KCR 2016

Answers for
Image Interpretation Session

September 21 (Wed) 14:00 - 15:30
Grand Ballroom 101 - 105, Convention Hall 1F, Coex

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  University of Ulsan, Asan Medical Center, Korea

- Panelists
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  [CH] Yeon Joo Jeong, M.D.
  Pusan National University Hospital, Korea
  [NR] Woong Yoon, M.D.
  Chonnam National University Hospital, Korea
  [GU] Deuk-Jae Sung, M.D.
  Korea University Anam Hospital, Korea
  [PD] Jung-Eun Cheon, M.D.
  Seoul National University Hospital, Korea

대한영상의학회
The Korean Society of Radiology
Image Interpretation Session

Case 1: Abdomen

Panelist: Mi-Suk Park, M.D.
Country: Korea
Current Affiliation: Yonsei University, Severance Hospital

Age/Gender: 42/M
Chief complaints: Hematochezia

Figure 1-1: Initial CT and endoscopy (2013-4-8)

Figure 1-2: Follow up CT (2015-4-3)
History
A 42-year-old male presented with hematochezia.

Findings
The initial CT image shows diffuse edematous thickening of the gastric folds. On endoscopy, there is diffuse fold thickening of the stomach without any mucosal changes. The initial endoscopic ultrasound also demonstrates diffuse fold thickening, especially in the first and second layers. There is a suspicious hypermetabolic lesion in the lesser curvature of the gastric body on FDG PET scan. On follow-up CT images, the extent of gastric fold thickening has decreased but there is enhancing wall thickening along the lesser curvature of the stomach with enlarged lymph nodes.

Differential diagnosis
1. Lymphoma
2. Hypertrophic gastritis with gastric cancer
3. Gastritis cystica profunda with gastric cancer

Diagnosis: Gastritis cystica profunda with gastric cancer

Discussion
Gastritis cystica profunda (GCP) is an uncommon hyperplastic lesion, which is located within the submucosa. GCP is a rare gastric lesion characterized by the presence of gastric glands in the submucosa of the stomach with normal overlying mucosa and is often mistaken for other more common gastric pathologies. In some reported cases, it is a premalignant condition and may lead to carcinoma of the stomach. An unspecified mucosal insult or injury is widely accepted as the nidus for GCP genesis but the pathophysiology is largely unknown. The majority of reported cases occurred in patients with a history of gastric surgery (65%) while as in the current case, GCP has been described in non-operated patients as well. On radiologic images, GCP may appear as a cystic or solid submucosal tumor.

Take home message
If radiologists are aware that GCP can be associated with gastric cancer, they should consider presence of gastric cancer with fold thickening of the stomach and features suggestive of GCP.

References
### Case 2: Chest

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<tr>
<th>Panelist</th>
<th>Yeon Joo Jeong, M.D.</th>
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<td>Country</td>
<td>Korea</td>
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<tr>
<td>Current Affiliation</td>
<td>Pusan National University Hospital</td>
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| Age/Gender | 50/F               |
| Chief complaints | Fever, chill, and cough |

**Figure 1-1:** initial chest radiograph

![Initial Chest Radiograph](image1.jpg)

**Figure 1-2:** 2016-2-16 CT

![CT Scan Images](image2.jpg)
History
A 50-year-old female presented with fever, chill and cough. A thorough medical history revealed that the patient had burned paper amulets prior to developing the symptoms.

Findings
The initial CT images show multifocal patchy ground-glass opacities in both lungs and mild bronchial dilatation in the RUL. The follow-up CT undertaken 10 days later, reveals that areas of ground-glass opacities decreased and consolidation with bronchiectasis developed in both lungs. Dimercaptosuccinic acid was
used to chelate the mercury, and methylprednisolone was used to treat the acute lung injury. The chest radiographs show that the extent of multifocal patchy opacities decreased after treatment.

