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Conquering newer arenas like Cancer in Ayurvedic Healthcare: Can we prove our Strength?

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Despite the life changing advances in Cancer care worldwide today, the sole intervention of Western Medicine has proven to fall short in many aspects. Cancer Researches in Ayurveda also has shown only incremental achievements till date. In spite of the discovery of several anti-carcinogenic active compounds in herbs and herbal formulations, a standardised treatment protocol that is based on evidence-based research is still unavailable. The present status and the future perspectives of Ayurveda in treating malignancy is described here. The importance of following Dinacharya, Ritucharya, Achara Rasayana to prevent Cancer is accepted worldwide. Wound Care, Sleep Management, Pain Relief and providing mental strength through Naisthiki Cikitsa are some unique Ayurvedic interventions that improve the Quality of Life (QOL) after the diagnosis of Cancer. Ayurveda should not be merely considered as source of "raw materials" for potential drug candidates. Rather, the principles and practices of this millennia old healthcare system could be developed into hypothesis which can be tested by modern scientific methods. This approach may provide evidence which validates some traditional concepts and may lead to the development of novel biomarkers for wellness and disease. By developing rigorous research, robust education and research training, high-quality clinical care, and inclusive policies, Ayurveda can be part of the solution to address the current and future global challenges of cancer.

Keywords: Ayurveda, Cancer, Malignancy, Prevention, Arbuda

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Introduction

"You beat Cancer by how you live, why you live and in the manner in which you live"

– Stuart Scott

Since Independence, keeping at par with the global achievements, India has witnessed the eradication of infectious diseases like Small Pox and Polio, elimination of Leprosy and Yaws and even containment of deadly epidemics like Plague and Leptospirosis.[1] But unfortunately, still today the lack of Cancer awareness in the masses coupled with poor resource allocation, inadequate healthcare infrastructure, poor access to cancer care close to patients' homes and limited affordability of Cancer treatments[2] are some of the few reasons why the data from National Cancer Registry program, India[3] projects that one in nine Indians will develop Cancer in their lifetime. The mass response of our country as of now, majorly constitutes of conventional treatment on the lines of the seven pillars of: Awareness, Early Detection, Screening, Chemotherapy, Radiotherapy, Surgery and Cellular Immunotherapy. Among them, the interventional approaches are again believed to be costly, mutilating with serious ill-effects and leading to residual morbidity and relapses.[4]

These factors and the resulting WHO initiatives has thus created a paradigm shift in Cancer care worldwide. Trimble *et al*.[5] suggests that TCIM may be considered Primary Health Care in Low- and Middle-income countries like Chile, Brazil, and rural India. Systematic reviews and meta-analysis done worldwide has revealed that the use of CAM in treatment of cancer was 40% that has increased from 25% in 1970 to 49% after 2000[6]. India, with its 5000-year-old rich heritage of Ayurveda has come forward to show the path of cancer care to the world in this regard.

At present, with the help of Government initiatives and novel strategies by policymakers the Indian Cancer care seeking population enjoys the privilege of Ayurveda inclusive novel Integrated therapeutic approach that are the fruits of evidence-based research. In this write up, we will try to acknowledge the present status and future prospectives that Ayurveda can deliver for combating this maligning healthcare conundrum of the 21st Century.

Review of Literature

With the progressive increase of Cancer worldwide, the healthcare fraternity has been doing constant brainstorming over this issue in the last few decades. Search of new knowledge in the hope of a breakthrough has seen ample amount of Drug Research, in vitro and in vivo studies, and testing of many novel compounds and treatment modalities. Researches with inclusion of Ayurvedic approaches and herbs both as standalone treatments and adjuvants to conventional therapies with outstanding success rates have been done. Many review articles and meta-analysis done in international multidisciplinary research institutes have established the effectiveness of Ayurveda in Cancer care worldwide.

Dr. TL Devaraj in his book "Cancer Therapy in Ayurveda" has mentioned specific clinically tested treatment protocols on various organ specific cancers that include both drug interventions and lifestyle modifications.

Dr. JLN Sastry in his book "Introduction to Oncology in Ayurveda" mentions a long list of traditional herbs and polyherbal formulations which have shown significant anti cancerous effects worldwide. In the book titled "Cancer, Myths & Realities of Cause and Cure", Dr. Manu L Kothari illustrates the common pattern of cancer care that is followed worldwide and the loopholes in the system that need to be addressed.

Dr. N S Mooskatayam in his book "Ayurvedic treatment of Cancer" has focused on the correct approach that a Ayurvedic practitioner should develop while treating a patient. The way to incorporate the classical *Cikitsa Siddhanta* in various stages of the cancer and according to the patient's condition is nicely illustrated here.

Materials and Methods

Classical Ayurveda Samhita, National and International Journals, Books of famous Authors on Oncology, Integrated Oncology and Cancer Care in Ayurveda were consulted. Government websites and national archives were sought to for gathering information on landmark initiatives taken up by Government in concerned subject. Online available interviews of renowned oncologists and discussion forum in concerned subject was accessed.

