% oxygen (room air) – 100% oxygen –21% oxygen. Acquired images were transferred to a workstation and subtracted to visualize for 100% oxygen-enhanced MRI. The signal-intensity (SI) -time course curve was calculated for each coronal section in defined regions of interest (ROIs) in the both lung. In order to compared this slope between healthy volunteers and patients, the points in the SI-time course curve from baseline to the maximum value of the SI during breathing 100% oxygen were fitted by a straight line and calculated the relative enhancement by 100% oxygen. And then, the mean SI was also compared with standard lung function tests.
Results: All 100% oxygen-enhanced MR images were visualized. Mean values of SI-time course curve of pulmonary emphysema and bronchogenic carcinoma were lower than that of healthy volunteer. The good correlation was shown between the SI enhancement and standard lung function tests.
Conclusions: Contrast enhanced MR imaging by using 100% oxygen is useful for detection of ventilation abnormality and will be an applicable diagnostic method for evaluation of lung function.

8

Respiratory Synchronized Turbo Short TI (inversion time) Inversion Recovery (STIR) Image: Usefulness of Detection of Lymph Node Metastasis on Bronchogenic Carcinoma
Takenaka D, Ohno Y, Kojima Y, Motoyama A, Adachi S, Sugimura K (Univ of Kobe, Kobe, 650-0017, takechu@med.kobe-u.ac.jp)

Introduction: The purpose of this study was to evaluate the detectability of lymph node metastasis of bronchogenic carcinoma by using respiratory synchronized turbo STIR.
Methods/ Materials: 13 patients with bronchogenic carcinoma were examined by contrast enhanced CT and MR imaging before operation. An axial T1 weighted image (TR 500-923/ TE 15) and an axial respiratory synchronized turbo STIR image (TR 2569-2721/ TE 15/ TI 150/ ETL 6) were acquired with spin echo sequence and turbo spin echo sequence. Three thoracic radiologists blindly diagnosed lymph node metastasis on CT and MRI by using follow criteria. Lymph node larger than 1cm on short axis was evaluated metastasis on CT and T1 weighted image. The lymph nodes which were shown high intensity similar to primary tumor were also diagnosed metastasis on turbo STIR. Then we pathologically compared these images and statistically evaluated them in specific node stations.
Results: On contrast enhanced CT, sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) were 41.2%, 100%, 100%, and 94.3% respectively . On T1 weighted image, these were 41.2%, 98.8%, 77.8%, and 94.2%. On STIR, these were 52.9%, 98.8%, 81.8%, and 95.3%.
Conclusions: The accuracy of diagnosing lymph node metastasis by using size criteria was not satisfactory. We concluded that respiratory synchronized turbo STIR image was more useful than CE-CT or T1 weighted image for diagnosing lymph node metastasis of bronchogenic carcinoma.

9

The Spectrum of Radiographic Manifestations of Pulmonary Blastomycosis. Favret RF, Culhane DK, (Univ of Tennessee, Knoxville TN 37920)

Pulmonary blastomycosis has a variable clinical and radiographic presentation. We reviewed the chest radiographs and concurrent CT in 15 cases collected at our institution from 1993 to 1999. Diagnosis of pulmonary blastomycosis was made by bronchoscopy (n=7), surgical excision or open lung biopsy (n=5), fine needle aspirate (n=2), or sputum culture (n=1). Charts were reviewed for acute (< 1 mo.) vs. chronic (>2 mo.) clinical presentation. Eight patients presented with acute and 5 with chronic illness. Cough was the most common presentation in both. Neither acute nor chronic clinical presentation correlated with a dominant radiographic finding. The predominant CT findings were consolidation (n=6) and mass (n=5) with other manifestations including solitary pulmonary nodule, bilateral diffuse hematogenous nodules, ground glass opacity, and satellite nodularity. Although cavitation has not been a common pattern reported in the literature, four of the patients demonstrated cavitary masses or nodules. One of the 4 patients with cavitation was immunocompromised and this patient presented with acute symptoms. A striking absence of air bronchograms (n=0) was demonstrated. Rare lymphadenopathy (n=2) and no pleural disease was demonstrated. A diagnosis of Blastomycosis should be entertained, especially in endemic regions, in cases where neoplasm or other fungal infection is considered, even in the presence of cavitation.

10

Imaging of Burkholderia (Pseudomonas) Cepacia Pneumonia in Lung Transplant Recipients With Cystic Fibrosis. Deitel WL, Weisbrod GL, Herman SJ (Toronto General Hospital/University Health Network, University of Toronto, Toronto, Canada.)

Introduction: Infection with Burkholderia (Pseudomonas) Cepacia is associated with high morbidity and mortality in lung transplant recipients with cystic fibrosis. We sought to describe the radiographic appearance of B. cepacia pneumonia in such patients.

Methods and Materials: A retrospective review was performed of 28 cystic fibrosis patients transplanted at Toronto General Hospital from 1989-98 who had sputum cultures positive for B. cepacia preoperatively. Of these, 21 had at least one episode of B. cepacia infection post-transplant. Plain films and computed tomography from these episodes were assessed for the presence of consolidation, nodules, cavitation, adenopathy, pleural effusion, and interstitial disease, as well as distribution and extent of disease. "Baseline" previous and follow-up imaging was also reviewed, as well as clinical features.

Results: Average age at transplant was 27.4, 14 male and 7 female. There were a total of 26 episodes of B.cepacia infection. Of these, consolidation was demonstrated in 23, nodules in 15, cavitation in 12, pleural effusion in 12. Middle and/or lower lung zone disease was seen early in most cases, with more diffuse involvement late. 16 patients have died (14 related to cepacia infection) while 5 are still alive. Mean length of time between transplant and episode was 11.7 months, but ten patients developed pneumonia within one month of surgery, nine of whom died. Four patients required biopsy for diagnosis. Co-existing bronchiolitis obliterans was seen in 8 patients.

Conclusion: This series demonstrates the high morbidity and mortality of B. cepacia pneumonia post-transplantation. The presence of consolidation, nodularity, and cavitation with middle and lower lung zone predominance on early imaging in the appropriate clinical setting can point to the diagnosis of B. cepacia pneumonia. It can also direct biopsy in equivocal cases.