

Comparison of Patient-Reported Outcomes with Single versus Multiple Fraction Palliative Radiotherapy for Bone Metastasis.

J. Conway M.D.^{1,2}, I. Olivetto M.D.¹, S. Miller M.D.³, R. Halperin M.D.⁴, D. Hoegler M.D.⁴, E. Yurkowski⁵, Q. Gentles B.Sc.⁶, W. Beckham Ph.D.⁷, J. Stephen Ph.D.⁸, H. Daudt Ph.D.⁷, J. French M.Sc.¹, R. Olson, M.D.³

¹ Department of Radiation Therapy, British Columbia Cancer Agency, Vancouver, BC, ² Department of Surgery, University of British Columbia, Vancouver, BC, ³ Department of Radiation Therapy, British Columbia Cancer Agency, Prince George, BC, ⁴ Department of Radiation Therapy, British Columbia Cancer Agency, Kelowna, BC, ⁵ Department of Science, University of British Columbia, Prince George, BC, ⁶ Department of Medical Undergraduate Education, University of British Columbia, Prince George, BC, ⁷ Department of Radiation Therapy, British Columbia Cancer Agency, Victoria, BC, ⁸ Department of Radiation Therapy, British Columbia Cancer Agency, Surrey, BC

Background

• Bone metastases (BM) are a common cause of cancer-related pain, and palliative radiotherapy (RT) is frequently prescribed to relieve such symptoms

• Although pain response is most often assessed, when given a preference quality of life (QoL) is placed as a top priority by patients. Knowledge of retreatment rates, fracture risk, and convenience are also important

• Despite multiple randomized control trials (RCTs) and meta-analyses showing equivalent efficacy between single fraction (SF) and multiple fraction (MF) RT for BM, considerable variation still exists in fractionation

Objectives

• Our study compares patient reported outcomes (PRO) following SF as compared with MF RT for BM in a population-based cohort

• Our hypothesis was that SF and MF were equivalent with respect to impact on pain, function and symptom distress as a measure of QoL

Methods & Materials

• The Prospective Outcomes and Supportive Initiative (POSI) database was used to identify patients who participated in the POSI questionnaire at initial visit and three weeks following RT from May 2013 to July 2014

• Three questions were asked:

1. Do you have bone pain? If yes, please rate the severity
2. Does the bone pain interfere with your ability to care for yourself?
3. Are you frustrated by your bone pain?

• Responses were ranked on a non-dichotomous ordinal scale from 0 (not at all) to 4 (very much)

• 648 cases were identified

• Electronic charts were reviewed to determine demographic factors, retreated cases and complicated BM

• Complicated BM were defined as a pathological fracture or neurological compromise

Results

Table 1: Patient characteristics

Patient Characteristics		Proportion who received a SF	p value
Gender	Male	199 (56%)	0.81
	Female	163 (55%)	
Tumour Histology	Lung	73 (51%)	0.18
	Genitourinary (GU)	124 (61%)	
	Breast	85 (59%)	
	Gastrointestinal (GI)	26 (48%)	
	Lymphoma	34 (58%)	
	Other	20 (44%)	
Treatment Site	Spine	123 (44%)	<0.001
	Pelvis	93 (57%)	
	Ribs	37 (77%)	
	Extremity	95 (74%)	
	Other	14 (50%)	
Retreatments	Yes	65 (64%)	0.08
	No	297 (54%)	
Complicated BM	Yes	88 (39%)	<0.001
	No	274 (65%)	

Tumour Histology – Other = Head & Neck, Gynecological, Skin, Central Nervous System, Unknown; Treatment Site – Other = Clavicle, Sternum, Mandible, Jaw

