Table 2a: Systematic review of curcumin in supportive cancer

Source: Conte E, CAM-Cancer Consortium. Curcumin [online document]. http://cam-cancer.org/en/curcumin, May 2020.

First author, year (ref)	Design and methods	Included studies and participants	Included interventions	Main outcome measures	Main results	Comments
Normando 2019 [7]	Systematic review Search dates: no date restriction, search performed on Jun 1, 2018 Databases: Cochrane Library, PubMed, Scopus, Web of Science, LILACS, LIVIVO Restrictions: English language Quality assessment: Risk of bias was assessed by Meta-Analysis of Statistics Assessment and Review Instrument Measure of treatment effect: Any outcome measurement. Data synthesis: No meta-analysis performed	4 randomized and 1 non-randomized trials included Patients received radiation or chemo-radiation for head and neck cancer	Topical turmeric/curcumin as gel or mouthwash during chemo and/or radiotherapy Dosing/admin: Turmeric mouthwash (400mg turmeric in 80mL water, swish 10mL for 2 minutes six times daily) Curcuma gel (10mg curcuma longa extract) applied tid after meals for 2 weeks. 0.5% curcuma longa gel applied tid for 21 days. 0.004%curcumin mouthwash 1 minute tid for 20 days 1.5g turmeric powder in 50mL water, tid for 5 days	Primary outcome: prevention of oral mucositis (OM) Secondary: reductions in erythema, ulcerations, pain intensity, improvement in healing, ability to drink and eat.	Topical turmeric/curcumin significantly reduced grade of mucositis (severity), pain, erythema, and ulcerative area, and delayed the onset of mucositis when used preventatively. Was superior to provido-iodine mouthwash, chlorhexidine, saline, and placebo	Two studies low risk of bias, three moderate risk.

Table 2b: Controlled clinical trials of curcumin in supportive cancer care

First author, year	Study design	Participants	Interventions (experimental treatments, control)	Main outcome measures	Main results	Comments
Delavarian 2019	RCT	32 patients with head and neck cancer undergoing radiotherapy	Nanocurcumin (C3-complex) 80mg/day taken as oral capsule compared to placebo capsule	Oral mucositis (OM) during chemo	Delayed onset of grade 1 OM (P = 0.002), significantly reduced severity of OM at all time points, and significantly less weight loss (P = 0.003) in curcumin group compared to placebo. Well tolerated	C3-complex nanocurcumin
Francis 2014	Quasi-experimental non-equivalent control group pre-test-post-test design	60 patients with cancer and treatment-induce OM	Turmeric powder in honey applied 5 minutes before treatment and again 5 minutes after treatment compared to no treatment control	Oral mucositis (OM)	Independent t-value for post-test 2 and 3 were significant between experimental and control group ($p < 0.05$) indicating turmeric and honey was effective for treatment-induced OM.	Weaker study design, details of the intervention (type of turmeric, dose) and patient population not provided, confounding effect of honey which has been evaluated for effect on OM so cannot determine if results are due to honey or turmeric.
Ryan 2013	Double-blind, placebo-controlled RCT	30 breast cancer patients	Oral curcumin, 6g daily compared to placebo	Radiation dermatitis	Reduced radiation dermatitis severity and moist desquamation	Curcumin formulation without improved bioavailability, which limits the possibility of a therapeutic effect.
Ryan Wolf 2018	Double-blind, placebo-controlled RCT	686 women with breast cancer receiving radiation therapy	Oral curcumin (4 x 500mg tid) compared to placebo during radiation therapy until 1 weeks post-treatment	Radiation dermatitis (measured using radiation dermatitis scale)	Curcumin did not reduce radiation dermatitis severity compared to placebo at end of trial. Fewer in curcumin group had RDS >3 but was not stat sig (7.4 vs 12.9% p = 0.082)	Curcumin was C3 complex

