Supplemental Online Content

This supplemental material has been provided by the authors to give readers additional information about their work.

eTable 1. Details on Treatment Delivery Times

	CT-guidance (n=77)	MRI-guidance (n=79)
Number of Arcs		
2	49 (64%)	
3	1 (1%)	
4	27 (35%)	
Number of Beams (median, IQR)		15 (15-17)
Post-Imaging Delivery Time (per fraction, second)		
Median (IQR)	232 (198-272)	1133.4 (1009.0-1289)

IQR, interquartile range

eTable 2. Comparison of Dosimetric Parameters Between CT- and MRI-Guided Arms

Parameter	CT-Guidance	MRI-Guidance	*P* value
CTV			
Volume	55.9 (44.2-66.9)	50.6 (37.7-60.6)	0.5
PTV			
Volume	**102.1 (82.5-119.6)**	**70.5 (52.6-87.3)**	**<0.001**
V_{40Gy}	95% (95%-95%)	95% (94.1-95.0%)	0.37
V_{42Gy}	**5.4% (0.4-14.9%)**	**18.6% (12.2-25.5%)**	**<0.001**
Bladder			
$D_{0.035cc}$	41.2 (40.8-41.8)	41.1 (40.6-41.5)	0.08
V_{40Gy}	**0.7 (0.2-1.6)**	**0.3 (0.1-0.44)**	**0.001**
V_{39Gy}	**3.7 (2.6-6.1)**	**1.9 (0.9-3.6)**	**<0.001**
V_{20Gy}	10.4 (7.7-17.5)	12.3 (5.9-18.0)	0.51
Urethra DMax	41.6 (41.0-41.9)	41.7 (41.5-42.1)	0.06
Rectum			
$D_{0.035cc}$	40.0 (37.3-41.1)	40.4 (34.4-41.1)	1.0
V_{40Gy}	0.05 (0.0-0.8)	0.2 (0-0.9)	0.13
V_{38Gy}	0.5 (0.03-1.4)	0.8 (0.-1.6)	0.64
V_{36Gy}	1.5 (0.3-3.6)	2.5 (0.03-4.4)	0.31
V_{32Gy}	3.4 (1.3-6.3)	5.0 (0.3-7.2)	0.40
V_{20Gy}	14.1 (9.0-20.0)	18.2 (9.0-22.3)	0.33
Anal Canal			
$D_{0.035cc}$	**12.3 (10.2-16.4)**	**24.0 (18.9-28.0)**	**<0.001**
V_{20Gy}	**0.0 (0.0-0.0)**	**0.1 (0.02-0.3)**	**<0.001**
Small Bowel			
$D_{0.035cc}$	1.7 (0.9-6.5)	1.4 (1.0-10.3)	0.91
V_{20Gy}	0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.84
Penile Bulb			
$V_{24.8Gy}$	0 (0-0)	0 (0-0)	0.27
Mean Dose	4.0 (2.6-4.9)	2.7 (2.3-4.5)	0.16

P values obtained using Wilcoxon rank-sum test

All values are reported as median Gy or cc (interquartile range).

$D_{x cc}$ refers to maximum dose received by x cc of structure in question; $V_{x Gy}$ refers to the volume of structure in question receiving x Gy

eTable 3. Sensitivity Analysis for Differences in Acute Genitourinary and Gastrointestinal Toxicity Including Patients Not Who Were Analyzed But Not Evaluable

	CT-guidance	MRI-guidance	*P* value
Grade ≥2 Genitourinary	42.7% (31-.6-54.7)	25.3 % (16.2-36.4)	0.02
Grade ≥2 Gastrointestinal	10.4% (4.6-19.5)	1.3% (0.03-6.7)	0.02

This "extreme" scenario assigns the patient on the MRI-guidance arm as having experienced grade 2 genitourinary and grade 2 gastrointestinal toxicity and assigns the patient on the CT-guidance arm as having experienced no toxicity. Numbers tabulated are the estimate and the 95% confidence interval.