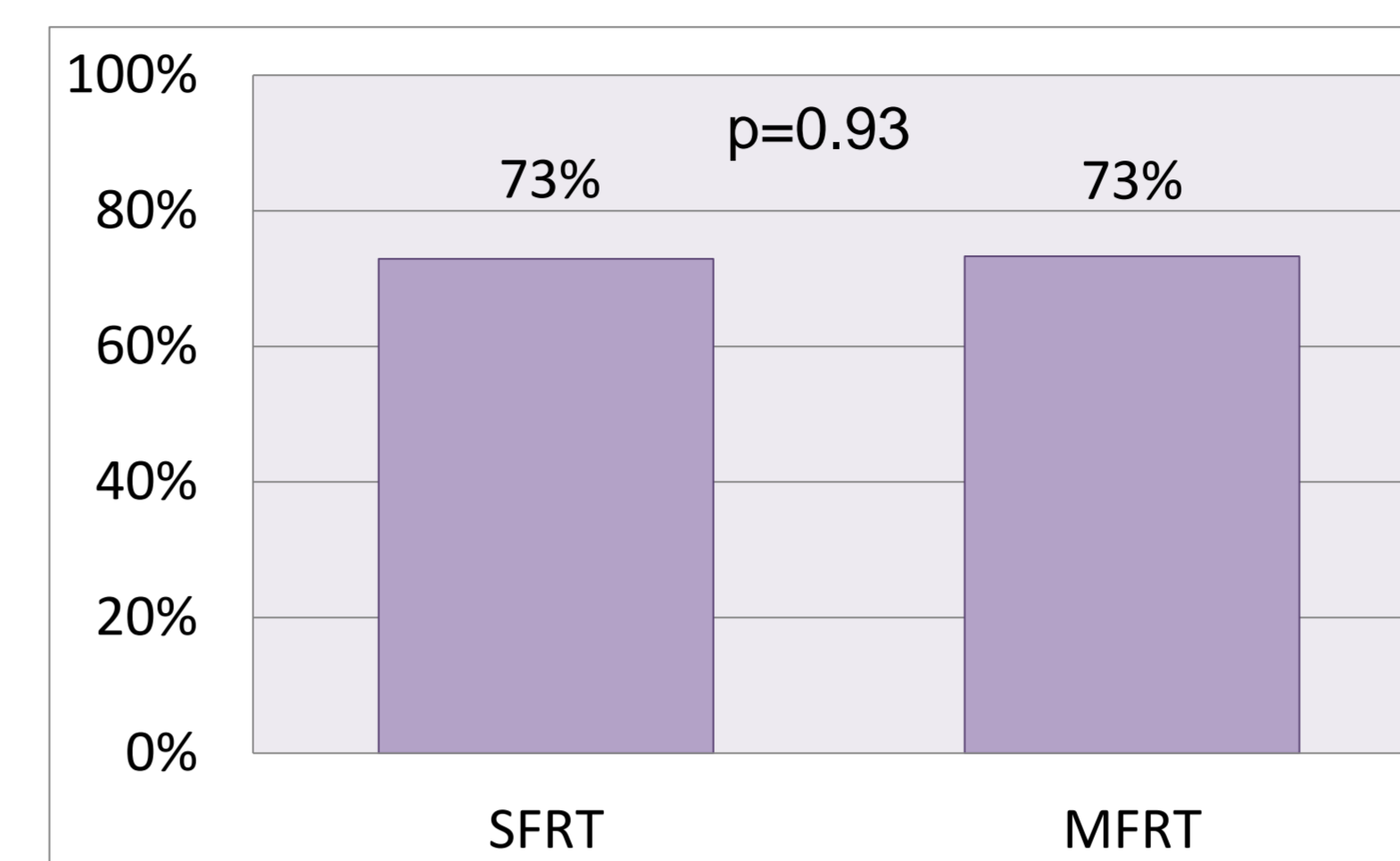
Table 2: Cox regression multivariate analysis for pain partial response (pain score improved by ≥ 1 pt).

Variable	Odds Ratio	95% CI	p value	
SF	1.00	0.68-1.48	0.99	
Female	0.87	0.53-1.44	0.60	
Tumour Histology	Lung		0.61	
	GU	0.65	0.36-1.17	0.15
	Breast	0.95	0.52-1.75	0.88
	GI	0.70	0.33-1.47	0.35
	Lymphoma	0.99	0.46-2.11	0.98
	Other	0.61	0.28-1.34	0.22
Treatment Site	Spine		0.66	
	Pelvis	0.94	0.58-1.51	0.79
	Ribs	1.05	0.49-2.24	0.90
	Extremity	0.82	0.49-1.36	0.44
	Other	0.55	0.23-1.30	0.17
Retreatments	1.54	0.90-2.61	0.11	
Complicated BM	1.06	0.70-1.61	0.78	

