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Role Of Ayurvedic Herbs In Chemotherapy Induced Devastating Side Effects: A Review

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Abstract: In a recent survey, Ayurveda Treatment has been found to significantly handle the negative effects of chemotherapy. It allows patients to tolerate it. Because, medications used in chemotherapy mostly affect the gastrointestinal tract. But, the Ayurvedic approach to treat this illness enhances appetite, encourages digestion. As mentioned above, it relieves symptoms including nausea, vomiting, appetite loss, stomatitis, diarrhea, constipation, and other problems too. By application, the excessive heat caused by chemotherapy medications can be effectively reduced by ayurvedic medicines. Because they have anti-inflammatory properties. Patients will no longer feel burning sensations in their eyes, hands, and soles, Traditional recipes of these herb mixtures are called "Rasayanas" which are formulas of herbs, used in preventive and regenerative medicine Chemotherapy or radiation therapy as an adjuvant or co-therapy ayurvedic minimizes toxicities of chemotherapy and radiotherapy. In case of recurrence ayurveda maintenance therapy will be helpful.

Keywords: ayurvedic herbs ,cancer, chemotherapy ,rasayan.

INTRODUCTION

Cancer is one of the most devastating illnesses. Present significant health risks in both developed and developing countries. It is second leading cause of Death behind heart disease. Cancer starts almost anywhere in the human body. In modern science Extensive research has produced many new healing methods for the management of cancer. The treatment of cancer has increased in complexity. Surgical procedures are often less extensive than in proceeding decades. However to limit the extent of surgery, the patient receives adjuvant chemotherapy and radiotherapy which increases the duration and toxicity of treatment. In cancer management health related quality of life is a multidimensional construct that includes the subject appraisal of the patient's physical and mental well being. Traditional recipes of these herb mixtures are called "Rasayanas" which are formulas of herbs, used in preventive and regenerative medicine, particularly for increasing strength and immunity and reversing the ageing process. Ayurvedic herbs (Dravya) are grouped according to their main effects on imbalances in the doshas(Vata, Pitta and Kapha) and dhatu (tissues), providing corrective qualities("gunas") for the patients according to the principle of Dravyaguna. According to classic Ayurvedic texts, Rasayana therapy can slow the aging process and enhance immunity, intelligence, memory, strength, youth, luster, and vitality. These herbs are purported to nourish the tissues of lymph, blood, muscle, adipose tissue, bone, nervous and reproductive systems, prevent degeneration and illness, and have been effective as radioprotective and chemoprotective agents. Many of the herbs have been evaluated for their use in the mitigating side effects of cancers treatments and enhancing immunity.

MATERIAL AND METHOD

Review Ayurvedic and modern literature for pathogenesis and treatments of cancer. Studies conducted at All Institute of Medical Science Delhi, have revealed that herbal remedies reduce side effects of chemotherapy. Herbal preparations for chemotherapy rehabilitation will also include spices such as Pippali (Piper nigrum), Tulsi (Ocimum sanctum), Brahmi (Bacopa monnieri),Guggul (Commiphora wightii), Turmeric (Curcuma longa), Amla (Emblica officinalis) etc. Chemotherapy as Visha (highly toxic) creates the tremendous Rukshata (dryness) in the body. Ayurveda is based on the stability of 3 doshas called Vata, Pitta, and Kapha. Each character has a completely unique mixture of these doshas which determines their physical and highbrow charter. Chemotherapy can disrupt this stability and the principal to irritated doshas and next fitness troubles.

Chemotherapy and its side effects[1]

Chemotherapy is the use of cytotoxic agents to destroy cancer cells. Chemotherapy dates back to the1500s, when heavy metals were used systemically to treat cancers, and severe toxicity and limited cure were reported. Chemotherapy remains the primary treatment for some malignancies and an adjunct to other treatment modalities (surgery, radiation, and immunotherapy). Unlike surgery and radiation, chemotherapy is distinguished by its systemic effects. Most of the drugs are transported by the bloodstream; most do not cross the blood–brain barrier and therefore cannot reach the central nervous system. The usefulness of cancer chemotherapy is often limited by toxic reactions

