Impact of Motion on Quality of T2W Prostate MRI

Baris Turkbey M.D.
Molecular Imaging Program,
National Cancer Institute, NIH, Bethesda, MD, USA
Motion of the Prostate Gland

• Prostate gland is documented to move during MRI.
  • This motion is more pronounced if rectum is full vs. empty.
  • Prostate motion can impact quality of MR (specifically T2W MRI).

Fig. 2. Probability of displacement of >3 mm over a time frame of 20 min for 3 points of interest characterizing prostate motion: (a) midposterior, (b) base posterior, and (c) apex. The solid line represents the full-rectum group, whereas the dashed line represents the empty-rectum group.

Ghilezan, Jaffray, Siewerdsen et al. 2005
Axial T2W MRI with significant motion

b2000 DW MRI

Repeat axial T2W MRI without significant motion
Axial T2W MRI with significant motion

b1500 DW MRI

ADC map

DCE MRI

Repeat axial T2W MRI without significant motion
Axial T2W MRI with significant motion

Repeat axial T2W MRI without significant motion

Case sample 1

Case sample 2

Case sample 3
Teaching Points

• Significant motion can impact quality of T2W MRI of the prostate:
  • Decreased lesion visibility
  • Decreased accuracy of prostate and lesion contouring for guided biopsies/focal therapy

• Potential solutions:
  • (A) Use of antispasmodic agents (e.g. glucagon, scopolamine butylbromide, or sublingual hyoscyamine sulfate)
  • (B) Use of dedicated pulse sequences (e.g. PROPELLER/BLADE) instead of/in addition to standard T2W pulse sequence
  • If (A) and (B) are not available, repeat the pulse sequence impacted with significant motion

• Please check for significant motion artifacts timely to ensure a good quality prostate MRI
References

• ACR PI-RADSv2.1 document: https://www.acr.org/-/media/ACR/Files/RADS/Pi-RADS/PIRADS-V2-1.pdf?la=en