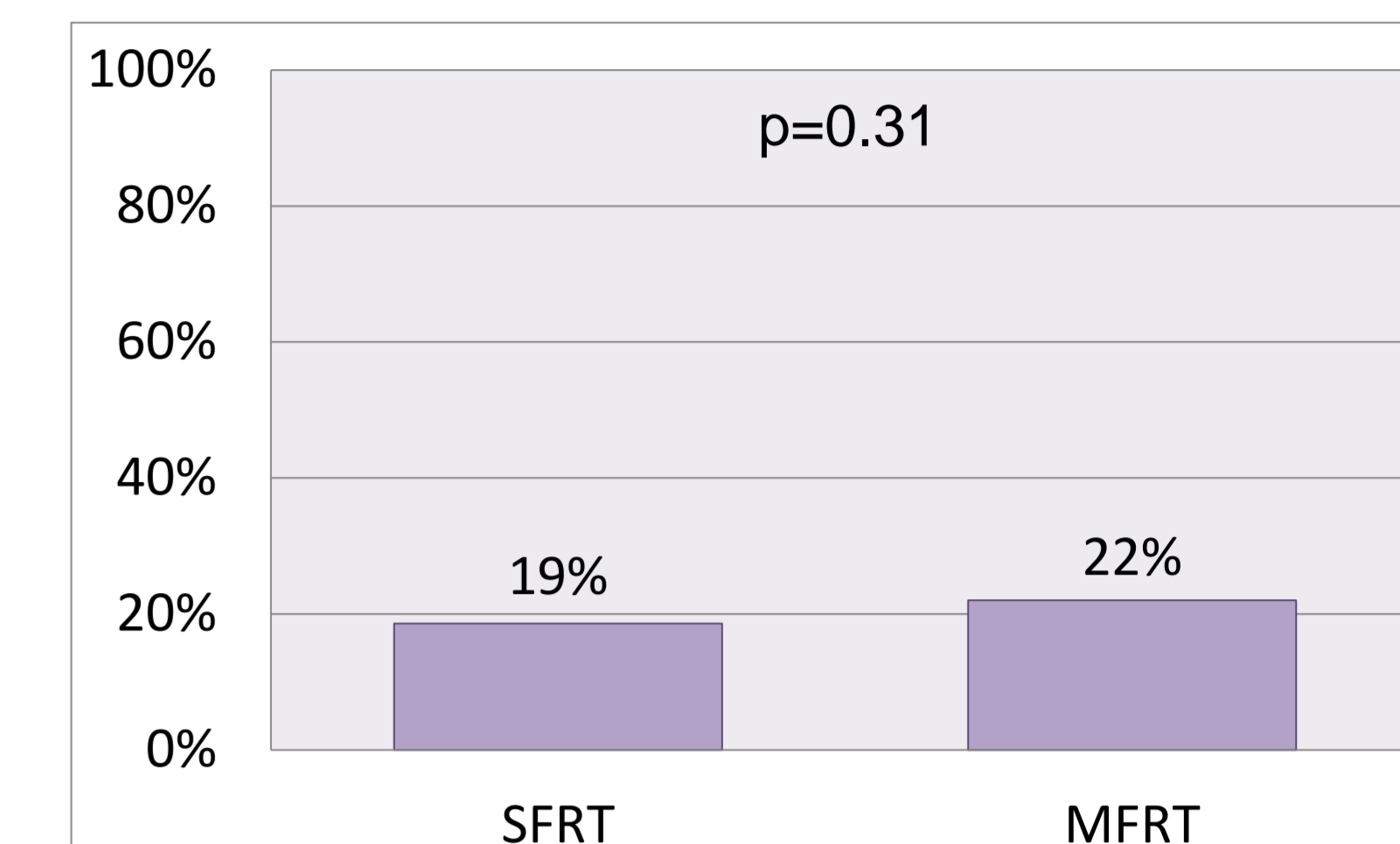
Table 3: Cox regression multivariate analysis for pain complete response (follow-up pain score=0).

Variable	Odds Ratio	95% CI	p value	
SF	0.83	0.53-1.27	0.38	
Female	0.87	0.50-1.50	0.61	
Tumour Histology	Lung		0.98	
	GU	0.97	0.52-1.83	0.93
	Breast	1.10	0.57-2.15	0.77
	GI	0.88	0.38-2.07	0.77
	Lymphoma	1.25	0.58-2.68	0.56
	Other	1.17	0.49-2.79	0.72
Treatment Site	Spine		0.61	
	Pelvis	1.15	0.67-1.96	0.62
	Ribs	1.73	0.81-3.71	0.16
	Extremity	1.22	0.69-2.17	0.49
	Other	1.67	0.65-4.32	0.29
Retreatments	0.63	0.34-1.17	0.14	
Complicated BM	1.31	0.83-2.05	0.24	

Figure 1: All Painful BM (n=605)