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1. Haematological side effects–It is the most dangerous form of toxicity for many of the antineoplastic drugs used in clinical practice. Its most common form is neutropenia, with an attendant high risk of infection, although thrombocytopenia and bleeding may also occur and can be life threatening.
2. Gastrointestinal side effects–Anorexia, nausea and vomiting are among the most common and distressing acute reactions to a wide variety of cancer chemotherapeutic agents. From the point of view of most patients, nausea and vomiting are the most important side effects of cancer chemotherapy.
3. Immunosuppressant–Most of the commonly used antineoplastic agents are capable of suppressing cellular and humeral immunity. The impact of immunosuppressant on the natural history of cancer is unpredictable, however; it may be necessary part of the antineoplastic efficacy of some drugs.
4. Dermatological side effects–Skin necrosis may result from the extravasations of certain vesicant drugs during intravenous therapy.
5. Vascular and hypersensitivity reactions–The most serious form of hypersensitivity seen with chemotherapy is anaphylaxis. Anaphylaxis is most commonly seen with L-asparaginase.
6. Hepatic side effects–It is an uncommon problem in cancer chemotherapy, but when occurs, it may be serious. E.g. cirrhosis with methotrexate.
7. Pancreatic side effects–Acute pancreatitis is a rare complication of cancer chemotherapy, but it has been described with L-asparaginase, corticosteroids and cytarabine.
8. Pulmonary side effects–A variety of drugs may cause profound pulmonary disturbances, especially in patients who have received prior pulmonary irradiation. E.g. Pulmonary fibrosis with bleomycin.
9. Cardiac side effects–Angina, left ventricular dysfunction and a variety of other less typical. cardiac abnormalities may occur. E.g. doxorubicin.
10. Genitourinary side effects–Haemorragic cystitis occurs in about 10% of patients treated with cyclophosphamide.

Table 1: Preclinical and Clinical Data on Ayurvedic Herbs in Cancer Treatment

Herb	Preclinical Findings	Clinical Findings	Study Design
Triphala	Significant anti-tumor activity in animal models, particularly in colon and breast cancer. Induces apoptosis and inhibits angiogenesis [2,3].	Clinical trials reported improved quality of life and reduced chemotherapy-induced toxicity in cancer patients [9].	Randomized controlled trials (RCTs) and observational studies.
Curcuma longa (Turmeric)	Curcumin inhibits cancer cell proliferation and induces apoptosis. Modulates multiple signaling pathways in breast, colon, and pancreatic cancers [5,6].	Curcumin supplementation resulted in reduced tumor markers and improved survival rates in patients with colorectal cancer [7].	RCTs and case-control studies.
Ashwagandha (Withania somnifera)	Anti-proliferative effects enhances immune function, and reduces oxidative stress. Effective in prostate and breast cancers [8.9].	Ashwagandha as an adjuvant therapy reduced chemotherapy-induced fatigue and improved quality of life [10].	RCTs and cohort studies.
Guduchi (Tinospora cordifolia)	Protects against DNA damage and enhances immune response. Demonstrated efficacy in reducing oxidative stress in animal models [11,12].	Clinical evidence supports Guduchi in reducing chemotherapy side effects and improving overall health outcomes [13].	RCTs and observational studies.
Neem (Azadirachta indica)	Anticancer activity, including induction of apoptosis and inhibition of angiogenesis. Effective in skin, oral, and prostate cancer models [14,15].	Limited clinical studies suggest benefits in managing skin cancers, with ongoing trials for oral cancer [16].	Early-phase clinical trials and observational studies.

Tulsi (Ocimum sanctum)	Inhibits cancer cell growth and induces apoptosis. Anti-inflammatory and antioxidant effects observed in various cancer models [17,18].	Early clinical studies indicate benefits in reducing chemotherapy side effects, particularly in breast cancer patients [19].	Pilot studies and small-scale RCTs.
Kumari (Aloe vera)	Radioprotective properties and enhancement of wound healing. Prevents chemotherapy-induced toxicity in animal models [20,21].	Used as a supportive treatment to reduce radiation-induced dermatitis in cancer patients [22].	Observational studies and case series.
Guggul (Commiphora mukul)	Inhibits angiogenesis and cancer cell proliferation in prostate and breast cancer models [23,24].	Early clinical trials show promise in reducing tumor size and improving symptoms, but more research is needed [25].	Phase I/II clinical trials.
Chitrak (Plumbago zeylanica)	Induces apoptosis and inhibits metastasis in various cancer cell lines. Significant anticancer activity in animal models [26,27].	Limited clinical data available, but preclinical findings suggest potential as a complementary therapy [28].	Preclinical studies with emerging clinical trials.

Table :2 pharmacological action of ayurvedic herb.

