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# Current management approach of Cancer in *Ayurveda*

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## ABSTRACT

*Ayurveda*, the oldest Indian indigenous medicine system of plant drugs is known from very early times for preventing or suppressing various tumors using these natural drugs. In *Ayurvedic* concept, according to *Charaka* and *Sushruta Samhitas*, Cancer is described as inflammatory or non-inflammatory swelling and mentioned either as *Granthi* (minor neoplasm) or *Arbuda* (major neoplasm). The nervous system (*Vata*), the venous system (*Pitta*) and the arterial system (*Kapha*) are three basics of *Ayurveda* and very important for normal body function. In malignant tumors all three systems get out of control (*Tridoshas*) and lose mutual coordination that causes tissue damage, resulting critical condition. *Tridoshas* cause excessive metabolic crisis resulting in proliferation. The modern cancer therapy which is known to be burdened by drug-induced toxic side effects hoping perfect cure of disease form the complementary and alternative medicine system. The main goal of *Ayurvedic* therapy is to find the ultimate cause of an illness while the therapeutic approach of *Ayurveda* is divided into four categories as *Prakrutisthapana Chikitsa* (health maintenance), *Rasayana Chikitsa*, (restoration of normal function), *Roganashani Chikitsa* (disease cure) and *Naishthiki Chikitsa* (spiritual approach). Commonly used herbal decoctions reported in *Ayurveda* are made of multiple herbs possessing great potential for a cancer cure; scientifically these formulations work on multiple biochemical pathways and influence different organ systems all together and nourish the body as a whole by supporting body's defence systems. Now it is important to raise awareness and encourage implementation of *Ayurvedic* therapies for combating cancer and suggest an integrated approach in tumor management and treatment.

**Key words:** *Ayurveda*, Cancer, *Granthi*, *Arbuda*, Herbal.

## INTRODUCTION

*Ayurveda* as it means in *Sanskrit* – *Ayus* (life) and *Veda* (knowledge) is often translated as science of life and is a 5000 years old system of Indian medicine. It emphasizes prevention of disease, rejuvenation of body systems and extension of lifespan. It has been successful from very early times in using these natural

drugs and preventing or suppressing various tumours using various lines of treatment.

A recent survey of the global incidence of cancer shows that the age adjusted cancer incidence in the united states is above 300 cases per 100,000 population, whereas that in Asian countries is less than 100 cases per 10,000. Also although the incidence of cancer of the prostate, lung, breast and colon is highest in western countries, it is lowest in Eastern countries.<sup>[1],[2],[3]</sup>

## CANCER - AYURVEDIC CONCEPT

*Charaka* and *Sushruta Samhitas*, two well-known *Ayurvedic* classics, describe cancer as inflammatory or non-inflammatory swelling and mention them as either *Granthi* (minor neoplasm) or *Arbuda* (major neoplasm).<sup>[4],[5]</sup> *Ayurvedic* literature defines three body-control systems, viz., the nervous system (*Vata* or air), the venous system (*Pitta* or fire), and the

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arterial system (*Kapha* or water) which mutually coordinate to perform the normal function of the body. In benign neoplasm (*Vataja*, *Pittaja* or *Kaphaja*) one or two of the three bodily systems are out of control and is not too harmful because the body is still trying to coordinate among these systems. Malignant tumours (*Tridosaja*) are very harmful because all the three major bodily systems lose mutual coordination and thus cannot prevent tissue damage, resulting in a deadly morbid condition.<sup>[5]</sup>

### Cancer - Ayurvedic classification

It depends on various clinical symptoms in relation to *Tridoshas*.

Group I: Diseases that can be named as clear malignancy, which includes *Arbuda* and *Granthi*, e.g. *Mamsarbuda* (melanoma) and *Raktarbuda* (leukaemia), *Mukharbuda* (oral cancer), etc.

Group II: Diseases that can be considered as cancer, such as incurable ulcers with e.g. *Tridosajulmas* (abdominal tumours like carcinomas of the stomach and liver or lymphomas).

Group III: Diseases with the possibility of malignancy, e.g. *Visarpa* (erysipelas), *Asadhya Kamala* (incurable jaundice) and *Nadivrana* (sinusitis).<sup>[6],[7]</sup>