Discussion

Pathophysiologic basis of Neoplasms- views of the Western Medicine

New growth is neoplasia. The labels benign and malignant describe how a neoplasm develops. Malignant neoplasms penetrate surrounding tissue and, in most circumstances, can spread to distant organs, whereas benign neoplasms remain localised in one area. A normal cell must undergo mutations that allow it to stop respecting the boundaries of other cells in order to become neoplastic. Additionally, the neoplasm must be able to produce its own blood supply. For the neoplasm to be malignant, the cells must also be able to penetrate the basement membrane and the tissue around it, enter the bloodstream, and spread to and develop inside distant organs. Changes in cellular function occur gradually, leading to the neoplastic process. The proliferative, invasive, and metastatic potential that are cancer's defining characteristics are conferred by these phenotypic alterations. Cellular and metabolic abnormalities that contribute to the malignant phenotype are mostly caused by mutational changes that modify the genetic code, together with epigenetic changes. Even though an epigenetic phenomenon, once acquired, are passed on to daughter cells during cell division, they do not alter the genetic code. Instead, they affect gene expression and cell behaviour.**[7]**

Interpretation of a Benign or Malignant Lesion in Ayurveda

Instead of seeing cancer as a separate illness or group of illnesses, Ayurveda holds that all illnesses are caused by severe, systemic imbalances and malfunctions of the three Doshas.

Tridosa Dusti*:** Numerous variables, including persistent exposure to environmental toxins, which are *Pitta*-provoking elements at the deeper cellular level, might produce *Samprapti* (pathogenesis). Micro-inflammatory alterations brought on by an increase in *Pitta* at the cellular level can disrupt the cellular components of *Agni*, known as *Pithar* and *Pilu Agni*. *Pithar Agni* creates poorly formed tissue because *Pilu Agni* is sluggish. *Vata* is the active *Dosha* in Ayurvedic pathophysiology and has a role in metastasis. The *Tejas* component of *Pitta* increases the metabolic activity of the cancerous cells, while *Kapha,* which is heavy and bulky, Is in charge of the aberrant cell proliferation that results in the malignant tumor. Strong *Agni* are present in the cancerous tissue. So, Ayurveda considers cancer as a disease caused by the interplay of all the three vitiated *Tridosa.[8]**

Sopha: In certain circumstances the normal *Snigdha-Sheet- Agneya* character of *Srotas* get disturbed by the *Vidahi* & *Abhisandhya Dravyas*, as a result there is a disturbance in the transport mechanism of the affected *Srotas*. So, this retention or accumulation of the fluid is termed as *Sopha*. With reference to the classical knowledge *Sopha* is a condition which is characterised by the features like *Grathita* (hard swelling), *Sama / Vishama* (regular or irregular), *Twak Mamsa Sthayi* (located superficially), *Sharira Ekadeshasthit* (localised lesion).**[9]** *Vrana-Sopha* can develop to *Vidradhi* & *Arbuda*. Chronic inflammation can induce certain cancers, and solid tumors, in turn, can initiate and perpetuate local inflammatory processes that foster tumor growth and dissemination. Consequently, inflammatory pathways have been targeted in attempts to control cancer.**[10]** To validate the concept in terms of treatment then it was found that *Dasamoola* is the drug of choice in *Sotha*. *Dashamoola* had anti-inflammatory, analgesic and anti-platelet effects comparable to that of aspirin. **[11]** *Haritaki* and *Punarnava* are best drugs in *Sopha*. *Terminalia chebula* extracts have ability to inhibit inducible nitric oxide synthase (iNOS) and cyclooxygenase-2 (COX-2) in LPS-stimulated macrophages and *Punarnavasava* has anti-inflammatory, central as well as peripheral antinociceptive, antipyretic and antiulcer activity. **[12,13]** All *Srotosothaka* and *Sothahara* herbs have anticancer properties.**[14]**

Arbuda* and *Granthhi: The most obvious term in the Ayurveda texts that correlates with cancer is *Arbuda. Arbuda* cannot be explained without referring to a related term *Granthi*. Both terms refer to swelling or growths that are hard on touch and do not easily go away. In fact, they tend to grow bigger over a period. Together, the terms *Arbuda* and *Granthi* seems to represent tumour forming pathologies that have been described in the earliest text books of Ayurveda. *Granthi* is a growth, a swelling with a knotted appearance. On the other hand, *Arbuda* is a more dangerous type of growth that can hurt or kill the individual and that which can grow in size by multiples of hundreds and crores.