eTable 4. Multivariate Analysis for Acute Grade ≥2 Genitourinary Toxicities

Parameter	OR (95% CI)	*P* value
Trial Arm (MRI-guidance vs CT-guidance)	**0.4 (0.2, 0.9)**	**0.02**
Age (1-unit increase)	**1.1 (1.0, 1.2)**	**0.007**
Baseline IPSS (1-unit increase)	1.1 (1.0, 1.1)	0.1
Rectal Spacer (Yes vs No)	1.0 (0.5, 2.2)	*1.0*
Pelvic LN Radiation (Yes vs No)	0.5 (0.2, 1.2)	0.1
GTV Boost (Yes vs No)	1.7 (0.7, 4.4)	0.3
Prostate Gland Volume (1-unit increase)	1.0 (1.0, 1.0)	0.9
Area under ROC curve (95% CI)	0.7 (0.6, 0.8)	n/a

MRI, Magnetic Resonance Imaging; CT, Computed Tomography; IPSS, International Prostate Symptom Score; LN, lymph node; GTV, gross tumor volume; OR, odds ratio; ROC, receiver operating characteristic; CI, confidence interval

eTable 5. Differences in Grade ≥2 Genitourinary and Gastrointestinal Toxicities Stratified by Baseline International Prostate Symptom Score (IPSS)

Endpoint	Statistic	CT	MRI)	*P* value
IPSS ≤15		**(n=63)**	**(n=68)**	
GU Toxicity ≥2	n (%)	26 (41.3%)	17 (25.0%)	**0.05**
	95% CI	29.0 , 54.4	15.3 , 37.0	
GI Toxicity ≥2	n (%)	5 (7.9%)	0 (0.0%)	**0.02**
	95% CI	2.6 , 17.6	0 , 5.3	
IPSS >15		**(n=13)**	**(n=10)**	
GU Toxicity ≥2	n (%)	7 (53.9%)	2 (20.0%)	0.2
	95% CI	25.1 , 80.8	2.5 , 55.6	
GI Toxicity ≥2	n (%)	3 (23.1%)	0 (0%)	0.2
	95% CI	5.04 , 53.8	0 , 30.9	

P values obtained using Chi-square test and Fisher's exact test as appropriate. p-interaction >0.1

eTable 6. Differences in Grade ≥2 Genitourinary and Gastrointestinal Toxicities Stratified by Baseline Prostate Volume

Endpoint	Statistic	CT	MRI)	*P* value
Prostate Volume ≤50 cc		**(n=49)**	**(n=55)**	
GU Toxicity ≥2	n (%)	24 (48.98%)	12 (21.82%)	**0.004**
	95% CI	34.42 , 63.66	11.81 , 35.01	
GI Toxicity ≥2	n (%)	6 (12.24%)	0 (0%)	**0.009**
	95% CI	4.63 , 24.77	0 , 6.49	
Prostate Volume >50 cc		**(n=27)**	**(n=23)**	
GU Toxicity ≥2	n (%)	9 (33.33%)	7 (30.43%)	1.0
	95% CI	16.52 , 53.96	13.21 , 52.92	
GI Toxicity ≥2	n (%)	2 (7.41%)	0 (0%)	0.5
	95% CI	0.91 , 24.29	0 , 14.82	

P value obtained using Chi-square test and Fisher's exact test as appropriate. p-interaction >0.1

eTable 7. Acute Grade ≥2 Genitourinary and Gastrointestinal Toxicity Rates in Selected Other Stereotactic Body Radiotherapy Studies

Study	PTV Dose	EQD$_2$ $\alpha/\beta=2$	EQD$_2$ $\alpha/\beta=10$	Margins	Acute Grade≥2 GU Toxicity	Acute Grade ≥2 GI Toxicity
Jackson et al.[1]	7.4 Gy x 5	77 Gy	53.7 Gy	3 mm	23%	4%
Fuller et al.[2]	9.5 Gy x 4	95 Gy	61.8 Gy	2mm/0mm posteriorly	35.1%	6.9%
Meier et al.[3]	7.25 Gy x 5	74 Gy	52.1 Gy	5 mm/3 mm	26%	8.1%
Brand et al.[4]	7.25 Gy x 5	74 Gy	52.1 Gy	4-5 mm/3-5mm	29.2%	14.9%
Bruynzeel et al.[5]	7.25 Gy x 5	74 Gy	52.1 Gy	3 mm	23.8%	5.0%
MIRAGE, CT-Guidance	8 Gy x 5	88 Gy	60 Gy	4 mm	43.4%	10.5%
MIRAGE, MRI-Guidance	8 Gy x 5	88 Gy	60 Gy	2 mm	24.4%	0%

