Healthcare Provider Resource

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General information

Common name(s): Curcumin, turmeric

Proper names(s): *Curcuma longa*

Routes of administration:
Oral and intravenous (IV). This monograph will discuss only IV administration.

Reported uses in cancer care:
IV curcumin has been used by integrative cancer care practitioners with goals of improving survival and tumour response, enhancing the effect of cancer treatments, improving quality of life (QoL), and ameliorating cancer-treatment related adverse effects.

Summary

Curcumin is used to treat various health conditions, most commonly with oral formulations. When ingested, its clinical use is limited by poor bioavailability, solubility, rapid metabolism, and clearance. Intravenous (IV) administration has been suggested as a method to overcome some of these limitations. IV curcumin is used by some integrative cancer practitioners with goals of improving cancer outcomes and quality of life. Our search yielded 6 studies including one randomized controlled trial, three phase 1 studies of safety and pharmacokinetics (PK), and 2 case reports. One of the phase I studies was conducted in healthy adults but is included due to a paucity of data.

and background information. The papers were screened by two reviewers independently. Data was extracted into standardized spreadsheets, and studies summarized using descriptive statistics.

Pharmacokinetics

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Most data on the mechanism of action of curcumin in cancer management is derived from preclinical data.

Immune modulation and anti-inflammatory effects

Chronic inflammation can produce genetic instability, which can serve as one of the first signals for the initiation of cancer.[27,28] Curcumin acts on various inflammatory molecules and pathways, inhibiting their actions. Curcumin binds directly to reactive oxygen species (ROS) and may lead to suppressing the growth and metastasis of some types of cancer.[29] Curcumin also has an inhibitory action on the NF-κB-dependent pathway,[30,31] can downregulate the expression of pro-

The only RCT was a placebo-controlled, double-blind study with 150 advanced and metastatic breast cancer patients.[49] Patients received

Adverse Events and Side Effects

In general, based on the limited clinical data available, IV curcumin has been well tolerated. It should be noted that different curcumin formulations could have different safety and tolerability profiles.

Four identified studies reported on safety and adverse events: one RCT,[49] two phase I studies,[14,15] and one case report.[51] In all studies other than the case report, IV curcumin was well tolerated with reported adverse events generally being mild and resolving without complication. The adverse events listed are all from the phase I studies.[14,15] The RCT of curcumin in breast cancer patients receiving paclitaxel found no significant difference in any adverse event between groups.[49]

The most commonly reported adverse events from the two phase I studies included fever and chills, anemia, red blood cell abnormalities (primarily echinocytes, however one case of grade 3 hemolysis was reported), dizziness/headache, nasopharyngitis/rhinitis, various laboratory abnormalities including increased AST, mean cell volume, blood lactic acid, and EKG deviations and QT prolongation.[14,15] Other less frequently reported adverse effects included gastrointestinal effects, fatigue, chest discomfort, epistaxis, decreased platelet count, cough, hypertrichosis, and infusion-related reactions.

Three serious adverse events were reported including one case each of hemolysis (grade 3), hyponatremia (in patient with pre-existing hyponatremia), and facial edema (grade 2 but required treatment).[15]

Unpublished data from a clinician with experience using IV curcumin in cancer populations reported the following side effects with the use of IV curcumin emulsion: nausea and vomiting, transient “manic”/euphoric symptoms (during/up to 2-4 hours post IV), peripheral heat and hand/foot itching in higher doses (duration 1-2 days), skin rash and redness, dizziness, and diarrhea.[52]

One case study reported on a woman with

are not known.

Impact on cytochrome P450 system

Curcumin may alter some cytochrome P450 enzymes.[89] Curcumin may inhibit CYP 1A2 [64] and CYP 2D6 ,[90] and induce CYP 2A6 enzymes.[64] Curcumin is not likely to impact CYP3A4 or CYP 2C9 in a clinically meaningful way based on several human studies.[90-94] Therefore caution should be exercised when using curcumin with CYP 2D6, CYP 1A2, or

Table 1: Clinical trials of IV curcumin for cancer

Reference	Study design	Participants

Compared to healthy participants, cancer patients had higher plasma levels of curcumin, and shorter elimination phase and half-life.

Of 44 co-medications studied, three medications targeting the renin–

activation in macrophages. *Biochem Pharmacol*. Dec 1 2000;60(11):1665-76. doi:10.1016/s0006-2952(00)00489-5
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