There are descriptions of the above-mentioned diseases in the *Caraka Samhita* and the *Susruta Samhita*, which represent the medical and surgical schools in Ayurveda. *Charaka* mentions these diseases under the group of diseases that are characterized by swelling or *Sopha*. *Sushruta* describes *Arbuda* and *Granth*i as diseases that need surgical management. The observations in the texts differentiating between *Granthi* and *Arbuda* are very interesting. *Charaka* distinguishes *Granthi* from *Arbuda* by the presence of a capsule. In other words, *Granthi* is encapsulated while *Arbuda* is not. When a *Granthi* is surgically removed, *Charaka* emphasises that it should be removed along with the capsule to prevent recurrence*. Suśruta* describes *Arbuda* as a slowly progressing growth, which can then take on a rapid course when it begins to ulcerate and. Because of the predominant involvement of *Kapha,* the disease is silent and slow in the initial phase. *Susruta* specifies that even in the beginning stage, there is more to *Arbuda* than meets the eye. *Arbuda* has deep roots. As it progresses, it can consolidate itself locally over a large area and become fixed, which indicates a bad prognosis. An *Arbuda* is especially difficult to manage if it manifests in a vital organ (*Marma*) or a vital channel (*Srotas*). An *Arbuda* can recur on the same site again even after treatment (*Adhyarbuda*) or manifest in another location (*Dvirarbuda*). The *Dvirarbuda* can occur simultaneously or in due course. *Dvirarbuda* seems to be a very early reference to metastasis of cancers in the Ayurvedic tradition. *Adhyarbuda* obviously refers to relapse of the cancer at the same site. According to *Susruta*, if an *Arbuda* is not removed completely through a surgical procedure, it will recur quickly in a very aggressive manner and kill the person like fire.**[15]**

***Lina Ama*:** The Ayurvedic concept of "*Ama*" is similar to the the Egyptian concept of "*Ukedu*," and also corresponds to the old theory of intestinal auto-intoxication propounded byMetchnikoff.**[16]** According to Metchnikoff, the breakdown of dietary proteins by proteolytic gut bacteria might result in the production of harmful byproducts such as ammonia, indoles, and phenols. As people aged, these harmful digestive byproducts accumulated and led to illness. Curiously, current data supports Metchnikoff since bacterial species that break down dietary carcinogens (heterocyclic amines) from cooked meat and fish are linked to a higher risk of tumor development.

The connection between intestinal auto-intoxication and illness aligns with Ayurvedic ideas about "*Ama*" and its propensity for harm. The obstructed micro-channels by "*Ama*" remain responsible for loss of homeostasis, inflammation, and tissue damage.**[17]** Ayurveda therefore holds that "*Ama*" is the underlying cause of several illnesses because it obstructs vital microchannels (*Srotas*) that provide nourishment to tissues (*Dhatus*).

An excessive amount of "*Ama*" can circulate and combine with excretory wastes to create a toxic, reactive form that has pro-inflammatory and antigenic qualities. The immune system may be weakened by this type of "*Ama*," which might make the original illness worse. It's interesting to mention in this regard that contemporary research also suggests that indigestible particles may be the source of persistent inflammation.

Current challenges in Cancer Management in India

Loopholes in the Health service delivery: One of India's biggest public health challenges has been providing accessible, affordable care. Different cancer profiles, pronounced socioeconomic diversity, varying access to care, gaps in public knowledge, behaviour, and attitudes, along with resource and infrastructure limitations, make it difficult to provide timely and effective cancer care in the nation.

Ample side effects of the existing conventional cancer therapies: Despite the improved efficacy and increased survival offered by contemporary treatments, the side-effects and long-term sequelae of anti-cancer chemotherapy continue to be a significant source of concern for both patients and clinicians. Current treatments for chemotherapy-related side effects are frequently ineffective, frequently ignore potential long-term consequences, or even cause new side effects that only make patients feel worse.

For patients undergoing chemotherapy and radiation therapy, nausea and vomiting are the most dreaded side effects. Cancer-related fatigue (CRF), a severe type of tiredness, is often described by cancer patients as an overpowering feeling of weakness and exhaustion that does not go away with rest or sleep. Chemotherapy exacerbates tiredness, which is arguably the most common and distressing side effect of cancer treatment.

While chemotherapy can cause hair loss on the head and other regions of the body, radiation treatment can cause hair loss in the area of the body that is exposed to the radiation. Chemotherapy and radiation treatments can cause dryness, itching, redness, and edema in the skin. Additionally, you may notice changes in your nails, such as darkening, yellowing, or cracking, and/or cuticles.

Salivary glands and mouth, throat, and lip problems can be harmed by anticancer medications and radiation to the head and neck. Swallowing difficulties, taste alterations, dry mouth, oral infections, mouth ulcers, tooth decay, and sensitivity to hot and cold foods can all result from this.

Failure to develop a proper Integrated Cancer Care Health Management System: has further added to the problem. Evidence based data generation and documentation on large scale patients over a long time needs a healthy medical infrastructure. Alongside, multidisciplinary training of healthcare providers is also lacking, ultimately affecting both research progression and patientcare. Knowledge of proper Research Methodology with a sound scientific tuning alongside the basics of Integrative Oncology is the need of the hour.