EQD$_2$, equivalent dose in 2 Gy fractions; GI, gastrointestinal; GU, genitourinary; PTV, planning target volume
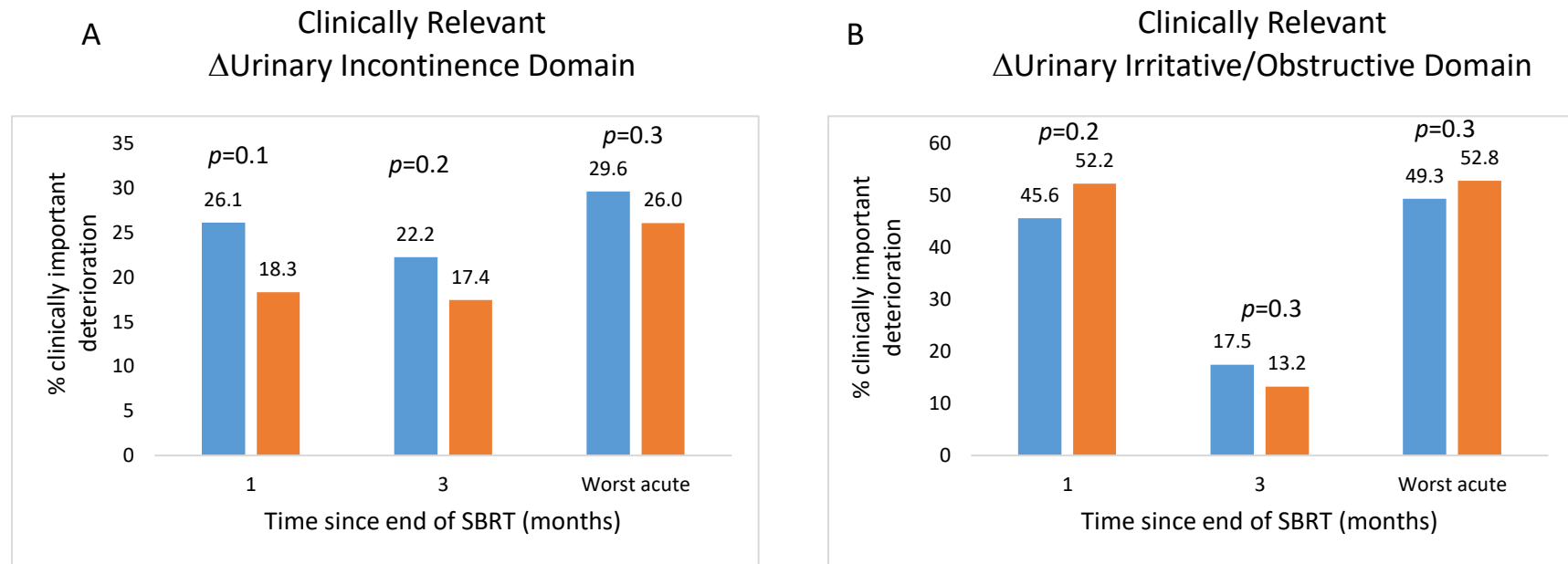
eFigure 1. Longitudinal Changes in Urinary Irritative/Obstructive and Total Urinary Expanded Prostate Cancer Index Composite-26 (EPIC-26) Scores