Differential diagnosis
1. Viral pneumonia
2. Cryptogenic organizing pneumonia

Diagnosis: Mercury vapor inhalation-related lung injury

Discussion
Mercury is traditionally used as a dye for making amulets in Korea. Inhaling the vapor produced by burning mercury damages major organs, such as the lungs, kidneys and brain. Although the actual fatal level of mercury vapor is not known, exposure to more than 1–2 mg/m$^3$ of elemental mercury vapor (Hg$^0$) for a few hours causes acute chemical bronchiolitis and pneumonitis. Two hours after exposure, lung injury appears as hyaline membrane formation, and eventually, extensive pulmonary fibrosis occurs. Clinical findings correlate with the duration of exposure, the concentration of mercury and the survival time after exposure. There is no correlation between pathological findings and the concentration of mercury in the tissues. Dimercaptosuccinic acid is used to chelate the mercury. Acute lung injury is treated with methylprednisolone.

Take home message
If radiologists are aware that the vapors produced from burning paper amulets contain mercury, the resulting acute lung injury can be more promptly diagnosed and accurately treated.

References
# Case 3: Neuroradiology

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<th>Panelist</th>
<th>Woong Yoon, M.D.</th>
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<tr>
<td>Country</td>
<td>Korea</td>
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<td>Current Affiliation</td>
<td>Chonnam National University Hospital</td>
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| Age/Gender | 24/M |
| Chief complaints | Asymptomatic |

Figure 2

![Image of neuroradiology scans](image-url)
**History**  
A 24-year-old man visited our hospital with an abnormality on the brain MRI. The abnormality was found incidentally.

**Findings**  
The T2-weighted MRI shows a high-signal intensity lesion around the midbrain, pons and medulla. The lesions show low signal intensity on T1W images and no definite high signal intensity on DWI.  
The brain parenchyma is compressed by the lesion. Contrast-enhanced T1W images show heterogeneous enhancement. The origin of the lesion is hard to determine with MRI.

**Differential diagnosis**  
1. Ependymoma  
2. Pilocytic astrocytoma

**Diagnosis**  
Pilocytic astrocytoma with myxoid background

**Discussion**  
Pilocytic astrocytoma is a slow-growing glioma, classified as grade I by the WHO. It typically occurs in children and young adults. In the pediatric population, 2/3 of the lesions are located in the cerebellum, whereas one-half of the tumors in adults are located in supratentorial cerebrums. The extraaxial pilocytic astrocytoma is very rare and the origin may be unclear whether the tumor truly originates from the extraaxial space or brain parenchyma adjacent to the CSF space. The appearance of pilocytic astrocytoma on MRI is variable and depends on the tumor size and structure. Four predominant imaging patterns have been described: a mass with a non-enhancing cyst and an intensely enhancing mural nodule, a mass with an enhancing cyst wall and an intensely enhancing mural nodule, a necrotic mass with a central non-enhancing zone, a predominantly solid mass with minimal to no cyst-like component. Solid and non-necrotic tumors are less common. The solid component delivers variable contrast enhancement patterns. In this
case, the contrast enhancement was inhomogeneous and showed a mottled appearance. This pattern of the contrast enhancement may be a characteristic of pilocytic astrocytoma, which sometimes is seen in pilocytic astrocytoma of other locations (pathologically confirmed pilocytic astrocytoma). The variable patterns of the contrast enhancement may be associated with different scan delay times after administration of contrast materials.

**Take home message**

In young patients with intracranial mass demonstrating an inhomogeneous and mottled contrast enhancement, pilocytic astrocytoma could be included in the differential diagnosis.

**References**

**Case 4: Genitourinary**

Panelist: Deuk-Jae Sung, M.D.
Country: Korea
Current Affiliation: Korea University Anam Hospital

<table>
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<tr>
<th>Age/Gender</th>
<th>43/M</th>
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<tr>
<td>Chief complaints</td>
<td>Lower back pain (2 weeks ago), S/P KT for ESRD (6 months ago)</td>
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Figure 1-1: L-spine MR

Figure 1-2:

<Initial CT>  <14-days f/u CT>
History
A 43-year-old male presented with lower back pain.