### ETIOLOGY

*Acharya Sushrut* explained, the fundamental cause of major neoplasm is the pathogens that affect all parts of the body. He called the sixth layer of the skin as '*Rohini*,' (epithelium) and pathogenic injuries to this layer in muscular tissues and blood vessels caused by lifestyle errors, unhealthy foods, poor hygiene and bad habits results in the derangement of *Doshas*, which leads to the manifestation of tumours.<sup>[8]</sup> Excess of water or fat in the corpus of the tumour and the stability and rigid confinement of the *Doshas* in a particular place were described as reasons for the non-infectious and non-suppurative nature of these abnormal growths. Cancer in each person differs according to the person's exposure to pathogens and genetic constitutions which make each of them to react differently to the same diet. The factors

responsible for the vitiation of *Doshas* are discussed here.<sup>[9]</sup>

- Vata aggravating factors:** excessive intake of bitter, pungent, astringent, dry foods and stressful conditions.
- Pitta aggravating factors:** excessive intake of sour, salty, fried foods and excessive anger.
- Kapha aggravating factors:** excessive intake of sweet, oily food and sedentary nature.
- Rakta aggravating factors:** excessive intake of acid or alkali containing foods. Fried and roasted foods, alcoholic beverages, sour fruits are some examples. Excessive anger or severe emotional upset, sunbathing or working under scorching sun or near fire and hot conditions, etc. are some other causes.
- Mamsa aggravating factors:** excessive use of exudative foods like meat, fish, yoghurt, milk and cream. Behaviours leading to exudation like sleeping during the day and overeating are some of the causes for pathogens invading the fatty tissues.
- Medo aggravating factors:** excessive intake of oily foods, sweets, alcohol and lazy attitude.

### PATHOGENESIS OF TUMOURS

Pathogenesis in *Ayurveda* is explained on the basis of *Tridoshas*. *Agni* or *Pitta*, which is present in each and every cell, is responsible for digestion and metabolism in human body. The decrease in *agni* is inversely proportional to the related tissue and therefore in *Arbuda*, the decreased state of *Dhatwagni* (deranged metabolism) will result in excessive tissue growth. *Vata* can be correlated with the anabolic phase of growth whereas *Kapha* to the catabolic phase. Cancer originates due to a metabolic crisis, i.e. aggravation of *Vata* forces and suppression of *Kapha* forces, both interacting with one another resulting in proliferation. However, the abnormal cancerous growth at a specific organ (*Ekadesavridhi*) is managed by compensation from other parts of the body (*Anyasthaniyakshaya*), e.g. body weight loss (cachexia). *Sushruta* has

proposed six stages in the pathogenesis of all diseases but his concept suits more to the pathology of the tumour than pathogenesis itself.<sup>[9]</sup>

1. **Sanchaya:** early stages of localized neoplastic changes.
2. **Prakopa:** transformation of primary growths into metastatic tumours.
3. **Prasara:** metastasis.
4. **Sthanasamsraya:** complete metastasis and secondary growth.
5. **Vyakti:** clinical signs and symptoms are expressed.
6. **Bheda:** the stage where differentiation of growth occurs on the basis of histopathology

## DIAGNOSIS

A physical examination and medical history, especially the history of symptoms, are the first steps in diagnosing cancer. In many instances, the medical care giver will order a number of tests, most of which will be determined by the type of cancer and where it is suspected to be located in or on the person's body. In addition, most care givers will order a complete blood count, electrolyte levels and, in some cases, other blood studies that may give additional information (for example, a PSA or prostate specific antigen test may guide the care giver to do additional tests, such as a prostate biopsy).

Imaging studies are commonly used to help physicians detect abnormalities in the body that may be cancer. X-rays, CT and MRI scans, and ultrasound are common tools used to examine the body. Other tests such as endoscopy, which with variations in the equipment used, can allow visualization of tissues in the intestinal tract, throat, and bronchi that may be cancerous. In areas that cannot be well visualized (inside bones or some lymph nodes, for example), radionuclide scanning is often used.

The biopsy can provide more than the definitive diagnosis of cancer; it can identify the cancer type and the "stage" of the cancerous cells.

## TREATMENT IN AYURVEDA

*Ayurveda* is an intricate system of healing that originated in India thousands of years ago. Historical evidence of *Ayurveda* can be found in the ancient books of wisdom known as the *Vedas* that were written over 6000 years ago. *Ayurveda* provides novel approaches to cancer prevention that are considered safe.

Classical *Ayurvedic* texts have several references to cancer. Some terms used to describe the condition are general while others are much more specific.

*Charaka* and *Sushruta Samhita* (700 BC) both described the equivalent of cancer as *Granthi* (benign or minor neoplasm) and *Arbuda* (malignant or major neoplasm). Both can be inflammatory or non-inflammatory, based on the *Doshas* (*Vata*, *Pitta* and *Kapha*) involved. The term *Dosha* describes the three principles that govern the psychophysiological response and pathological changes in the body.

*Acharya Charaka*, described effective treatment for cancer, focusing on the principle of detoxification, rejuvenation. Treatment involves;

- *Shamana Chikitsa* (treatment using *Ayurvedic* medicines orally)
- *Shodhana Chikitsa* (detoxification through *Panchakarma* therapy)
- *Rasayana Chikitsa* (immunotherapy, rejuvenation or *Kayakalpa*)
- Diet and life style management
- *Satvavajaya* (counseling)
- *Daivavyapashraya Chikitsa* (divine therapy), *Yoga* and *Pranayama* are also suggested as per the need and condition of the patient.