Palatty 2014	Investigator blinded RCT	50 patients with head and neck cancer, receiving >60 Gy radiotherapy or chemo radiotherapy	Turmeric and sandal wood oil-containing cream (VTC; commercial product) compared to Johnson's baby oil. Applied 5-times daily from day 1 of radiation until 2 weeks post-radiation.	Radiation dermatitis Measured according to Radiation Therapy Oncology Group (RTOG) score	Significant reduction in dermatitis grade at all time-points in those applying VTC cream compared to baby oil. Reduction in grade 3 dermatitis in VTC group compared to controls (P < 0.01).	Cannot be certain the therapeutic effect is due only to turmeric, given there is also sandal wood oil in the topical cream. Patients were not blinded to their treatment
Rao 2017	Investigator-blinded RCT	40 women receiving radiation therapy for breast cancer	Turmeric and sandal wood oil-containing cream (VTC; commercial product) compared to Johnson's baby oil (control). Applied 5-times daily from day 1 of radiation until end of week 5 of radiation	Radiation dermatitis Measured according to Radiation Therapy Oncology Group (RTOG) score	Delayed onset and decreased severity of dermatitis in the VTC arm. Decreased incidence of grade 1 dermatitis at week 2 (p = 0.003), decreased grade 2 and 3 dermatitis at weeks 3 (p = 0.003) and week 4 (p = 0.002). Average severity significantly decreased in treatment arm at weeks 2, 3, and 4 (p< 0.05). Not statistically different at week 5.	Cannot be certain the therapeutic effect is due only to turmeric, given there is also sandal wood oil in the topical cream Patients were not blinded to their treatment
Hejazi 2013	Double-blind RCT	40 men with prostate cancer undergoing radiotherapy	Curcumin (BCM95) 3g/day (n=20) or placebo (n=20) starting 1-week before radiation until completion of treatment	Quality of life (QoL) (EORTC QLQ-PR25) assessed at baseline and 3 months-post treatment	Reduced urinary symptoms in curcumin group compared to placebo (p = 0.011). No other differences between groups	Curcumin formulation was BCM95, 2 x 500mg capsules tid with meals. Small sample size, no long-term follow up for treatment efficacy.

Hejazi 2016	Double-blind RCT	40 men with prostate cancer undergoing radiotherapy	Curcumin (BCM95) 3g/day (n=20) or placebo (n=20) starting 1-week before radiation until completion of treatment	Oxidative status and treatment outcomes Measured: plasma total antioxidant capacity (TAC), activity of superoxide dismutase (SOD), catalase, and glutathione peroxidase (GPx) at baseline and 3 months after radiation. PSA levels and MRI 3 months post-treatment.	Significant increase in TAC ($p < 0.001$) and decrease in SOD activity ($p = 0.018$) after radiation in curcumin group, and compared to placebo there was a significant increase in TAC ($p = 0.014$) and decrease in SOD activity ($p = 0.026$). No difference in PSA between groups or MRI findings – suspected no impact of therapeutic efficacy of radiotherapy	Curcumin formulation was BCM95 Small sample size, no long-term follow up for treatment efficacy.
Saadipoor 2019	Double-blind RCT	64 men with prostate cancer undergoing radiotherapy	Nanocurcumin (40mg tid) (n=33) or placebo (n=31) starting 3 days before radiation for the duration of radiotherapy	Radiation proctitis and other acute toxicities as assessed by CTCAE v.4.03 Tumor response (MRI), hematologic nadirs	Radiation-induced proctitis occured in 58.1% of placebo-treated versus 45.5% of curcumin patients and was non-significant ($p =0.313$). No sig. difference for radiation cystitis, radiation toxicities, hematologic nadirs, or tumor response. Nanocurcumin was well tolerated.	SinaCurcumin product was used. Small sample size, possibly underpowered.