What should be the best approach from an Ayurveda perspective?

The importance to study Cancer from a Whole systems approach or in a holistic method rather than an organ specific or risk factor triggered phenomenon is crucial. *Asadhya* or *Kricchasadhya Vyadhi* in Ayurveda is considered mostly to be "*Gambhir Dhatusthita*" and "*Tridosaja*." From the general progression of diseases concept in Ayurveda we know that ailments that start from a mild *Mandagni* or *Ajirna* get modified in several steps if not taken care of. Formation of *Ama, Amavisa,* Sama Dosa, Transmigration of that *Dosa* from *Kostha* to *Sakha*, then from *Sakha* to *Gambhir Dhatu* and *Indriya*. This process finally ends in *Oja Visramsa, Vyapat* and *Kshaya* - thus surpassing the naturally occurring disease preventing mechanism of the body. On a closer look, deep rooted "*Lina Ama Dosha*" and a progressively long sustaining "*Kha- Vaigunya*" coupled with continuous "*Nidan Sevan*" and depleted " *Vyadhikhshamatwa*" plays the major role to maintain the malignant nature of the neoplasm in body. On lines of the "*Prati Purush Siddhanta* " we know that at this stage, the greatly differing status of *Vikriti*, *Agni, Dhatusarata, Sattwabala, Satmyabala, Vyadhikshamatwa*, *Kala Parinama* - the response to the conventional therapies varies to a great extent.

Keeping in mind, these inherent characteristics of the pathophysiology, the Ayurveda physician in today's world, as per the situation plays either of the two roles-

1. To provide adjuvant therapy besides conventional therapy with a goal to mainly improve the Quality of Life in a patient debilitated by the effects of Chemotherapy and Radiotherapy.
2. To provide palliative care in advanced stage Cancer patients who either cannot afford conventional therapy, or are been rejected as potential suitable for Chemo-Radio therapeutics or have not responded as expected to Conventional treatment approaches.

At such crossroads, the initial step should be to assess the current condition of each patient. A thorough *Rogi Bala Parikhsha*, *Roga Bala Parikhsha* by establishing the "*Dasha Vidha Parikhasha*" and "*Pancha Nidana*" parameters is necessary. This will lay the foundation stone to prepare a "perfect hit" for the "precise target." Taking Lung Cancer as an example, the potential assessment points are represented in Table 1.

Table 1: Exemplary Approach in Lung Cancer

Dashavidha Pariksha	Points of Investigation	Remarks
Prakriti	Assess the Doshik predominance by Questionnaire, Physical Appearance and Anthropometry	To know the natural bias of the subject and assess "Pakrirtisamasamavaya" or "Vikritivisamasamsavaya"
Vikriti	▪ Nature of difficulty of breathing ▪ If associated with any Pain ▪ Complaint of Chest tightness, discomfort ▪ Characteristic feature of symptom presentation	To gain knowledge about the extent of the disease- the ' Vyatka' or ' Bheda' Stage.
Sara	Assessment of the Dhatusarata, any marked changes from verbal testimony of the patient	To assess the patency of the Dhatusnehaparampara- the "Gambhirdhatusthitatwa" of the Vyadhi

Dashavidha Pariksha	Points of Investigation	Remarks
Samhanana	To assess the Compactness and measure the Physical Deterioration affecting the Quality of Life in the Patient	For assessment of severity of nutritional depletion - a marker of vitality in malignancy.
Sattwa	For determination of "Guruvyadhita" and "Laghuvyadhita"	Can be used to determine compliance with the therapy and effectiveness of "Naisthiki Cikitsa"
Satmya	To gain knowledge about the personal, familial, societal, and racial habits pertaining to food habits, cultural practices, and social norms.	To establish the effect and extent of risk factors
Desa	Includes the morphologic peculiarities of the lesion as well as the geographical presentation of the disease	To gain knowledge about the natural progression and behaviour of the illness in the patient's native region
Kala	The history of onset of the presenting symptoms and their progression with respect to age and seasonal variation.	For assessment of the disease progression speed- a marker of the pathogenicity of the lesion.
Ahara Shakti	Assessing appetite, Digestion, Bowel movement	To assess the impact of the disease on Vital Functions and involvement of Neuralgic pathways.
Vyayam Shakti	Examination of Physical Strength, level of exhaustion and ability to perform daily activities.	Assessment of status of Nutrition, and probable involvement of Musculoskeletal system, and Sensory- Motor Nerves.

