Case Study

Dual Energy Composition Analysis

“The Dual Energy capability of the Aquilion Prime SP makes for comprehensive evaluation of arthropathies. In addition to the traditional soft tissue and bone images, I am empowered to check for the presence of monosodium urate as an extra index when gout is suspected. This increases the diagnostic confidence.”

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Patient History
This 69-year-old male patient with known psoriatic arthritis has increasing symptoms which did not respond to conventional biological treatments. Blood analysis revealed raised serum urate levels, which indicated the possibility of gout. X-ray showed bony erosions in both wrists/hands and ankle/feet but were inconclusive. DE Composition Analysis of a Dual Energy scan of the left ankle and foot was performed.

Results

Many high density soft tissue areas are seen in images (a) and (b) such as the first metatarso-phalangeal (MTP) joint (blue arrows), peroneous tendons (yellow arrows) and achiles tendon (white arrow). Images (c) and (d) show there are mono sodium urate (MSU) depositions in the corresponding areas. The software depicts the MSU as red color and outputs an estimate of the total MSU volume, 4.09 cm³.
**Technology**

Dual Energy Composition Analysis is an application for identifying the presence of monosodium urate in peri-articular anatomic regions. It utilizes the attenuation information of 2 scans covering the same anatomy: a High kV scan and a Low kV scan. The Aquilion Prime SP has the DE-Helical scan mode to acquire high kV and low kV images which are input to the application. The DE-Helical scan mode allows generating the high kV image and the low kV image in a single acquisition. The kV is rapidly alternated between high kV and low kV while the mA is predefined for each kV to achieve equal noise balance of the images.

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**Conclusion**

The Dual Energy Composition Analysis software allows identification of monosodium urate in dense peri-articular regions and may save the need for joint synovial fluid aspiration. While joint aspiration is the definitive method to identify the presence of monosodium urate, it is a painful procedure which may fail due to a lack of synovial fluid in the target region.