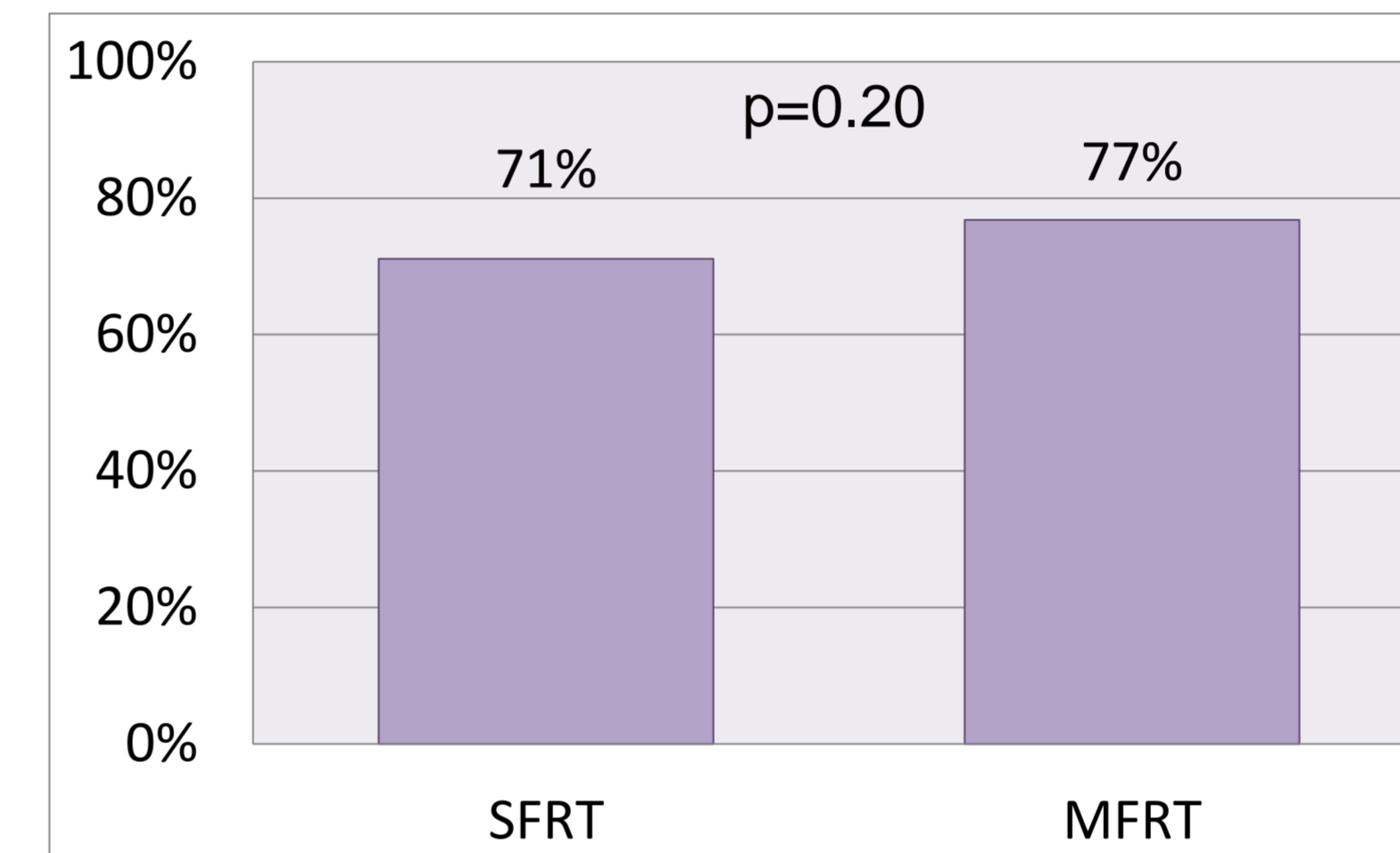


Partial pain response (Improvement by ≥ 1 -pt)



