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Research Article

Curcumin Prevents Mucositis and Improves Patient Compliance in Head & Neck Cancer Patients Undergoing Radio-Chemotherapy

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Abstract

Oral mucositis is a common complication and a dose limiting toxicity in up to 90% of head & neck cancer patients (HNCP) undergoing radio-chemotherapy. Several adjuvant agents like folic acid, Vit-E, antibiotic mouth rinse etc. have been tried without remarkable success. Curcumin is known to have antioxidant and free radical scavenging activity that had shown its radio protective potential in *in vitro* studies. Objective of this pilot study was to evaluate effects of curcumin on mucositis in HNCP undergoing radio-chemotherapy. An open labelled controlled trial was conducted, 95 HNCPs in historic control group were given conventional radio-chemotherapy and 109 HNCP in trial group were given 2 gm of curcumin /day in addition to conventional therapy for two months starting from 3 days before planned radiation. Mucositis gradation as per WHO oral toxicity scale was done weekly for the whole radio-chemotherapy period. Incidence of mucositis in each grade, and patient compliance were compared in both control and curcumin treated group by Chi-square test ($P \leq 0.05$). There was a significant decrease in incidence of mucositis from 92% to 51% ($P \leq 0.001$) and in grade III and IV mucositis from 51.6% to 12.8% ($P \leq 0.001$) among control and curcumin treated group respectively. Patient compliance in terms of completion of scheduled RT dose, increased from 52.6% to 89.0% ($P \leq 0.001$). Curcumin showed a remarkable adjuvant protective activity to radio-chemotherapy in HNCP. So, a well-designed RCT with a long term follow up for prognostic implications is imperative.

ABBREVIATIONS

HNCP: Head and Neck Cancer Patient; RT: Radiotherapy; RCT: Radio-Chemotherapy; CU: Curcumin; IRB: Institutional Review Board; HPLC: High Performance Liquid Chromatography; QOL: Quality of Life; Gy: Gray

INTRODUCTION

Radiotherapy has been the most common modality for treating human cancers needed by 80% of cancer patients at some time or other, either for curative or palliative purpose. Damage to the cells by radiotherapy is potentiated or mitigated depending on several factors, such as the presence of oxygen, sulfhydryl compounds and other molecules in the cellular milieu [1-3]. Highly reactive oxygen radicals react with cellular macromolecules, such as DNA, RNA, proteins, membrane, *etc*, causing cell dysfunction and ultimately cell death. Naturally the reactions occur in tumour as well as normal cells alike during radiotherapy though the rapidly dividing tumour cells are much more susceptible than normal cells. It requires a very high dose of radiation to kill all malignant cells at a time and that dose could not let normal cells survive. Hence small doses of radiation (2 Gray) are given at a time to repeat daily for 5 days a week permitting normal cells to repair the damage while hyperactive outer layer malignant cells would be killed. But this strategy does not work equally well with cancers in the region where rapidly dividing cells and malignant tumour are in near vicinity e.g. Head and Neck cancers.

Oral mucositis is a common complication of cancer treatments such as chemotherapy and radiotherapy. It is characterized by erythema, inflammation, pain, and ulceration and can occur in up to 100% of patients undergoing stem cell transplantation, radiotherapy to the head and neck, and stomato-toxic chemotherapy [4,5]. Usually, oral mucositis is a dose-limiting toxicity when treating head and neck cancers. In one large (n = 450) retrospective review of stage III or IV head and neck cancer patients (HNCP) undergoing radiation therapy, 83% developed mucositis [6] and significantly more patients with mucositis (59%) required unplanned delays/breaks in therapy than did those without mucositis (16%). Patients undergoing conventional radiation therapy to the head and neck typically experience erythema and mouth soreness within 2 weeks of beginning therapy and often develop more severe damage to the epithelium within an additional 2 weeks [7]. When chemotherapy and radiotherapy are administered concurrently, the incidence