Panahi 2014	Double-blind RCT	80 patients with solid tumors undergoing adjuvant chemotherapy	Bioavailability-boosted curucminoids (180mg/day), n=40, or placebo n=40	Health-related QoL (University of Washington QoL Index), inflammatory markers (IL-6, IL-8, TNF-a, TGFb, hs-CRP, calcinonin gene-related peptide, substance P, MCP-1)	Improved QoL by end of trial in both groups ($p<0.001$), but curcumin group had greater improvement compared to placebo ($p < 0.001$). Magnitude of reduction in TNF-a, TGFb, IL-6, substace P, hs-CRP, CGRP, and MCP-1 were significantly greater in curcumin versus placebo group. Reduction in serum IL-8 was greater in placebo compared to curcumin ($p = 0.012$).	Curcumin formulation was Meriva (phosphatidylcholine complex). Predominant cancer types: breast, colorectal, gastric. Common chemotherapy-agents used: docetaxel, cisplatin, 5-FU, topotecan, cyclophosphamide, etoposide, methotrexate Baseline QoL was not matched between groups thus possible confounding. No long-term follow up was conducted to assess for treatment efficacy.
Belcaro 2013	Controlled clinical trial	160 cancer patients undergoing radio- or chemotherapy	1,5 g Meriva (curcumin-phospholipid complex with improved bioavailability, 500mg of Meriva contains 200mg of curcumin) compared to placebo	Adverse effects of cancer treatment (chemotherapy and radiotherapy)	Consistent improvement of the side effect profile in both treatment groups (radio- or chemotherapy) compared to control group	Subjective reporting of symptoms, heterogeneity of the study group, and lack of randomization are major limitations of this study

References

Belcaro G, Hosoi M, Pellegrini L, et al. A controlled study of a lecithinized delivery system of curcumin (Meriva®) to alleviate the adverse effects of cancer treatment. Phytotherapy research : PTR. 2014;28(3):444-450.

Delavarian Z, Pakfetrat A, Ghazi A, et al. Oral administration of nanomicelle curcumin in the prevention of radiotherapy-induced mucositis in head and neck cancers. Spec Care Dentist. 2019;39(2):166-172.

Francis M, Williams S. Effectiveness of Indian Turmeric Powder with Honey as Complementary Therapy on Oral Mucositis : A Nursing Perspective among Cancer Patients in Mysore. Nurs J India. 2014;105(6):258-260.

Hejazi J, Rastmanesh R, Taleban F-A, et al. Effect of Curcumin Supplementation During Radiotherapy on Oxidative Status of Patients with Prostate Cancer: A Double Blinded, Randomized, Placebo-Controlled Study. Nutrition and cancer. 2016;68(1):77-85.

Hejazi J, Rastmanesh R, Taleban F-A, Molana S-H, Ehtejab G. A Pilot Clinical Trial of Radioprotective Effects of Curcumin Supplementation in Patients with Prostate Cancer. Journal of Cancer Science & Therapy. 2013;5(10):320-324.

Normando AGC, de Menêses AG, de Toledo IP, et al. Effects of turmeric and curcumin on oral mucositis: A systematic review. Phytotherapy research. 2019;33(5):1318-1329.

Palatty PL, Azmidah A, Rao S, et al. Topical application of a sandal wood oil and turmeric based cream prevents radiodermatitis in head and neck cancer patients undergoing external beam radiotherapy: a pilot study. Br J Radiol. 2014;87(1038):20130490-20130490.

Panahi Y, Saadat A, Beiraghdar F, Sahebkar A. Adjuvant therapy with bioavailability-boosted curcuminoids suppresses systemic inflammation and improves quality of life in patients with solid tumors: a randomized double-blind placebo-controlled trial. Phytotherapy research. 2014;28:1461-1467.

Rao S, Hegde SK, Baliga-Rao MP, et al. Sandalwood Oil and Turmeric-Based Cream Prevents Ionizing Radiation-Induced Dermatitis in Breast Cancer Patients: Clinical Study. Medicines (Basel, Switzerland). 2017;4(3):43.

Ryan JL, Heckler CE, Ling M, et al. Curcumin for radiation dermatitis: a randomized, double-blind, placebo-controlled clinical trial of thirty breast cancer patients. Radiat Res. 2013;180(1):34-43.

Ryan Wolf J, Heckler CE, Guido JJ, et al. Oral curcumin for radiation dermatitis: a URCC NCORP study of 686 breast cancer patients. Supportive care in cancer. 2018;26(5):1543-1552.

Saadipoor A, Razzaghdoust A, Simforoosh N, et al. Randomized, double-blind, placebo-controlled phase II trial of nanocurcumin in prostate cancer patients undergoing radiotherapy. Phytotherapy research. 2019;33(2):370-378.