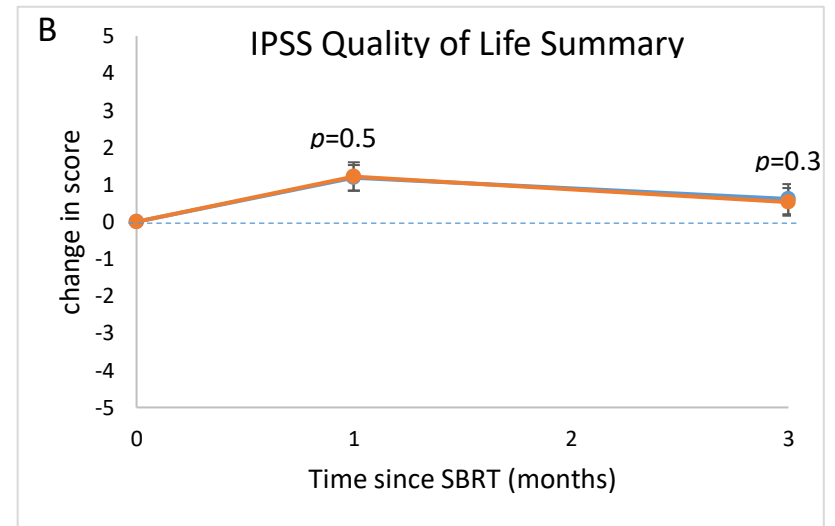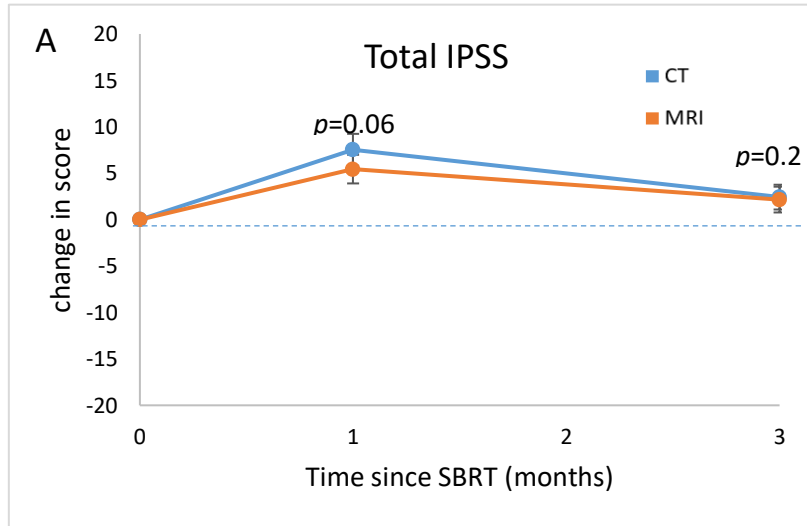*P* values determined by the Mann-Whitney test.
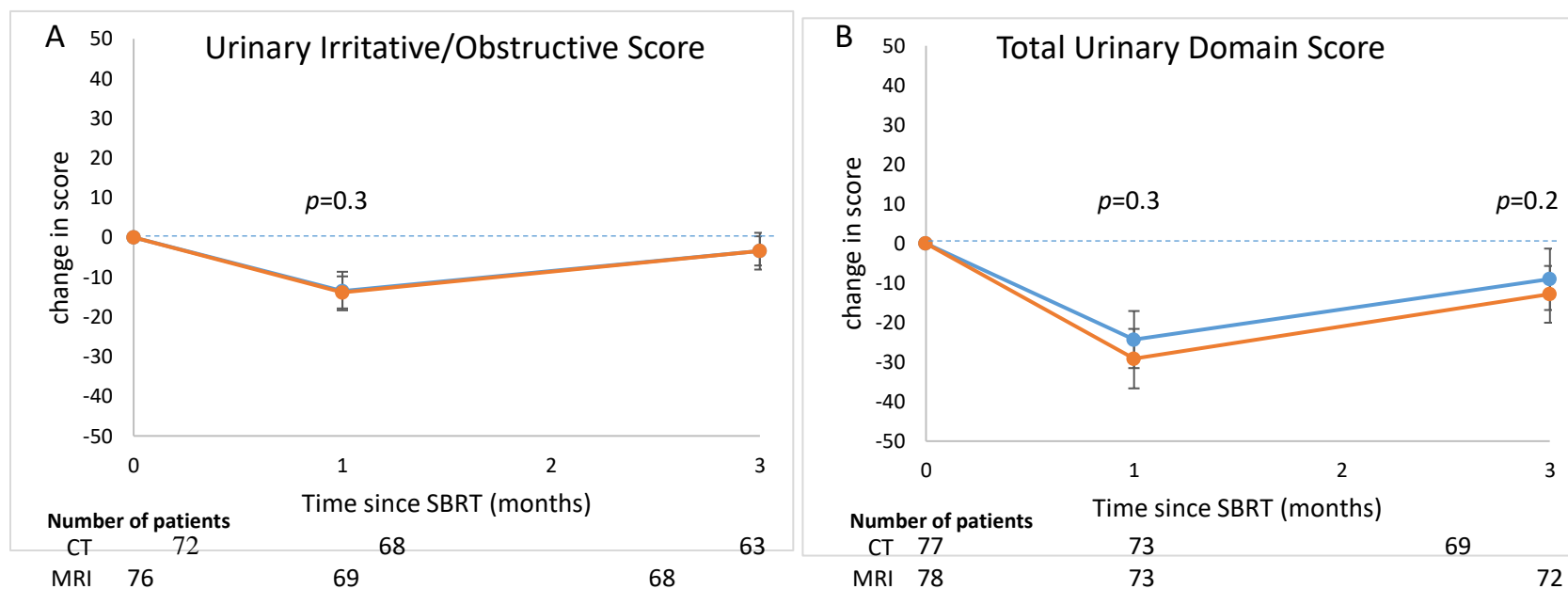
eFigure 2. Proportions of Patients With Clinically Relevant Declines in Expanded Prostate Cancer Index Composite-26 (EPIC-26) Scores Urinary Subdomains