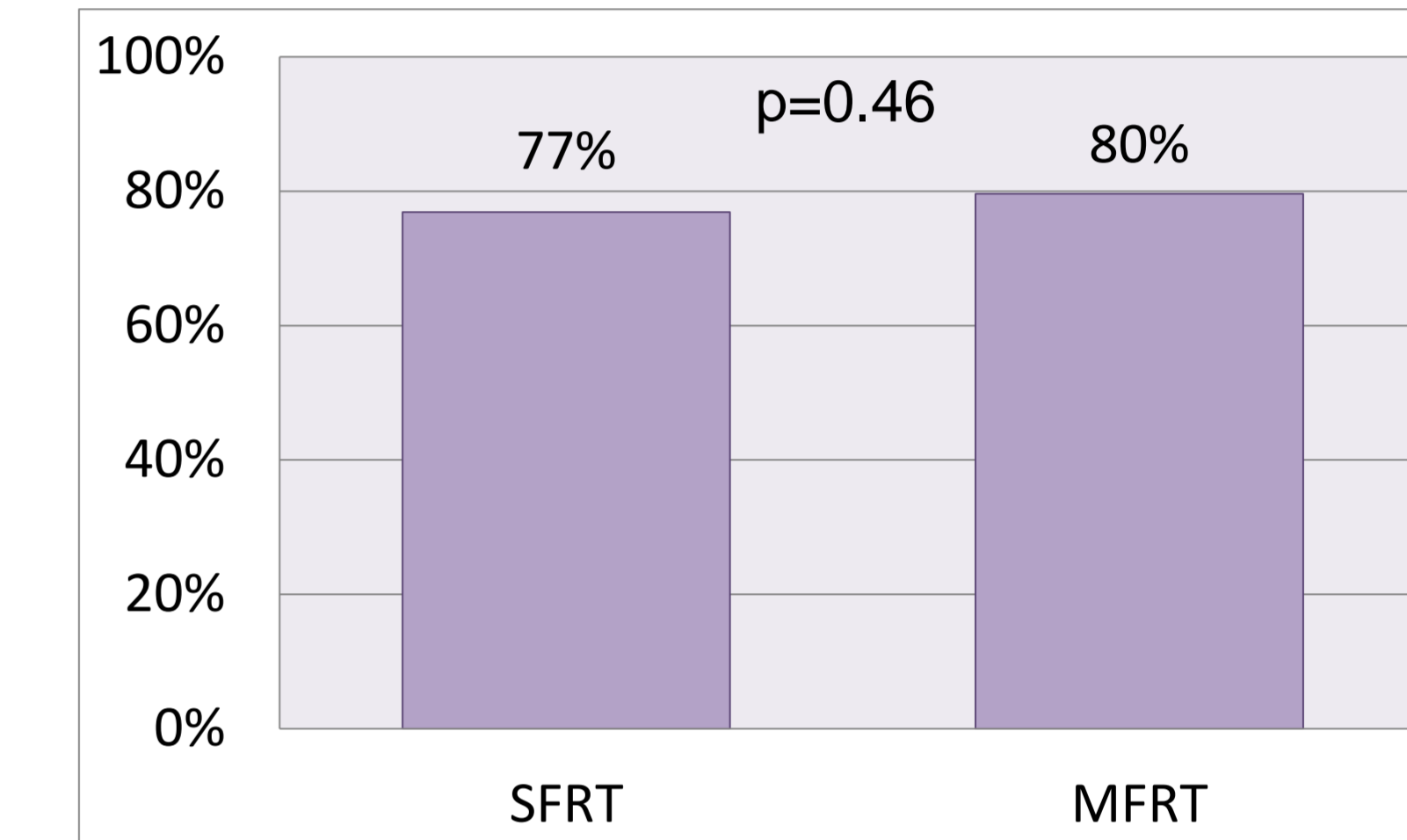
Complete pain response (Follow-up score of 0)

Figure 2: All BM with Functional Complaints (n=453)



