

Efficacy of multiple fraction conventional radiation therapy for painful uncomplicated bone metastases: a systematic review

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Objective

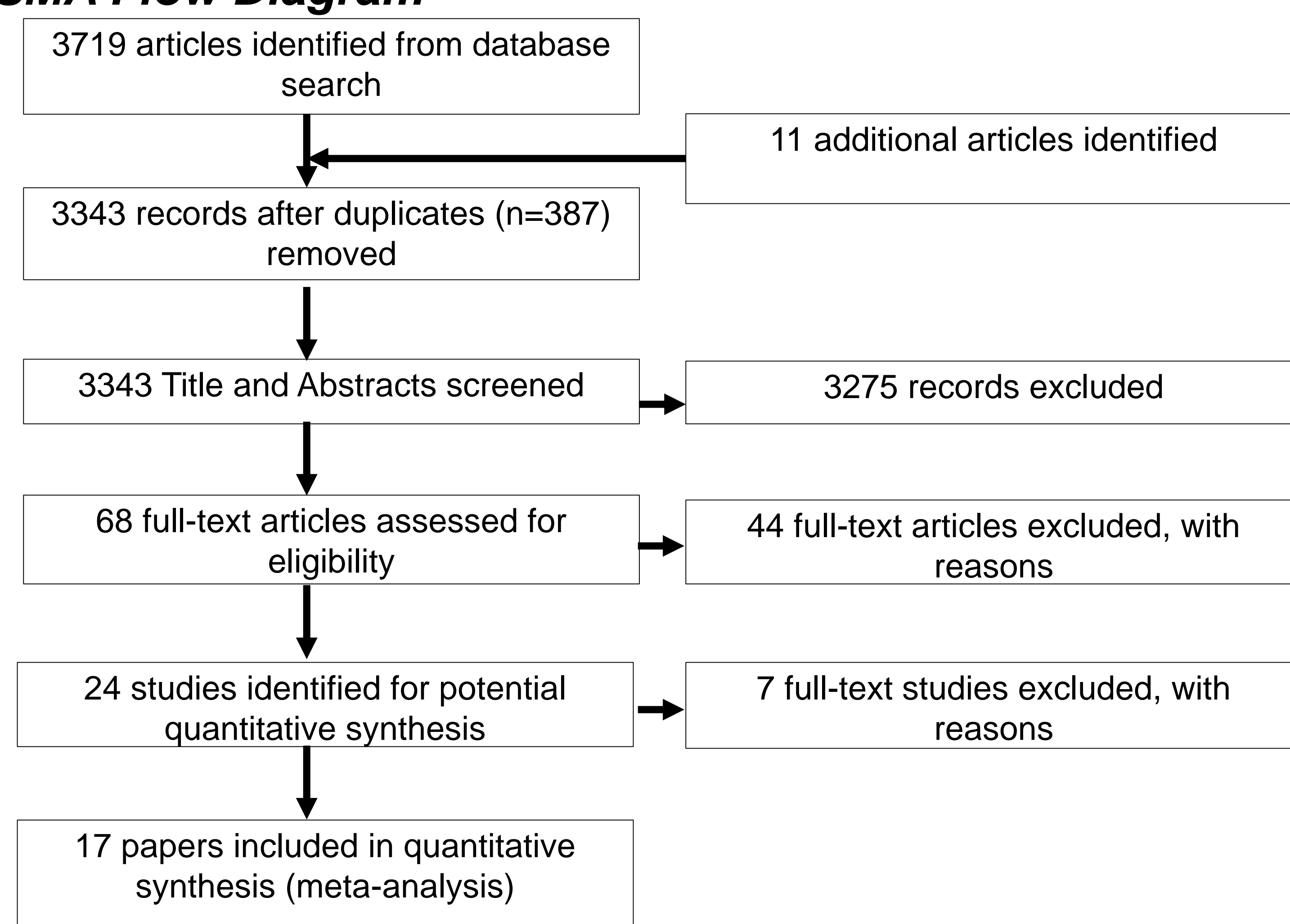
- Determine pain response across multiple fraction radiation therapy (MFRT) doses