Table 2: *Pancha Nidan* Assessment in Cancer

Pancha Nidan	Questions?	Purpose
Nidana	Was there any H/O Smoking? H/O any form of Tobacco use? Was there any H/O exposure to Asbestos/ Silica Dust etc.? Was there any H/O exposure to Ionising Radiation? Did any family member experience similar difficulties in the past?	By determining the probable presence or absence of risk factors, the resulting Dosha Samchaya and Dosha Dushti can be predicted
Purvarupa	Did you experience any of the following? Since what Duration? ▪ A new cough that doesn't go away ▪ Coughing up blood, even a small amount ▪ Shortness of breath ▪ Chest pain ▪ Hoarseness ▪ Losing weight without trying ▪ Bone pain ▪ Headache ▪ Any other concurrent health issues	By the chronology, severity and pattern of onset of these premonitory symptoms Dosa- Dusya Sammurchana stage of the disease can be traced back.
Rupa	What is the extent of breathing difficulty? How frequent is the Chest pain? Is it associated with Fever? Was there any Fatigue, weight Loss? How is the Sleep/ Appetite/Bowel and Bladder Movement?	"Angshangsha Kalpana" and "Tara- Tama Bheda" of the disease, the affected Srotamshi and the condition of the Dhatus can be known by these.
Upashaya	Was there any relief of symptoms with Rest Pain Medications Food Supplements Ventilation Support Chemotherapy Radiotherapy Surgery	The status of Oja, Vyadhikshamatwa, Sattwabala and Vyadhi Prakriti can be known by this.
Samprapti	This is established by a comprehensive analysis of the previously collected data. An insight to the extent of the malignancy in the patient is achieved.	

The TNM classification and QOL assessment provides a significant knowledge about the extent and effect of the disease in the patient's body. But, on the Ayurvedic principles of management of any *Anukta Vyadhi*, knowing the specific *Dosa- Dusya Sammurchana* and the status of *Srotamsi* is elementary. On the above-mentioned example, the "*Panca Nidana*" *pariksha* of the patient can be carried out in the manner as in Table 2.

By the above-mentioned procedure, the groundwork for planning the patient centric- holistic treatment can be done. Many a times patients simultaneously undergo conventional treatments. The approach to plan adjuvant Ayurveda treatment in such cases needs to be modified accordingly.

What Ayurveda can offer?

Preventive Measures: Like any other disease in Ayurveda, the best approach to combat malignancy also starts from assessing the "*Shat Kriyakal*" stages of the disease. Thus, one can infer the modalities can be grossly classified as Preventive, Curative and Palliative care in general.

Preventive aspects of various Cancer **[18]** are described in Table 3.

Table 3: Preventive Aspects in Common Cancers

Cancer Type	Main Risk Factors	Theoretical Minimum Exposure Distribution	Primary Prevention: Currently available Ayurvedic Measures
Lung, trachea, and bronchus	Tobacco use	Zero exposure possible	Quitting Tobacco through controlling Asatmaindriyarthasamyoga
	Urban air pollution	7.5 µg/m3for particles with aerodynamic diameters <2.5 microns15 µg/m3for particles with aerodynamic diameters <10 microns	Regular Nasya as part of Dinacharya
	Low fruit and vegetable intake	600 grams/day fruit and vegetable intake for adults	Following Pathya Ahara that is Satmya
	Indoor smoke from cooking and heating	Zero exposure possible	Following Ritucharya, Dinacharya and Medicated Dhoopan Karma at home.
Breast	Physical inactivity	At least 2.5 hours/week of moderate- intensity activity or equivalent (4,000KJ/week)	Avoiding Sajjyasana- Sukha
	Overweight and obesity	BMI(weight/height2) of 21	Avoiding Ati Santarpana Ahara- Vihara
	Alcohol use	Zero exposure possible	Sticking to healthy lifestyle following Achara Rasayana
Colon and rectum	Physical inactivity	At least 2.5 hours/week of moderate- intensity activity or equivalent (4,000KJ/week)	Avoiding Sajjyasana- Sukh
	Overweight and obesity	BMI(weight/height2) of 21	Avoiding Ati Santarpana Ahara- Vihara
	Low fruit and vegetable intake	600 grams/day fruit and vegetable intake for adults	Following Pathya Ahara that is Satmya
Mouth and oropharynx	Tobacco use	Zero exposure possible	Avoiding Asatmaindriyarthasamyog and abiding by Achara Rasayana Rules.
	Alcohol use	Zero exposure possible	
Leukemia	Ionizing radiation (natural and medical)	Low medical exposure possible; lower radon exposure possible	Avoidance of Viruddha Vihar, Following Dinacharya and Ritucharya to develop Kalkrta and Yuktikrita Bala
	Tobacco use	Zero exposure possible	Avoiding Asatmaindriyarthasamyog and abiding by Achara Rasayana Rules
	Various occupational exposures	Lower exposures possible (varying by exposure)	Avoiding Asatmaindriyarthasamyog
Stomach	Chronic infection withHelicobacter pylori	Zero exposure possible	Avoiding Akala- Ajirna- Puti Bhojan and doing seasonal Panchakarma
	Low fruit and vegetable intake	600 grams/day fruit and vegetable intake for adults	Intaking Pathya Ahara that is Satmya
	Tobacco use	Zero exposure possible	Avoiding Asatmaindriyarthasamyog and abiding by Achara Rasayana Rules