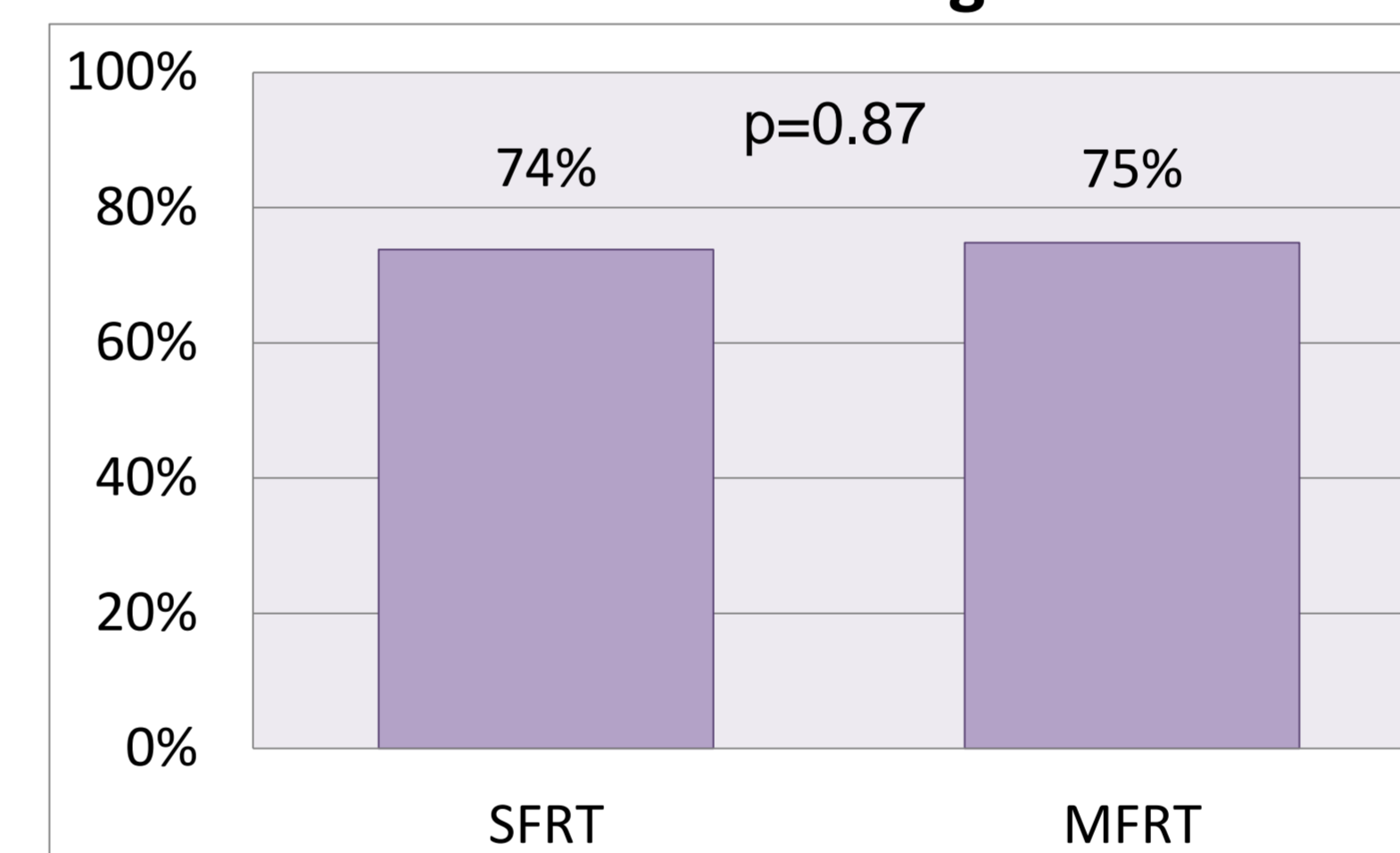
Improvement in function by ≥ 1 -pt

Figure 3: All BM with Symptom Distress (n=528)