Methods

- A literature search was conducted in Ovid MEDLINE(R) <1946 to July Week 3 2016>, Embase Classic & Embase <1947 to 2016 Week 30> and Cochrane Central Register of Controlled Trials <June 2016>
- Articles were included if they reported pain response of MFRT conventional external beam radiotherapy in the setting of a randomized controlled trial
- When possible, reported pain response was categorized into partial (PR), complete (CR) and overall response (OR), and recorded separately as "Intent to Treat" (ITT) and "Evaluable Patients" (EP)

Results

PRISMA Flow Diagram



Pain Response by Dose

Dose	Response Rate	
	ITT	EP
Overall Response		
20Gy/2	13/27 (48%)	13/27 (48%)
20Gy/5	270/448 (60%)	270/404 (67%)
20Gy/10	21/27 (78%)	21/27 (78%)
22.5Gy/5	126/157 (80%)	126/137 (92%)
24Gy/6	386/621 (62%)	386/561 (69%)
30Gy/10	435/851 (51%)	435/583 (75%)
30Gy/15	22/29 (76%)	22/29 (76%)
Complete Response		
20Gy/5	102/428 (24%)	102/379 (27%)
20Gy/10	10/27 (37%)	10/27 (37%)
22.5Gy/5	62/167 (37%)	62/147 (42%)
24Gy/6	175/578 (30%)	175/528 (33%)
30Gy/10	122/860 (14%)	122/580 (21%)
30Gy/15	12/29 (41%)	12/29 (41%)
Partial Response		
20Gy/5	153/428 (36%)	153/381 (40%)
20Gy/10	11/27 (41%)	11/27 (41%)
22.5Gy/5	64/167 (38%)	64/147 (44%)
24Gy/6	186/578 (32%)	186/528 (36%)
30Gy/10	315/831 (38%)	315/563 (56%)
30Gy/15	10/29 (34%)	10/29 (34%)

