

Diffusion Weighted MRI in NCTN Clinical Trials Meeting Series

Summary and Recommendations

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Main Issues in DWI for Breast & Rectal Cancer (Technical)

Key Challenges for New and Ongoing Phase 2 and 3 Clinical Trials:

Breast

- **DWI Quality Strong Dependence On:**
 - Patient habitus
 - Scanner platform / options
 - MRI operator skill & experience
- **Lack of Harmonization / Optimization:**
 - DWI acquisition
 - Processing (esp. for advanced models)
 - Lesion segmentation
- **Need Vendor Buy-In/Support:**
 - Multi-shot & GNL correction
 - Image registration (DWI \leftrightarrow DWI & DWI \leftrightarrow T13DGd)

Rectal

- **DWI Quality Dependence On:**
 - Patient habitus
 - MRI operator training
- **Lack of Harmonization / Optimization:**
 - Field strength
 - Patient prep
 - DWI acquisition (b-values; spatial resolution; scantime)
 - Processing (esp. for advanced models)
 - Lesion segmentation
- **Need Vendor Buy-In / Support:**
 - Reduced FOV DWI

Recommendations

Proposed Solutions and Next Steps:

Breast

- **Rigorous Site Qualification Process**
 - **Scanner capabilities**
 - **Dedicated MRI operator training**
 - **Com. Breast DWI phantom QC**
- **Consensus → Standardization**
 - **Field strength – 3T only**
 - **Spatial resolution & PE-direction**
 - **b-values; scantime; TE (SS vs MS-EPI)**
 - **Centralized ADC generation and lesion segmentation**
- **Challenge Vendors to Deliver Protocol That Meet Standards**

Rectal

- **Rigorous Site Qualification Process**
 - **Scanner capabilities**
 - **Commercial DWI phantom QC**
- **Standardization**
 - **Field strength – 3T only**
 - **Patient prep – enema & anti-spasmodic**
 - **b-values (~0-100, 800, 1600)**
 - **Spatial resolution & scantime 4-5'**
 - **Centralized ADC generation and lesion segmentation**
- **Involve Vendor(s) for sub-par performance systems (phantom tests)**