Thresholds for clinically relevant declines were ≥18 points for urinary incontinence and ≥14 points for urinary irritative/obstructive subdomains. *P* values determined by chi-square test.

A
Clinically Relevant ΔUrinary Incontinence Domain

B
Clinically Relevant ΔUrinary Irritative/Obstructive Domain

eFigure 3. Longitudinal Changes in Total International Prostate Symptom Score (IPSS) and IPSS Quality-of-Life Scores
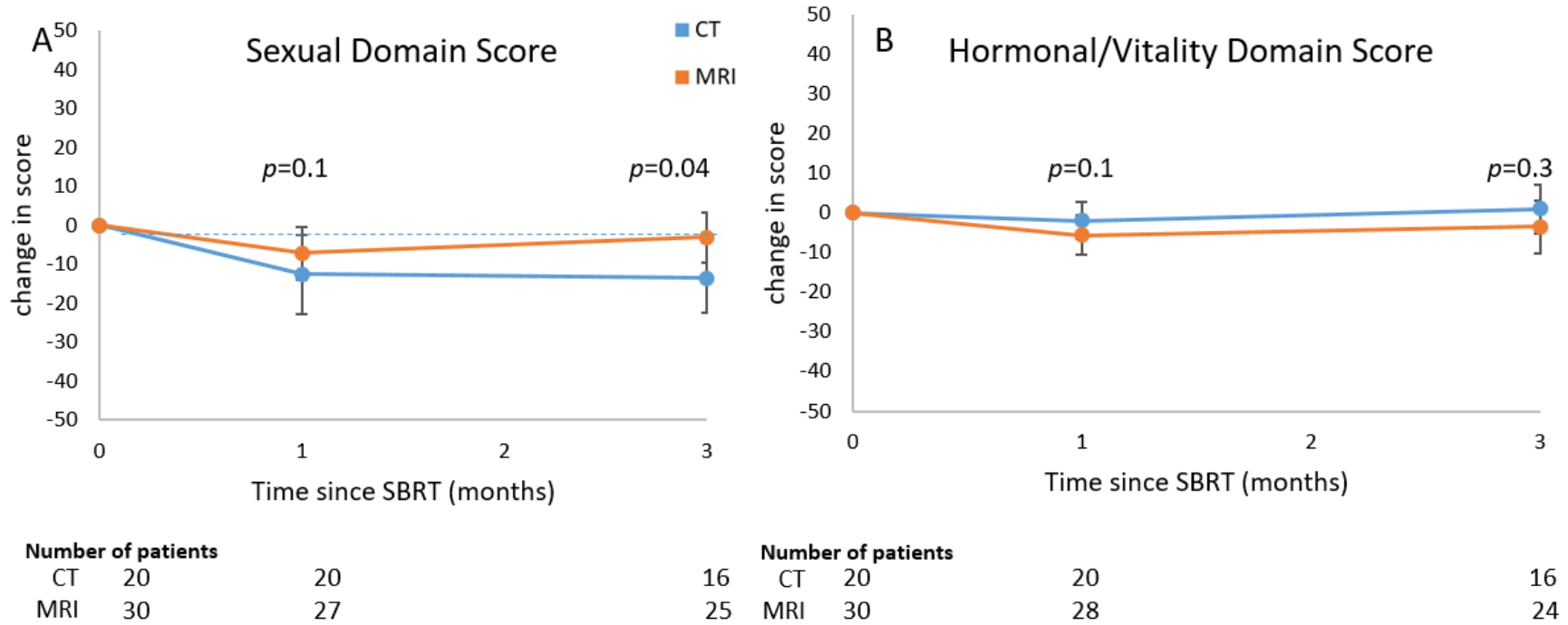
*P* values determined by the Mann-Whitney test.