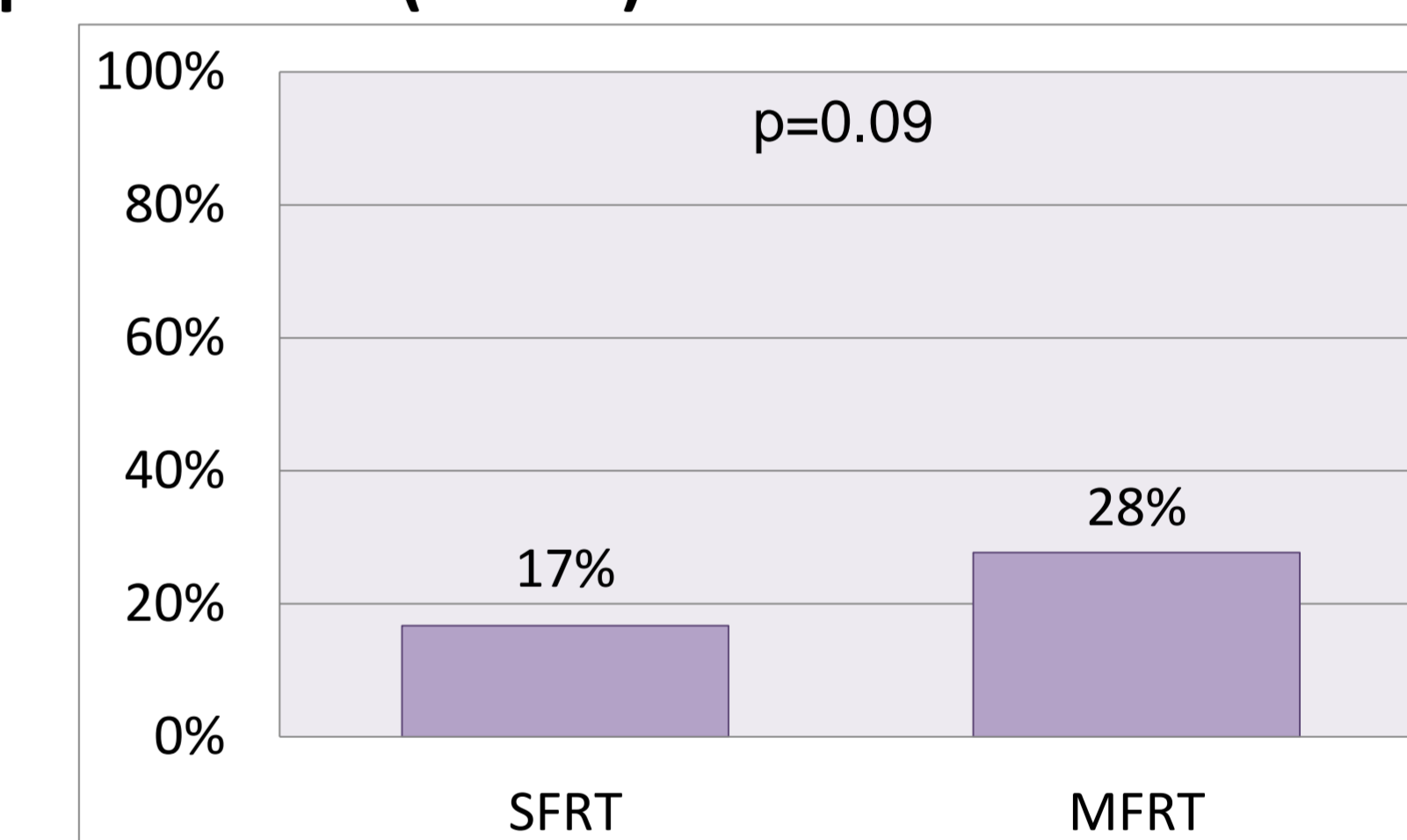


Improvement in symptom distress by ≥ 1 -pt

Figure 4: All Painful Complicated BM (n=203)