Findings
There are multifocal lobulated hypodense lesions with peripheral enhancement along the left common and external iliac vessels on enhanced CT. The lesions invade the left psoas muscle closely abutting the left external iliac vessels while encasing the left external iliac vein. The follow-up CT images obtained after 2 weeks of antibiotic treatment, reveal no change in the size of the lesions but increased enhancing portion of the tumor. The CT images obtained 6 months ago (immediately after the kidney transplantation) show no remarkable findings in the pelvic cavity.

Differential diagnosis
1. Retroperitoneal inflammatory lesion with abscess (TB, actinomycosis...)
2. Tumorous condition such as sarcoma or lymphoma

Diagnosis: Malakoplakia

Discussion
Malakoplakia is derived from the Greek malakos (soft) and plakos (plaque), describing its usual clinical presentation as friable yellow soft plaques. It is rare chronic granulomatous inflammatory disease. It can affect any organ of the body but primarily the genitourinary tract. In the genitourinary tract, it can affect the bladder in 40% and kidneys in 16%. There is a peak incidence in the fifth to seventh decades at the time of initial presentation with female predominance of a female to male ratio of 4:1. Most patients have a predisposition to immunosuppression such as solid organ transplantation, autoimmune disease requiring long-term steroid use, chemotherapy, malignancy, alcohol abuse and diabetes mellitus.

It is highly associated with E.coli but infection alone is not thought to be causative. Pathophysiology of the malakoplakia may be impaired host defenses and defective phagocytosis. The histologic hallmarks are Michaelis-Gutmann bodies (intracellular inclusions in the large histiocytes containing calcium). Treatment options include antibiotics, surgical excision or a combination of both.

Take home message
Renal malakoplakia can present as extensive retroperitoneal mass and often be confused with malignancy, especially in patients who have a risk factor for immunosuppression.

References
Case 5: Abdomen

Panelist: Mi-Suk Park, M.D.
Country: Korea
Current Affiliation: Yonsei University, Severance Hospital

Age/Gender: 36/F
Chief complaints: Abdominal discomfort

Figure 1-1: Initial MR (2011-6-20)
Figure 1-2: FU CT (2012-12-18)
Figure 1-3: FU MR (2012-12-28)
History
A 36-year-old female presented with abdominal discomfort. She underwent liver surgery for hepatic cystadenoma in 2008. In 2011, she presented with fever and chill. Her diagnosis was CBD stone with failed ERCP-guided stone removal. The patient underwent an operation that revealed a cystic mass in CBD.

Findings
The initial MR images show dilatation of intra- and extra-hepatic biliary tree. There is a septated cystic lesion in the dilated extrahepatic bile duct. On follow-up non-enhanced CT, there still is a hyperattenuating mass-like lesion in extrahepatic bile duct. T2-weighted MR images demonstrate multiple septations, which show enhancement on contrast-enhanced dynamic MR images. On ERCP, there is a dumbell-shaped filling defect overlying in IHD and EHD.

Differential diagnosis
1. mucinous cystic neoplasm
2. intraductal papillary neoplasm

Diagnosis: Mucinous cystic neoplasm of extrahepatic bile duct

Discussion
Mucinous cystic neoplasm (MCN, biliary cystadenoma) of the liver has been a controversial entity, in particular, regarding differentiation from intraductal papillary neoplasm of the bile duct. Hepatic MCN primarily occurs in women in the fifth decade of life. Although 10% of reported MCNs originate in the extrahepatic biliary tree, the overwhelming majority arise from the intrahepatic biliary system. Characteristic features of MCN are a multiloculations, internal septations and mural nodules, and these potentially differentiate MCN from other hepatic lesions such as complicated cyst, abscess and hydatid disease. There seems to be no significant difference in the imaging findings between hepatic and extrahepatic MCN.

Take home message
Mucinous cystic neoplasm with bile duct invasion can cause biliary obstruction with intraductal mass forming features.