Table 4: Ayurveda drugs with Anti-Cancer Properties

Carcinoma	Drugs found to have Anti-Cancer Properties
Lung Cancer	Vasa (Adhatoda vasica), Kantakari (Solanum xanthocarpum). Vasicinone showed prominent cytotoxic activity in vitro against A549 lung adenocarcinoma cancer cell line
Uterus Cancer	Sthouneyaka (Taxus buccata) is known to contain taxane/taxol which exerts anticancer effect
Liver Cancer:	Bhumyamalaki (Phyllanthus nururi), Kalamegh (Andrographis panniculata), Chitraka (Plumbago zeylanica)
Breast Cancer:	Matulunga (Citrus medica), Haridra (Curcuma longa) The flavonoids and limonoids present in Citrus plants are postulated to be the cause of their anti-tumour and antiinflammatory effects. The effect of curcumins on different stages of development of cancer was studied
Colon cancer:	Sounth (Zingiber officinalis), Maricha (Piper nigrum), Bilwa (Aegle marmelos). The anticancer effect of hydro-alcoholic extract of Aegle marmelos (AME) was studied in the Ehrlich ascites carcinoma bearing Swiss albino mice.3
Prostate Cancer:	Salmali (Bombax malabarica), Guggulu (Commiphora mukul). The studies reveal that Guggul-Lipid, an extract of Commiphora mukul is a potent inhibitor of cancer cell growth. Guggul- Lipid is a multi-targeted chemo preventive and chemotherapeutic agent.

Curative Measures: Till date a lot of Drug Research, Pre- Clinical and Clinical trials have been done to find out the Anti- Cancer properties of documented Ayurveda herbs. The marvellous results have shown multi-dimensional potency like Immunity Enhancers, Tumour Suppressors, inhibition of Mutagenesis and Carcinogenesis, Blocking Cancer cell line growth etc. Some Organ specific Anti – cancer drugs that can be used as *Vyadhipratyanika* treatment are describ in Table 4.

Treatment through the Lines of *Arbuda Cikitsa* can also be planned as per the condition. *Upanaha Swedana, Raktamokshana, Mridu Virechana, Lepa* of *Udumbara* and *Sakhotaka Patra Kalka*, *Vaman Karma*, *Kshara Karma* can be applied in the lesion.

Palliative Cancer Care through Ayurveda: Palliative care, according to WHO**[19]** is the avoidance and alleviation of suffering for both adult and paediatric patients, as well as their families, who are dealing with the challenges of a life-threatening disease. These issues encompass patients' physical, mental, social, and spiritual pain as well as family members' psychological, social, and spiritual distress. Only 1% of India's population of over 1.2 billion people can utilize the country's more than 908 palliative care facilities.**[20]** In the current situation, the Ayurvedic principles of diet, sleep, *Rasayana* therapy, wound care, pain management, mud therapy, and yoga might be quite beneficial.

Food [21,22]: According to Ayurveda, *Agni* experiences hypofunction in a prolonged illness, which lowers food desire and impairs digestion. Therefore, it is imperative to provide these patients with specialized treatment that includes nutrient-dense, easily digestible, and palatable meals. *Yavagu* & *Manda* (rice as the main ingredient), *Yusha* (pulses as the main ingredient), *Mamsarasa* (meat soup), *Raga Shadava* (sugar, rock salt, and pomegranate juice), and *Takra* & *Mantha Kalpana* (fruits, sugar, meat soup, milk, and ghee) are a few Ayurvedic dietary preparations that can be used with patients who are near death. In addition to offering nourishment, these food preparations contain a variety of medicinal ingredients that may help patients live better lives and function as a therapeutic diet. Additionally, these preparations are easy to take and replenish hydration since they are liquid, pleasant, and easy to digest.

Sleep[23,24]: Sleep is crucial for good health. It is also regarded as the foundational element of health. Sleep is essential to both contentment and sadness, sustenance (a healthy body) and emaciation, strength and weakness, sexual prowess and impotence, knowledge and ignorance, and life and its absence, or death. massage, unification, bathing, and consuming soup made from aquatic and marshy domestic animals, *Shali* rice with milk, curd, other luscious ingredients Psychedelic enjoyment, smell of one's own preferred fragrances, Basic sleep-promoting techniques include applying calming ointments to the face and head, *Samvahana* (mild massage), *Netra Tarpana*, listening to one's own favourite noises, and having a comfortable bed and home.

Wound Care[25]: *Acharya Sushruta* has described 60 healing techniques for wounds, known as *Shashtiupkrama*. These procedures involve the use of several plants and other medications for a variety of objectives, including bandaging, healing, disinfection, and purification. Therefore, if appropriate *Shashtiupramas* and a healthy diet are followed, it will encourage the healing of wounds and lessen the pain of a patient receiving palliative care.