Other methods of treatment include *Dhatwagni Chikitsa*, *Vyadhipratyanik Chikitsa* and *Lakshanic Chikitsa*.<sup>[10]</sup>

Cancer therapies are based on the philosophy of removal the cancerous cells when possible and destroy any cells that remain.

Our *Ayurvedic* treatments can be safely combined with chemotherapy and radiotherapy procedures to minimize the side effects. Even in surgical treatment, this treatment can be started immediately to prevent metastasis and further healing.

Early detection, early medical or surgical interventions are believed to be the key factors in combating cancer effectively. Similarly early stage *Ayurvedic* treatment as a co-therapy yields best possible results.

The *Ayurvedic* system of medicine was well founded on the basic principles of nature and its elements after a careful and thorough study of human physiology. This is the first system to emphasize health as the perfect state of physical, psychological, social and spiritual component of a human being. The therapeutic approach of *Ayurveda* has been divided into four categories as *Prakritisthapani Chikitsa* (health maintenance), *Roganashani Chikitsa* (disease cure), *Rasayana Chikitsa* (restoration of normal function) and *Naishthiki Chikitsa* (spiritual approach). Finding the cause of an illness is the basic goal of *Ayurvedic* therapy. It classifies disease development into six stages that include aggravation, accumulation, overflow, relocation, build-up in a new location and manifestation into a recognizable disease. *Ayurvedic* physicians can diagnose an illness at even initial stages of body imbalance and their therapeutic approach maintains a balance by supplying deficient substances as well as reducing the excessive ones. Surgery is considered only for advanced cases.

Herbal decoctions consisting of multiple herbs each possessing tremendous potential for a cancer cure are commonly used in *Ayurveda*. The benefit of an herbal decoction is that it can nourish the body as a whole by supporting various organ systems. Many of the herbs mentioned below have scientifically-proven anti-cancerous properties and are used for the treatment of various cancers.

#### *Andrographis paniculata*

The extract and isolated diterpenes (andrographiside and neoandrographolide) from this plant are proved to be beneficial against tumorigenesis by their anti-

lipoperoxidative action and by enhanced carcinogen detoxification action.<sup>[11],[12],[13],[14]</sup>

#### *Annonaatemoya/muricata*

Bullatacin, an acetogenin isolated from the fruit of *Annonaatemoya*, induces apoptosis, preceded by chromatin margination and tumour cells condensation.<sup>[15]</sup> Several other annonaceousacetogenins, e.g. muricins A–G, muricatetrocin A and B, longifolicin, corossolin and corossolone are also showed to be significantly selective in bringing in vitro cytotoxicities to tumour cells.<sup>[16]</sup>

#### *Phyllanthus niruri/amarus*

An aqueous extract of *P. amarus* increases the life span of the tumour bearing rats and normalizes glutamyl transpeptidase activity.<sup>[17]</sup> It plays a major role in disruption of HBsAg mRNA transcription and post-transcription which could be beneficial against viral carcinogenesis.<sup>[18]</sup>

#### *Piper longum*

Piperine, an active alkaloid extracted from this plant has been used as an ingredient of *Ayurvedic* anticancer formulations, because of its anti-oxidative potency in both in vitro and in vivo conditions.<sup>[19]</sup>

#### *Podophyllum hexandrum* Linn. (Podophyllin)

It is a powerful anticancer drug against various cancers for e.g. sarcomas, adenocarcinoma and melanoma. Podophyllin and its active principle, podophyllotoxin are known for their cytotoxic effect by virtue of their properties of mitotic inhibition, nuclear fragmentation, impaired spindle formation and they are also found to be karyoplastic. The mechanism of action has been suggested as necrosis and is a direct consequence of its cytotoxic effect on tumour tissues. These derivatives have been analysed in cancer chemotherapeutic studies and the methods of preparation of these compounds are patented. In recent days, chemically modified podophyllotoxins are widely used in cancer therapeutics. VP-16 (etoposide), a podophyllotoxin derivative has been tested against in vitro and in vivo cancer cells and been used against



hepatic cancers for more than a decade.<sup>[20]</sup> It has proved its efficacy in combination with epirubicin in phase II studies.<sup>[21,22]</sup> By this combination therapy at least 3% of the patients had complete cure and 36% had partial response. P-glycoprotein, a drug efflux pump, seems to be less effective in reducing VP-16 concentration in cancer cell lines and hence this drug proves to be more efficient in these cells.<sup>[23]</sup> It is also safe even above therapeutic dosage without much toxic effects.<sup>[24]</sup>

### *Tinospora cordifolia*

The active principles from *T. cordifolia* enhance host immune system by increasing immunoglobulin and blood leukocyte levels and by the stimulation of stem cell proliferation. It has the ability to reduce solid tumour volume by 58.8%, which is comparable to cyclophosphamide, a known chemotherapeutic agent.<sup>[25],[26],[27]</sup> These immuno stimulating properties can be used in the prevention of tumour mediated immuno suppression and hence could be a drug choice for various cancers.