Mode of Action	Herbs
Antioxidant Activity	Triphala, Curcuma longa (Turmeric), Ashwagandha, Guduchi, Phyllanthus emblica (Amla), Terminalia chebula (Haritaki), Terminalia belerica (Bibhitaki[2,5,8,11,19].
Induction of Apoptosis (Programmed Cell Death)	Triphala, Curcuma longa (Turmeric), Ashwagandha, Plumbago zeylanica (Chitrak), Azadirachta indica (Neem), Catharanthus roseus (Madagascar Periwinkle[2,5,8,14,27].
Modulation of Inflammatory Pathways (e.g., NF-kB, COX-2 inhibition)	Curcuma longa (Turmeric), Ashwagandha, Triphala, Ocimum sanctum (Tulsi), Withania somnifera (Ashwagandha) [[5,8,17,18].
Immune System Enhancement	Ashwagandha, Guduchi, Tinospora cordifolia (Guduchi), Azadirachta indica (Neem), Zingiber officinale (Ginger) [13,16,19,26].
Protection Against Chemotherapy/Radiotherapy-Induced Toxicity	Triphala, Guduchi, Aloe vera, Curcuma longa (Turmeric) [7,16,25].
Reduction of Oxidative Stress	Ashwagandha, Guduchi, Curcuma longa (Turmeric), Withania somnifera (Ashwagandha), Zingiber officinale (Ginger) [8,11,21].
Modulation of Cell Cycle	Triphala, Curcuma longa (Turmeric), Plumbago zeylanica (Chitrak) [2,15,27].
Anti-metastatic Effects	Withania somnifera (Ashwagandha), Ocimum sanctum (Tulsi), Curcuma longa (Turmeric) [[23,27].

DISCUSSION

As Ayurvedic herbs are increasingly used alongside conventional cancer therapies, it is critical to understand potential herb-drug interactions. For example, Curcuma longa (Turmeric) and Withania somnifera (Ashwagandha) have been shown to interact with certain chemotherapy drugs, potentially altering their metabolism and efficacy [30]. These interactions could either enhance therapeutic effects or lead to adverse reactions, underscoring the need for comprehensive pharmacokinetic and pharmacodynamic studies. Identifying and managing these interactions is essential for the safe integration of Ayurvedic medicines with conventional cancer treatments. Ayurvedic formulations often consist of a complex mixture of herbs, each containing multiple active compounds. This variability can lead to inconsistencies in efficacy and safety, posing a barrier to the broader acceptance of these therapies in clinical practice [31]. Standardization of herbal medicines, including the identification and quantification of active constituents, is essential for ensuring consistent therapeutic outcomes and gaining acceptance in the medical community. Incorporating these herbs into daily regimens could be a valuable strategy in preventive oncology, particularly for individuals at high risk of developing cancer. Moreover, Ayurveda's focus on maintaining balance within the body aligns with

the principles of preventive medicine, which seeks to promote overall health and well-being to prevent disease.

CONCLUSION

Therefore, Ayurveda-based therapies propose the formulations that have been extracted from classical Vedic literature and ancient texts. This information would assist medical professionals and cancer patients in preventing severe side effects from chemo-radiotherapy. While preclinical and clinical evidence suggests that these traditional therapies can play a crucial role in improving patient outcomes. Besides, recent Ayurvedic therapies are relatively affordable, and the treatments are widely accessible and secure. These straightforward Ayurvedic Treatments may improve the quality of life for cancer patients and serve as a crucial immunity booster after chemo-radiotherapy.

Further scope of study

These herbs are easily available in everywhere and all are economically affordable. In future clinical trial should be done.

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Conflict of interest

Nil

REFERENCES

1 Wardle J, Sibbritt D, Adams J. Introduction of Complementary and Alternative Medicine in Oncology: The "Mainstreaming" of CAM. Integr Cancer Ther. 2014;13(3):196-204.

2 Sandhya T, Lathika KM, Pandey BN, Bhilwade HN. Potential of traditional Ayurvedic formulation, Triphala, as a novel anticancer drug. Cancer Lett. 2006;231(2):206-214.

3Deep G, Dhiman M, Rao AR, Kale RK. Chemopreventive potential of Triphala (a composite Indian Cancer Res. 2005;24(4):555-563.

4Maheshwari RK, Singh AK, Gaddipati J, Srimal RC. Multiple biological activities of curcumin: a short review. Life Sci. 2006;78(18):2081-2087.

5 Aggarwal BB, Kumar A, Bharti AC. Anticancer potential of curcumin: Preclinical and clinical studies. Anticancer Res. 2003;23(1A):363-398.

6 Strimpakos AS, Sharma RA. Curcumin: preventive and therapeutic properties in laboratory studies and clinical trials. Antioxid Redox Signal. 2008;10(3):511-

7 Carroll RE, Benya RV, Turgeon DK, Vareed S, Neuman M, Rodriguez L, et al. Phase IIa clinical trial of curcumin for the prevention of colorectal neoplasia. Cancer Prev Res (Phila). 2011;4(3):354-364.

