

## **Whole-Body Diffusion-weighted MRI: Spectrum of Pitfalls, Unusual Cases, Unexpected Findings and Artifacts**

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### **PURPOSE/AIM**

To demonstrate a spectrum of imaging findings on whole body diffusion MRI (WB-DWI) performed for assessing disease extent in patients with known malignancy with emphasis on pitfalls, unusual cases, unexpected findings, prosthetics and artifacts.

### **CONTENT ORGANIZATION**

From our database of 1400 prospectively acquired whole body diffusion MRI scans (October 2012):

- (1) Demonstrate data acquisition methods and must have post-processing steps that allowing the efficient display and reporting of diffusion data. This includes image stack normalization, multiplanar reconstructions, creation of inverted high b-value 3D MIP movies and fusion of high b-value images with corresponding anatomic images.
- (2) Illustrate artifacts from movement, poor shimming, imaging station misregistrations ("fractured spine") and suggest strategies for their correction.
- (3) Show normal changing appearances over the decades from adolescents to older men and women.
- (4) Discuss common imaging pitfalls (including false positives and negatives).
- (5) Demonstrate a range of unusual and unexpected findings e.g. bony metastases masked by marrow hyperplasia, diffuse bony metastatic infiltration ('diffusion superscan'), peritoneal disease, nerve root involvement, non-malignant conditions e.g. endometriomas, infection, arthritis, hemangiomas, etc.
- (6) Display typical imaging appearances of internal and external prosthetics (breast implants and metallic prostheses).
- (7) Exhibit patterns of marrow atrophy resulting from aging, drug use and locoregional radiotherapy.

### **SUMMARY**

Knowledge of the spectrum of pitfalls, unexpected and unusual findings and artifacts on whole body diffusion imaging will enable image support scientists, technologists and radiologists to effectively use this emerging clinical technique for disease detection and response assessments in patients with known cancers.