### *Semecarpus anacardium*

In Ayurveda classics, numerous references are available on the anticancer properties of *Semecarpus anacardium* nuts.<sup>[28]</sup> An extensive review describes the phytochemical and pharmacological properties of *S. anacardium*. The chloroform extract of *S. anacardium*<sup>[29]</sup> nut possess antitumour action with increased life span against leukaemia, melanoma and glioma.<sup>[30],[31]</sup> The milk extract of *S. anacardium* produces regression of hepatocarcinoma by stimulating host immune system and normalizing tumour markers including alpha-fetoprotein levels.<sup>[32],[33]</sup> This preparation stabilizes the lysosomes and normalizes glycoprotein and mineral content in the body during cancer progression.<sup>[34],[35]</sup> It also corrects hypoglycaemia<sup>[36]</sup> and controls abnormal lipid peroxidation<sup>[37]</sup> by the maintenance of antioxidant defense status.<sup>[38]</sup> In the microsomes, it acts as a bifunctional inducer of both phase I and II biotransformation enzymes and prevents tumour initiation by preventing carcinogen activation.<sup>[39],[40]</sup> Histologically, on treatment with the *S. anacardium*

extract to hepatocarcinoma animals, the liver sections showed almost a normal architecture. The nodules become completely regressed and further cell necrosis was prevented.<sup>[41]</sup> Anacartin forte, another preparation from *S. anacardium* has been used for several decades as an anticancer drug since it is giving health improvement with alleviation or disappearance of troublesome symptoms. It provides clinical benefit with an extension of survival time in various cancers including oesophageal, chronic myeloid leukaemia, urinary bladder and liver cancer.<sup>[42]</sup> Another Ayurvedic drug containing *S. anacardium*, *Amurarahitaka*, *Glycyrrhiza glabra* and copper powder were reported to inhibit breast tumour development in mice by significantly extending the survival period. Ayurvedic herbs used in cancer therapy results not only in total healing, but also reduces the side effects and cancer associated complications. It also avoids the need for supplemental therapy to manage cancer cachexia. Each herbal product contains multiple active principles that may operate synergistically, producing therapeutic benefits and lowering the risks on adverse effects. The anorexia or weight loss could be effectively managed by *Withania somnifera*, *Sida cordifolia*, *Asparagus racemosus*, *Vitis vinifera*, *Plumbago zeylanica*, *Tinospora cordifolia*, *Zingiber officinale*, *Coptidis rhizoma*, etc. These herbs have been shown to improve appetite, food intake, malnutrition, fatigue and sensation of well-being which could elicit bodyweight gain. These herbs might stimulate the flow of digestive juices, there by improving digestion and increasing the appetite. *Aegle marmelos*, *Holarrhena antidysenterica*, *Punica granatum*, *Cyperus rotundus*, *Emblia officinalis*, and *Plumbago zeylanica* can be used as anti-diarrhoeals when diarrhoea becomes one of the complications of cancer cachexia. *Terminalia chebula* could be useful against chronic constipation and digestive disorders which are common in cancer patients resulting in loss of appetite. *Eclipta prostrata*, *Emblia officinalis*, *Withania somnifera*, *Piper longum* can be directed to correct nausea and vomiting. Among the above-mentioned herbs, *Withania somnifera* and *Tinospora cordifolia* are also proven to be powerful immuno stimulants, which could increase body resistance

power during cancer associated immuno suppression. Ayurvedic anticancer therapy includes recommendations for lifestyle and use of specific foods and herbs which are very helpful not only in preventing the progression of the disease but also makes the patients feel better and comfortable overcoming the symptoms. *Allium sativum* (garlic) could be helpful to manage pain and ache. *Bacopa monniera* strengthens mental faculties and helps to manage insomnia or sleeplessness due to stress.<sup>[43]</sup> An herbal combination of *Withania somnifera*, *Asparagus racemosus*, *Hydrocotyle asiatica*, *Nardostachys jatamansi*, *Elettaria cardamomum*, *Tribulus terrestris*, *Zingiber officinalis* and *Eclipta alba* could also be useful in the treatment of anxiety, tension and insomnia. *Ocimum sanctum* is beneficial against stress and depression during cancer. *Curcuma longa*, *Zingiber officinale*, *Glycyrrhiza glabra*, *Terminalia chebula*, *Ocimum sanctum* and *Adhatoda vasica* are used to control cough and shortness of breath especially for lung cancer patients.

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