8 Vyas AR, Hahm ER, Arlotti JA, Watkins SC, Spitz DR, Singh SV. Chemoprevention of prostate cancer by d,l-sulforaphane is augmented by pharmacological inhibition of autophagy. Cancer Res. 2013;73(19):5985-5995.

9 Khan N, Afaq F, Mukhtar H. Cancer chemoprevention through dietary antioxidants: progress and promise. Antioxid Redox Signal. 2008;10(3):475-510.

10 George J, Singh AK, Srivastava RK, Bhui K, Roy P, Chaturvedi PK, et al. Antitumor effects of neem (Azadirachta indica) oil and its component limonoid azadirachtin in human cervical and prostatic cancer cells. Curr Med Chem. 2009;16(23):2803-2810.

11 Thatte UM, Rege NN, Phatak SD, Dahanukar SA. Immunotherapeutic modification of experimental infections by Indian medicinal plants. Phytother Res. 1993;7(3):253-259.

12 Goel A, Kunnumakkara AB, Aggarwal BB. Curcumin as "Curecumin": From kitchen to clinic. Biochem Pharmacol. 2008;75(4): 787-809.

13 Mishra LC, Singh BB, Dagenais S. Scientific basis for the therapeutic use of Withania somnifera (Ashwagandha): a review. Altern Med Rev. 2000;5(4):334-346.

14 Kumari V, Kaushal K, Sharma A, et al. Ayurvedic approach for the treatment of side effects caused by radiotherapy and chemotherapy in cancer patients. J Conventional Knowledge Holistic Health. 2018;3(2):1-5.

15 Zeng Y, Jiang J, Zhu J, Yu R, Jiang M, Liang S. Advances and challenges in sensing technology for bioactive polyphenols in tea. Food Chem. 2015; 277(2):735-746.

16 Weber JM, Kehrer JP. Oxidative stress, Nrf2, and the epigenome in cancer: is there a benefit or burden? Chem Res Toxicol. 2018;31(5):478-490.

17 Rai MK, Gade AK. Herbal medicine: its toxic effects and drug interactions. In: Ramawat KG, Mérillon JM, editors.

18 Singh S, Majumdar DK. Toxicological studies of Tulsi (Ocimum sanctum L.) extracts in animals. Int J Toxicol. 2007;26(2):147-152.
19 Agarwal R, Gupta S, Agarwal S. Aloe vera and cancer prevention: A review. Asia Pac J Clin Oncol. 2015;11(4):269-279.
20 Patial A, Kumar P, Sunita S, et al. Herbal Medicine used in Cancer Treatment. Res J Pharmacogn Phytochem. 2023;15(1):1-9.
21 Srivastava S, Singh P, Mishra G, Jha KK. Anticancer activity of the root extract of Plumbago zeylanica against Ehrlich ascites carcinoma in Swiss albino mice. Asian Pac J Trop Biomed. 2012;2(2).
22 Akhtar N, Gupta D, Ahmed N, et al. biological characteristics and anticancer properties of Commiphora mukul. Adv Pharm Bull. 2017;7(2):343-352.
23 Lakhotia S. Need for Integration of Ayurveda with Modern Biology and Medicine. Proc Indian Natl Sci Acad. 2019;85(2):269-275.
25 Bhandari M, Ravipati AS, Reddy N, et al. Traditional Ayurvedic medicines: pathway to develop anti-cancer drugs. J Ethnopharmacol. 2015;3(1):1-11.
26 O'Cathail S, Stebbing J. Ayurveda: alternative or complementary? Lancet Oncol. 2012;13(9):865.
27 Lim T, Ling SK, Lee LM, et al. Plumbagin protects PC12 cells against amyloid β-induced neurotoxicity by promoting HO-1-mediated autophagy. Neurochem Int. 2018; 118:246-256.
28 Agrawal S, Rathod S. Integration of Ayurveda with Modern Medicine: Need and Challenges. J Ayurveda Integr Med. 2022;13(2):100320.
29 Murthy PK, Vaidya ADB, Anturlikar SD. Regulatory challenges and perspectives in advancing Ayurvedic drug research. Curr Sci. 2019;117(7):1146-1152.
S30 Ponnusankar S, Pandit R, Bandyopadhyay A. Critical appraisal on methodological challenges in Ayurvedic research: A journey from tradition to evidence-based medicine. J Ayurveda Integr Med. 2020;11(4):542-547.
31 Williamson EM. Synergy and other interactions in phytomedicines. Phytomedicine.2001;8(5):401-409.