Preface

Radiomics and Diagnostic CT-MRI

The first issue of Current Medical Imaging in 2022 presents 8 scientific papers related to radiomics and neural networks for the diagnosis of breast cancer, nuclear imaging of tuberculosis, CT of Covid-19 pneumonia and pelvic congestion, CT-MRI for the diagnosis of Takayasu arteritis and liver cancer, and MRI of maculopathy. There are also 7 case reports of rare clinical diseases with imaging findings.

Radiomics, a method that extracts a large number of features from clinical images, using data-characterization algorithms are related to tumor size, shape, intensity and texture, providing comprehensive tumor characteristics that may fail to be appreciated by the naked eye. Radiomics are based on the development of computational models, trying to address either unmet clinical needs, mostly in oncologic imaging. Radiomics in breast cancer is presented by Moyya and Asaithambi.

Tuberculosis (TB) still remains a major global threat, with 2.5 billion people latently infected with mycobacterium TB. The most commonly used diagnostic tool for TB is a skin test, though blood tests are becoming more commonplace. The gold standard for diagnosing TB is either isolation of mycobacterium TB by culture or detection of TB-specific nucleic acids by molecular methods. Although chest x-ray is the primary diagnostic tool for evaluating pulmonary TB, chest CT is generally required to detect fine lesions. SPECT or PET using bacterial probes or radiolabeled drugs is a powerful noninvasive tool that can rapidly provide 3-D views of disease processes deep within the body and conduct a longitudinal assessment of the same patient. Nuclear imaging for the diagnosis of TB is presented by Rafique et al. Along with laboratory testing; chest CT may be helpful to diagnose Covid-19 after clinical symptoms for an average of 5-6 days. The serial CT scans show the spectrum of CT manifestations by Covid pneumonia as different phases of lung injury and repair. CT of Covid-19 pneumonia is presented by Atlt el al.

Pelvic congestion syndrome is a long term condition in women believed to be due to enlarged pelvic veins and may cause chronic pelvic pain which can be worsened by standing, walking or sex. It is not easy to diagnose pelvic congestion because the symptoms are similar to those of other conditions. Pelvic ultrasonography is the starting point, but CT or MRI may be utilized when a more detailed image is needed. Pelvic congestion on CT is presented by Akdeniz. Takayasu’s arteritis is a rare type of vasculitis, and the inflammation damages the large artery, leading to narrowed or blocked arteries, or to weakened arterial walls that may bilge or tear. It can lead to arm or chest pain, hypertension and eventually heart failure or stroke. Its diagnosis is confirmed by angiography showing stenosis and dilatation of the aorta. Thickening of the aortic wall detectable by ultrasonography or MRI can precede angiographic changes. MR and CT angiography for the diagnosis of Takayasu’s disease is presented by Sarma et al.

Patients with chronic liver disease who are at risk for hepatic cellular carcinoma undergo periodic liver screening for focal nodular or mass lesions, usually with ultrasonography. Contrasted MRI is preferred for the characteristics of indeterminate hepatic masses with biopsy used when the tissue diagnosis is necessary. CT-MRI for the diagnosis of liver cancer is presented by Rahimi et al. Maculopathy is any pathologic condition or disease of the macula, the small spot in the retina where vision is keenest. It is the result of neovessel proliferation inside the retina. The liquid coming out of the irregular vessels accumulates in the central retina, causing image distortion that can be linked to several causes, including venous thrombosis, diabetes, and age. Maculopathy on MRI is presented by Chen et al.

Seven case reports are dealing with Castleman disease of the kidney, Zinner syndrome with ectopic ureter remnant, vaginal adenosis, bladder lipoma, cisternal lipoma, cecal paraganglioma, and thymic hyperplasia in anterior mediastinum.

Euishin Edmund Kim
(Editor-in-Chief)
Department of Radiological Sciences
University of California
Irvine, CA
(USA)