Study	Dose	Pain Assessment Tool	Time to Pain Response	CR and PR Criteria	Pain Response Rates					
					OR		CR		PR	
					ITT	EP	ITT	EP	ITT	EP
Amouzegar-Hashemia et al 2008	30Gy/10	4-point numerical scale	1 month	CR: pain reduction of 2 grades or more PR: pain reduction of 1 grade or more but less than 2 grades	20/34 (59%)	20/31 (65%)	11/34 (33%)	11/31 (35%)	9/34 (26%)	9/31 (29%)
Anter 2015	20Gy/5	Numeric Rating Scale	3 months	CR: no pain 3 months after RT PR: at least 2 points lower than baseline	33/49 (65%)	33/44 (75%)	10/49 (20%)	10/44 (23%)	23/49 (47%)	23/44 (52%)
Badzio et al 2003	20Gy/5	4-point pain intensity scale	4 weeks	CR: complete disappearance of pain and withdrawal of analgesic drugs PR: decrease in pain score or decrease in dose of analgesic drug	52/74 (70%)	52/62 (84%)	24/74 (32%)	24/62 (39%)	28/74 (39%)	28/62 (45%)
Bayard et al 2014	30Gy/10	Visual Analog Score	1 month	CR: no pain PR: decrease in pain score	39/45 (87%)	39/45 (87%)	8/45 (18%)	8/45 (18%)	31/45 (69%)	31/45 (69%)
Cole 1989	24Gy/6	Physician consult and patient diary	6 months	N/A	11/13 (85%)	11/11 (100%)	N/A	N/A	N/A	N/A
Foro Arnalot et al 2008	30Gy/10	Ordinal pain scale	3 weeks	CR: absence of pain without need for increasing analgesia PR: improvement of equal or greater than 2 on scale with no need for increasing analgesia	71/82 (87%)	71/82 (87%)	11/82 (13%)	11/82 (13%)	60/82 (73%)	60/82 (73%)
Gaze et al 1997	22.5Gy/5	Five-point categorical scale	1 month	CR: complete pain relief PR: decrease in pain score	99/131 (76%)	99/111 (89%)	47/131 (36%)	47/111 (42%)	52/131 (40%)	52/111 (47%)
Hartsell et al 2005	30Gy/10	Brief Pain Inventory	3 months	CR: no pain PR: at least 2 points lower than initial response	188/443 (42%)	188/285 (66%)	51/443 (12%)	51/285 (18%)	137/443 (31%)	137/285 (48%)
Madsen 1983	24Gy/6	Visual Analog Scale	4 weeks	N/A	14/30 (47%)	14/30 (47%)	N/A	N/A	N/A	N/A
	20Gy/2				13/27 (48%)	13/27 (48%)	N/A	N/A	N/A	N/A
Majumder et al 2012	30Gy/10	Visual Analog Scale	1 month	CR: no pain PR: reduction of 2 or more points without analgesic increase	24/33 (73%)	24/26 (92%)	2/33 (6%)	2/26 (8%)	22/33 (67%)	22/26 (85%)
Nielson et al 1998	20Gy/5	Visual Analog Scale	4 weeks	CR: absence of pain PR: improvement of at least one-category	53/119 (45%)	53/101 (52%)	25/119 (21%)	25/101 (25%)	28/119 (24%)	28/101 (28%)
Niewald et al 1996	30Gy/10	N/A	End of RT	N/A	38/46 (83%)	38/46 (83%)	10/46 (22%)	10/46 (22%)	28/46 (61%)	28/46 (61%)
	20Gy/5				34/51 (67%)	34/51 (67%)	7/51 (14%)	7/51 (14%)	27/51 (53%)	27/51 (53%)
Okawa et al 1988	30Gy/15	5-point categorical pain scale	N/A	CR: no pain PR: improvement in pain	22/29 (76%)	22/29 (76%)	12/29 (41%)	12/29 (41%)	10/29 (34%)	10/29 (34%)
	22.5Gy/5				27/36 (75%)	27/36 (75%)	15/36 (42%)	15/36 (42%)	12/36 (33%)	12/36 (33%)
	20Gy/10				21/27 (78%)	21/27 (78%)	10/27 (37%)	10/27 (37%)	11/27 (41%)	11/27 (41%)
Price et al 1986	30Gy/10	4-point pain scale	28 days	CR: complete loss of pain PR: reduced pain	41/148 (28%)	41/48 (85%)	13/148 (9%)	13/48 (27%)	28/148 (19%)	28/48 (58%)
Roos et al 2005	20Gy/5	4-point categorical pain scale	4 weeks	CR: no pain with no analgesia or adjuvant analgesia PR: improvement in pain score by at least one grade with no increase in analgesia	83/135 (61%)	83/121 (69%)	36/135 (27%)	36/121 (30%)	47/135 (35%)	47/121 (39%)
Safwat et al 2007	20Gy/5	5-point categorical scale	6 weeks	N/A	15/20 (75%)	15/20 (75%)	N/A	N/A	N/A	N/A
	30Gy/10				14/20 (70%)	14/20 (70%)	N/A	N/A	N/A	N/A
Steenland et al 1999	24Gy/6	11-point scale	N/A	CR: 0 to 1 pain score, independent of analgesics consumption PR: decrease in initial pains score by at least two points	361/578 (62%)	361/520 (69%)	175/578 (30%)	175/528 (33%)	186/578 (32%)	186/528 (35%)

Conclusions

- 22.5Gy/5 had the highest OR, 30Gy/15 had the better CR and 20Gy/2 had the best PR; their sample sizes are much smaller than some other dosages (which may account for the different response rates)
- Given the small differences seen, it is reasonable to conclude that no major difference exists between the schedules

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