References
## Case 6: Chest

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| Age/Gender | 29/M |
| Chief complaints | cough, sputum |

Figure 2-1: 2015-1-30 (initial CT)
Figure 2-2: 2015-3-31 (CT images obtained 2 months later, after antibiotic therapy)
Figure 2-3: 2015-12-29 (11 months after initial CT)
History
A 29-year-old male presented with cough and sputum.

Findings
The initial CT images show consolidation with necrosis in the RUL, multiple enlarged lymph nodes with or without necrosis and mediastinal fat infiltration in the right side. Also, there is an enlarged lymph node in the right supraclavicular area. The follow-up CT images obtained 2 months later, demonstrate a partial improvement after antibiotic treatment. On follow-up CT performed nine more months later, the extent of consolidation and GGO increased, and a few satellite nodules developed in the RUL. There are a newly-developed tracheal nodule and lymph nodes in the right paratracheal area with increased extent of mediastinal fat infiltration. The coronal CT reformation of the thoracic spines, shows multiple sclerotic lesions with wax and wane.

Differential diagnosis
1. Lung cancer with bone metastasis
2. Active pulmonary tuberculosis

Diagnosis: Disseminated Mycobacterium kansasii infection in immunocompetent host

Discussion
Mycobacterium kansasii is a slow-growing NTM and the most virulent of all NTM species. M. kansasii has been shown to represent only 1–2% of all isolates and pathogens in NTM lung disease in South Korea. Tap water is thought to be the major reservoir of M. kansasii in cities. The most common presentation of M. kansasii infection is a chronic bronchopulmonary disease, which manifests typically in adult patients with chronic obstructive pulmonary disease or cystic fibrosis.
In addition, M. kansasii can infect skeletal system, skin and soft tissue. It also may cause cervical or other lymphadenitis, and disseminated infection.

Disseminated infection by M. kansasii occurs almost exclusively in immunocompromised patients, such as solid organ transplant recipients, HIV-infected individuals, patients with hematologic malignancy, or patients receiving long-term steroid regimens. In the case of disseminated M. kansasii infection, involvement of multiple organs including the lungs, liver, spleen, bone marrow, lymph node, bowel, central nervous system, pericardium, pleura or kidneys, has been reported. According to a report of disseminated M. kansasii infection in non HIV-infected patients, the most common underlying disease among 63 cases, was a hematologic malignancy. However, the frequency of previously healthy persons with no underlying diseases was relatively high up to 23.8%.

Patients with severe M. kansasii infection and disseminated infection should also be treated with 3-drug regimens containing rifampin, ethambutol and isoniazid with pyridoxine daily for a total duration that includes at least 12 months of negative sputum culture results.

**Take home message**

Mycobacterium kansasii infection is usually confined to the lungs, but extrapulmonary or disseminated forms can occur, especially in immunocompromised patients but rarely in immunocompetent subjects.

**References**

Case 7: Neurordiology

Panelist: Woong Yoon, M.D.
Country: Korea
Current Affiliation: Chonnam National University Hospital

Age/Gender: 65/F
Chief complaints: Left-sided weakness

Figure 1-1: At the time of the chief complaint

Figure 1-2: 6 months later

Figure 1-3: 1 year later
History
A 65-year-old woman presented with a three-day history of left-sided weakness. She experienced mild URI symptoms with fever prior to developing the chief complaint.

Findings
The initial MRI was performed when the patient was symptomatic with left-sided weakness. Ill-defined FLAIR high signal intensity is observed along the cortical and subcortical areas of the right paracentral lobule, which shows contrast enhancement and DWI high signal intensity without definite reduction of ADC. Contrast enhancement is seen along the leptomeninges and in the brain parenchyma. After 6 months, the previous lesion regressed, whereas a new lesion with FLAIR high signal intensity and no contrast enhancement appeared in the midline of the medulla. After 1 year, the medullary lesion regressed. Two years after initial symptoms, another lesion with FLAIR high signal intensity and ill-defined contrast enhancement appeared in the left medial temporo-occipital lobe. The lesion mainly involves cortical area with prominent leptomeningeal enhancement. Similar imaging features are recurrently observed along the cortical and subcortical areas over the whole brain. On the abdominal and chest CT, there is no evidence of primary malignancy.