Pain management[26]: Handling chronic Ayurvedic pain management techniques can be used in palliative care. It is possible to lessen the frequency, severity, and duration of pain. Patients can be kept as low as possible on the WHO pain scale by using *Basti*, *Shirodhara*, *Abhyanga*, and *Swedana* for pain management. Similarly, Ayurveda may be used to treat constipation, one of the well-known side effects of morphine.

Yoga[27]: Along with calming *Yoga* positions, meditation and *Pranayama* can help manage the emotional components of chronic pain, successfully lower anxiety and depression, and enhance quality of life. There is strong evidence that *Yoga* can help people cope with anxiety and depression and lessen the effects of heightened stress reactions. It primarily works by downregulating the sympathetic nervous system and the hypothalamus pituitary-adrenal (HPA) axis. Palliative care patients' physical, emotional, and spiritual needs can be met by combining the knowledge of yoga with a comprehensive holistic approach that promotes patients' overall well-being.

Music Therapy: Music is a universal language. Worldwide, the use of music therapy is growing. Both music and ayurveda have their roots in the Vedas. *Samveda* has a wealth of musical expertise. Since ancient times, music therapy has been employed in Ayurveda. Music therapy has its roots in Ayurveda and includes anything from daily and seasonal regimens to *Chikitsaupkrama* of *Doshas* & specific ailments. Music therapy is a powerful tool for palliative care, which includes mental health care. While many kinds of music may be utilized therapeutically, Indian classical music can readily be infused with Ayurvedic principles.

Probable areas of potential success - Line of Treatment of Cancer in Ayurveda

Grossly, the *Cikitsa Siddhanta* of Cancer in Ayurveda revolves around *Amapachana, Dhatwagni Dipana, Shaman, Shodhana* and *Lekhana Chikitsa*.

Balya Ahara perhaps constitutes the most important pillar of Ayurveda therapeutics in Cancer treatment. At the various stages from coping up with the Radio- Chemotherapeutic drugs, to promoting the much-needed nutrition and to maintain a homeostasis of the *Dosa Dhatu Mala*. *Pathya Aahara* that is planned as per the patient's individual needs is very important. It has been emphasised as "*Bhesajakshapite Deha Aharaiiab Brimhanama*." The numerous *Rashaushadhi* that an Ayurveda practitioner prescribe might render useless until coupled with the most suitable diet regime along with healthy lifestyle practices.

As stated earlier, malignancy is a condition where the ***Lina Ama***, that has been accumulated over years, gets deep seated into Dhatus. This *Ama* being a foreign material surpasses the *Dhatwagnipaka* and causes *Srotorodha*. Subsequently, due to diminished *Dhatwagni*, *Dhatuposhana* gets hampered, thus breaking the *Dhatusnehaparampara*. This causes depletion or degradation of *Ojas*, thus the *Vyadhikhsamatwa* or immunity is affected at the cellular level. To reverse this pathogenesis, choice of appropriate *Amapachan* drugs or *Shaman* type of Medicine or in advanced stages expelling it out of the body by purificatory therapies is advocated. We know Angiogenesis, bypassing the Apoptosis and genetic mutation of the affected cells are some notorious features of Malignant lesions. This becomes possible only because of development of a Tumour facilitating micro environment at the site.

Through ***Agnidipana*** and promoting the ***Dhatwagni*** at this cellular level, the normal *Dhatuposhankrama* can be maintained and the cells we can have the necessary immunity to maintain their local Homeostasis. So accordingly, assessing the *Bala* of the patient ***Dipana*** drugs can be the second line of treatment in Cancer patients. If a patient has just finished chemotherapy, the body is still toxic. By performing ***Shodana***, we force the toxins deeper into the tissues. We must first perform ***Shamana***, or palliative measures. Chemotherapy and radiation therapy will cause ama in the body. The *Shamana* protocol will neutralise that ama before we move on to the main course of treatment, *Shodhana*, which could happen after three or six months, depending on *Prakriti*. People with *Kapha Prakriti* typically detox quickly, whereas *Pitta* and *Vata* take longer. Extensive Phytochemical based research and whole drug-based Research with classical drugs of ayurveda has been done worldwide in the last few decades for assessing their Anti- Cancer properties. The results of these researches are marvellous. Drugs for specific Cancers, tumour regression, symptomatic relief and even for addressing the side effects of Chemo-Radiotherapies are well documented today. ***Vyadhipratyanika Cikitsa*** with these formulations can prove to be more efficient and cost-effective alternative in today's scenario.