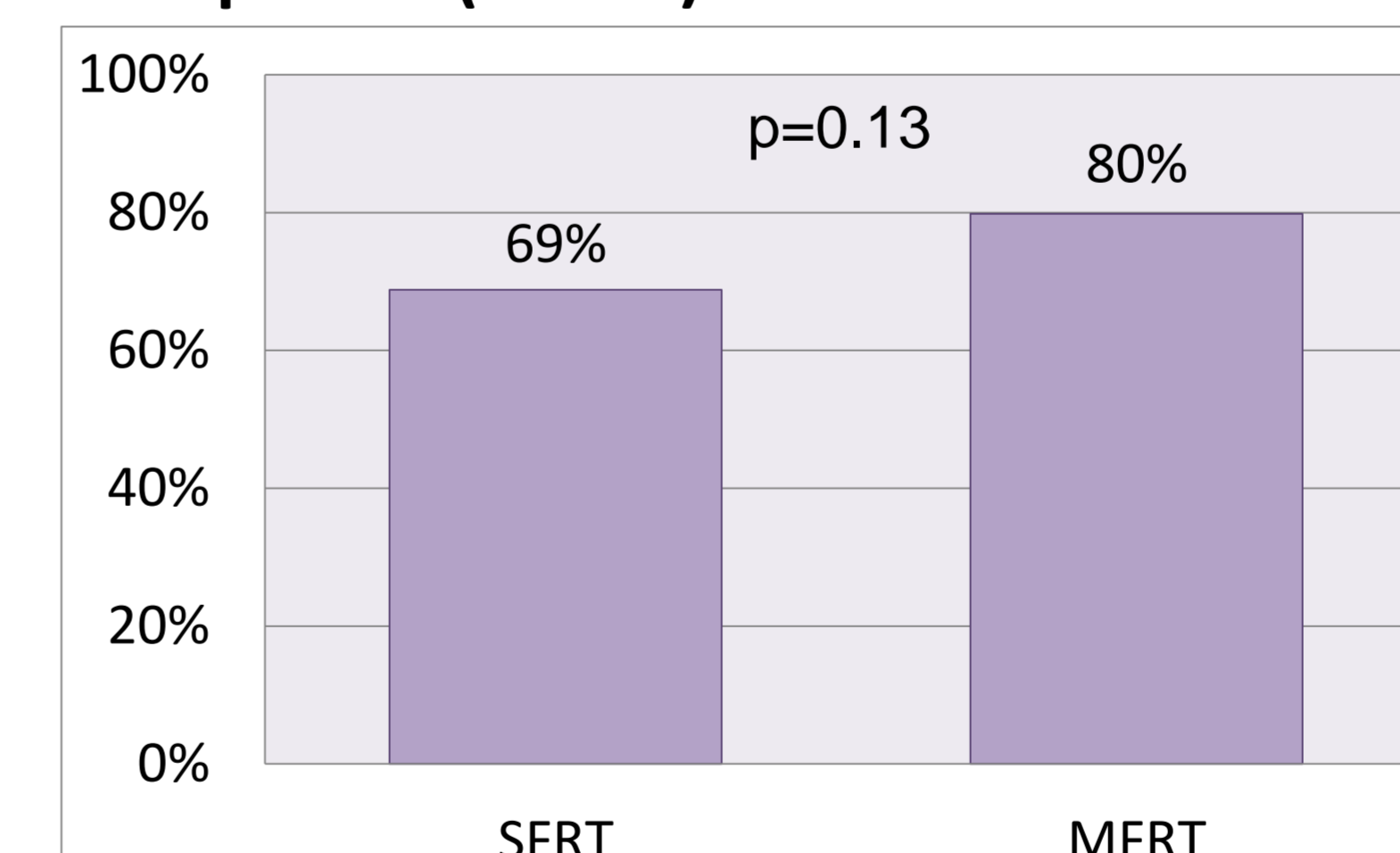


Partial pain response



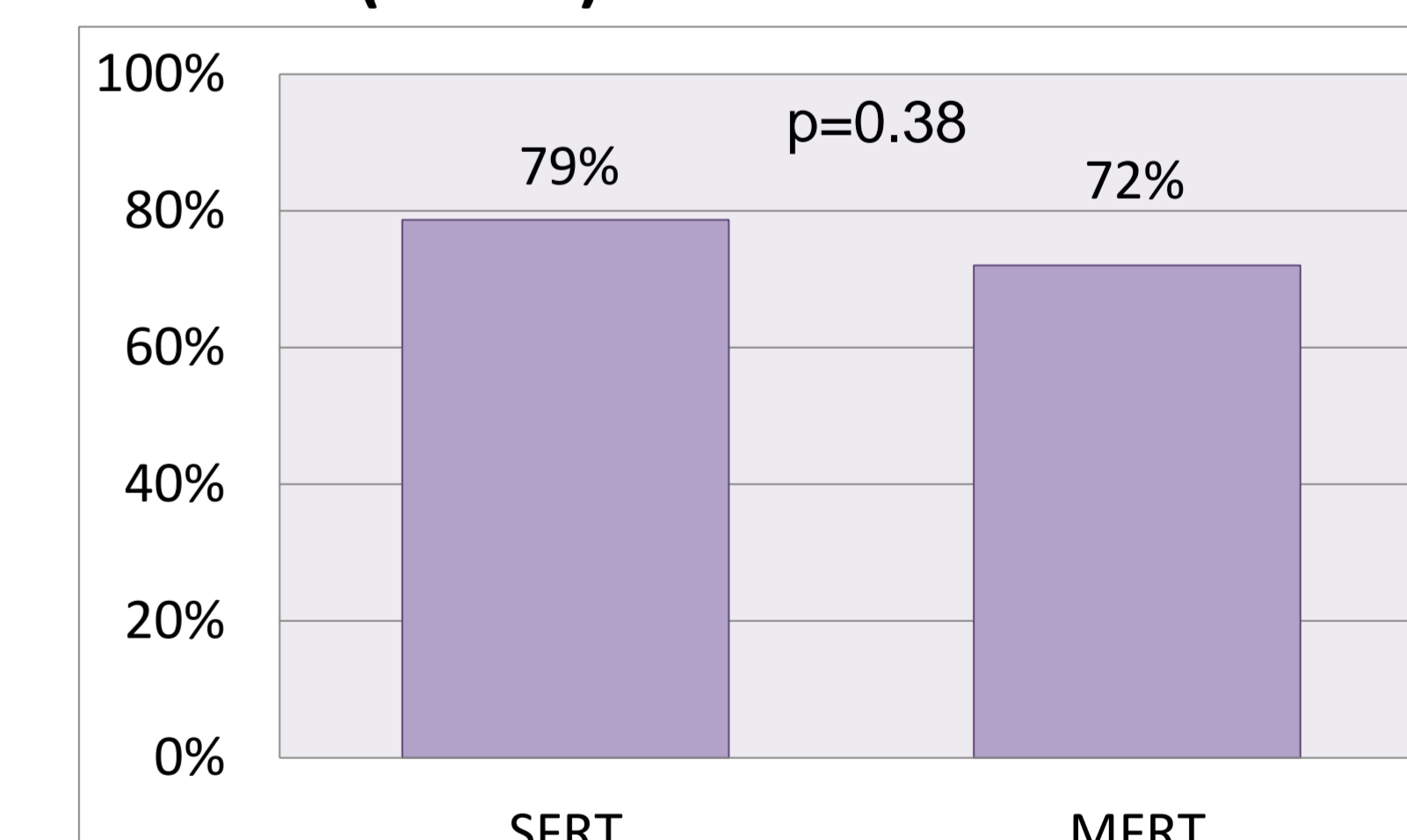
Complete pain response

Figure 5: Complicated BM with Functional Complaints (n=453)



Improvement in function by ≥ 1 -pt

Figure 6: Complicated BM with Symptom Distress (n=528)



Improvement in symptom distress by ≥ 1 -pt

Conclusions

• In our study, improvements in PRO for pain, function and degree of symptom distress were similar between SFRT and MFRT supporting the generalizability of RCTs to clinical practice

• No differences were observed between SFRT and MFRT for pain PR or CR when evaluating all painful BM cases

• Our study suggests that SFRT should be the standard management policy for patients with uncomplicated BM

• No evidence was found that SF was inferior to MF in complicated BM with respect to pain, function or symptom distress but a larger sample size is needed to draw further conclusions