eFigure 4. Longitudinal Changes in Sexual and Hormonal Expanded Prostate Cancer Index Composite (EPIC-26) Scores

P values determined by the Mann-Whitney test. Analysis restricted to men not receiving androgen deprivation therapy.

eFigure 5. Proportions of Patients With Clinically Relevant Declines in Sexual and Hormonal Expanded Prostate Cancer Index Composite (EPIC-26) Scores

Thresholds for clinically relevant declines were ≥24 points the sexual domain and ≥12 points for the hormonal/vitality domain score. *P* values determined by chi-square test. Analysis restricted to men not receiving androgen deprivation therapy.
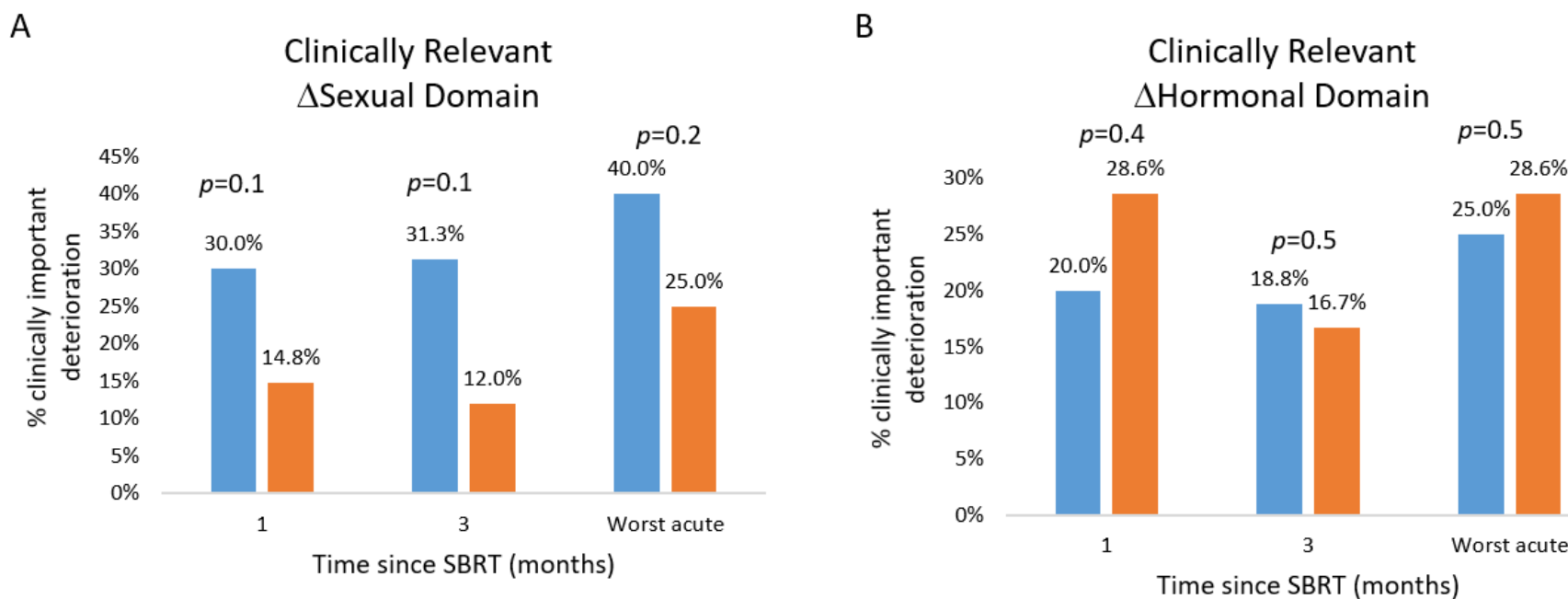
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