Differential diagnosis
1. Autoimmune encephalitis
2. Vasculitis

Diagnosis

Anti-NMDA (N-methyl-D-aspartate) receptor encephalitis in autoimmune encephalitis

Discussion

Autoimmune encephalitis is an encephalopathy caused by antigen sensitizing immune system of CNS, which represents 10–20% of all encephalitis. It is generally classified into paraneoplastic or non-paraneoplastic encephalitis. Anti-NMDA receptor encephalitis is one of the most important causes in autoimmune encephalitis. This encephalitis is predominantly observed in young women (< 40 year-old) and often related to ovarian teratoma (59%, good prognostic factor). The characteristic clinical picture is a prodrome of headache, febrile symptom, neuropsychiatric symptom, amnesia and recovery after treatment. The diagnosis is made by the detection of anti-NMDA antibody in the serum or CSF. Half of the patients showed a normal finding on conventional MRI. In patients with abnormal imaging findings, nonspecific T2W/FLAIR high signal intensity with mild enhancement involving meninges can be seen in one or several brain regions. Without an appropriate diagnosis and treatment, the patients may suffer from the disease over the years. Corticosteroids and IV immunoglobulin have been treatments of choice, and recently cyclophosphamide and/or rituximab are used for unresponsive patients.

Take home message

When similar imaging features suggestive of encephalitis occur recurrently, autoimmune encephalitis could be included in the differential diagnosis.

References

**History**

An 11-year-old female presented with right-sided chest pain and respiratory difficulty.

**Findings**

The initial chest radiograph reveals diffuse increased opacities in the right hemithorax that is representative of a large amount of pleural effusion. It also reveals the moth-eaten bony destruction of the right clavicle, scapula, right 1st and 2nd ribs. The chest CT image shows a large amount of right pleural effusion and irregular thinning in the right scapula. There are multiple small nodular lesions of low attenuation in the spleen. A chylous pleural effusion was observed at thoracentesis. The amount of pleural effusion progressively increased bilaterally. Finally, she underwent thoracic duct ligation and bilateral pleural drainage catheters were placed. On the follow-up chest radiograph and CT images, intractable bilateral pleural effusion persisted and permeative osteolytic lesions progressed in the right scapula, clavicle right proximal humerus and thoracic vertebrae.
Differential diagnosis

1. Gorham syndrome (bone, chest and spleen involvement).
2. Hematologic malignancy with inflammatory lesions in the spleen including fungal abscess

Diagnosis: Gorham syndrome

Discussion

Gorham syndrome (also known as Gorham-Stout syndrome, massive osteolysis, idiopathic osteolysis, disappearing bone disease, phantom bone disease, vanishing bone disease, spontaneous absorption of bone, progressive atrophy of bone, or hemangiomatosis or lymphangiomatosis of bone) is a rare disorder characterized by proliferation of thin-walled vascular channels associated with regional osteolysis. This disease starts in bone tissue, but it may secondarily involve soft tissue and adjacent bones. It may occur at any age; however, it is most often recognized in children and young adults, with no sex predilection or inheritance pattern. The cause of this disease is unknown. Massive and progressive osteolysis is caused by the proliferation of abnormal thin-walled endothelial-lined capillaries of vascular or lymphatic origin. Chylothorax is a rare complication. Chylothorax is usually associated with shoulder girdle or thoracic vertebral osteolysis. Bilateral chylothorax as a complication of Gorham syndrome is almost always fatal, with death usually occurring from malnutrition, lymphopenia and superimposed infection. Splenic involvement can occur and it is considered as lymphangiomatosis.

Take home message

Gorham syndrome is a combined clinical, radiologic and histologic entity. Radiologic findings are especially important in the diagnosis of Gorham syndrome. As in this case, lytic lesions involve contiguous bones of the thorax with pleural effusion (chylothorax).

References