Cellular Immunoprotection has gained particular importance in recent days in Cancer management. Improvement of the Immunocompromised state is crucial for both treatment compliance and increased Quality of Life in advanced stage Cancer patients. An Immunomodulator id defined as "A biological or non-biological substance that directly influences a specific immune function or modifies one or more components of immunoregulatory network to achieve an indirect effect on specific immune function". In Ayurveda, ***Rasayana*** can be defined as the treatment, which arrests ageing, increases lifespan, intellectual power, and complexion. Tremendously promising results of Phytochemical based studies and whole plant studies are available today proving the efficacy of *Guduchi, Ashwagandha, Yasthimadhu, Amalaki, Bhallataka* on this matter. A very important action of Tinospora is that it inhibits Apoptosis of normal cells and induces Apoptosis of malignant cells. It also has an anti-complimentary activity by increasing IgG Antibodies & enhancing Humoral & Cell mediated immunity.

The way Forward-Developing translational integrative research programs in Ayurveda

Within India, centres for integrated Oncology need to be set up where Ayurvedic physicians get open hand with state-of-the-art in-patient and Panchakarma facilities. The mere existence of an AYUSH OPD or Panchakarma unit in a full-fledged Modern Medicine Cancer centre does not meet operational needs.

To build an international research program in Ayurveda, we need to build collaborations between open-minded expert researchers and practitioners from Ayurveda, conventional biomedical scientists, and bioinformatics experts to share ideas and develop a path for practical applications of this knowledge. Towards this point, collaborations between US and Indian scientists and Ayurvedic scholars and practitioners have been established. The goals are to provide education and explore potential research applications of Ayurveda with mainstream medical practices in US and India. Reciprocal efforts would encourage theories of Ayurveda to be presented in medical schools where physicians and biomedical researchers can learn principles and have hands-on training. As well, training could be available to Ayurvedic practitioners and clinicians for advanced research methodologies and to incorporate scientific rigor, reproducibility, and documentation into their studies. Consistency in training of Ayurvedic practitioners has been addressed in an effort by World Health Organization to develop standardized training guidelines.**[28]**

Intervention standardization is also a challenge for integrative oncology research. Integrative therapies are personalized to the individual. However, research typically involves a standardized intervention that can be tested across a diverse population so that the findings can be easily replicated, generalized to large patient groups, and ultimately implemented in a standardized manner. **[29]** However, such issues do not just affect the field of integrative oncology. For example, in the field of psychology, cognitive-behavioural interventions follow a specific manual that allows for structured delivery of intervention components based on responses of the individual. Careful development and pilot testing of treatments are needed before launching clinical trials to refine intervention components, optimize dose, frequency of delivery, and factors for individualization.

Novel research methodologies and whole systems approaches are needed to explore individualization of TCIM interventions. In addition, careful training of interventionists and frequent fidelity testing are needed to ensure treatment fidelity.

Summary

Cancer care with *Vyadhipratyanika Cikitsa* consisting of specific herbs acting on organ specific tumours is a great gain. Besides, the promotion of practice of a healthy lifestyle and proper diet plan can contribute greatly to prevention of the disease. *Rasayana* therapy, Yoga, Pranayama, *Abhyanga* and *Naisthiki Cikitsa* are used worldwide as a form of palliative care to alleviate the suffering of patients. With the recognition of Ayurveda in this field growing rapidly worldwide, further Research needs to be done mainly focusing to discover more specific 'hits' for the patient specific 'target' as per the individual's *Samprapti*.

Conclusion

Most of the time, the precise etiology of cancer is unknown. The Ayurvedic viewpoints on the onset, management, side effects, and supportive care of cancer show that knowing several viewpoints on complicated illnesses like cancer may yield insightful information. These data's associations between Ayurvedic and biological ideas in cancer offer an illustration of how traditional and contemporary treatment may communicate. In the age of integrated and global medicine, this discussion is especially crucial.

However, our current reductionist approach of Research might not give the desired results in this personalised multimodal treatment plan. When we try to derive one active component from an Ayurvedic formulation (composed of many herbs) or single herb (composed of numerous alkaloids) we tend to deviate from the very active principles of Ayurveda pharmacology.

The drugs as a whole tend to repair or replace the missing *Panchabhautik* Components in their respective sites of action, thus maintaining the harmony between the microcosm (the human body) and the macrocosm (the Nature). The vast Pharmacopoeia and Principles of Ayurveda now needs to be tested on light of modern scientific advancement through Systems Biology.

Such efforts can assist the development of paradigm shifting whole person health research approaches to find novel markers of health and disease that can provide new clinical targets to integrate into existing standard of care protocols. Besides Research on the Curative aspects, at present the incorporation of Diet Management, *Yoga*, *Pranayam* and *Sattwavajaya Cikitsa* (personalised counselling sessions to boost up the morale of the patient) must be made mandatory in all stages of Cancer care in India. On 22th January, 2018 our honourable Vice President on his speech at the Tata Memorial Centre, Mumbai noted the need to incorporate cost-effective indigenous traditions like Ayurveda in cancer care while emphasising the need to promote awareness among the public on the need to lead healthy lifestyles and avoid consumption of junk food. Adopting the spirit of this change in mind, we can prove the strength of Ayurveda in Cancer as we have done in many other chronic illnesses in the past.

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