

INTERVENTION OF PANCHAKARMA IN ONCOLOGY: A SCIENTIFIC EXPLANATION

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ABSTRACT

The **Cancer** is such a disease, which is very complicated in nature with complexity at every level at anatomy, physiology, biochemistry, molecular biology and gene expression. So, treating such disease is a big challenge.^[1] Cancer is one of the most dreadful disease of present century. Many efforts have been taken yet but success is still far, that's why terror of disease is bigger other than disease. Recent study shows that over seven lakh people died of cancer every year in India and mortality rate is higher in males than females.^[2] Integrative Oncology is an emerging field of cancer-care that has been gaining momentum over the past decade and Supported by growing scientific evidence,

clinicians are beginning to see benefits of natural approaches to cancer care with regards to improving quality of life, enhancing effectiveness of conventional therapy, as well as attaining and maintaining remission from cancer. Integrated approach of Cancer treatment is highly effective to improve quality of life and survival rate. *Ayurvedic* treatment with healthy diet, lifestyle modification and mind-body treatment are beneficial for Cancer patients to improve immunity. Rejuvenating treatment and *Panchakarma* treatment have proved to be effective in preventing recurrence and metastasis. Side effects of Radiotherapy and Chemotherapy are remarkably reduced with complimentary *Ayurvedic* treatment and Using meditation techniques namely *Yoga*, *Pranayam*, Sound Therapy, Acupuncture, Acupressure for Healing Stress.

KEYWORDS: *Panchakarma*, Oncology, Rejuvenation, Toxins, *Yoga*, *Pranayam* etc.

INTRODUCTION

In 2012, WHO released new statistic on cancer incidence, mortality and prevalence worldwide i.e., GLOBOCAN 2012 estimates for 28 types of cancer in 184 countries in which there is more prevalence of cervix and breast cancer. According to survey 8.2 million cancer deaths and 14.1 million new cases per year by 2025. More than half of the new cases of deaths occurred in less developed regions of the world.^[3] **Integrative Oncology** is an emerging field of cancer-care that has been gaining momentum over the past decade and Supported by growing scientific evidence, clinicians are beginning to see benefits of natural approaches to cancer care with regards to improving quality of life, enhancing effectiveness of conventional therapy, as well as attaining and maintaining remission from cancer. By their nature, cancer cells grow very rapidly, this is a function of the abnormal gene expressed by the cancer cells. Cancer cells also produce abnormal markers that are by-products of the rapidly growing cells. Each person must be treated individually, depending upon his or her cancer type, tumors markers, body type and genetic weakness. The conventional cancer treatment modalities surgery, Chemotherapy and radiotherapy are believed to be costly, mutilating with serious ill-effects and leading to residual morbidity and relapses. Integrated oncology is defined as both a science and philosophy that focus on the complexity of the health of cancer patients and propose a multitude of approach to accompany the conventional therapies of surgery, chemotherapy, molecular therapy and radiotherapy to facilitate health (Stephen Sagar). The integrated multitude approach for cancer should be aimed at adding days to the life of the patients and also life to the days they survive.^[4]

Cancer diagnosis in Ayurveda

Cancer is not directly mentioned in *Ayurvedic* text under one title and as a set of similar diseases as described in modern sciences. *Ayurvedic* classification of neoplasm depends on various clinical symptoms in relation to *Tridoshas*. Following diseases or conditions described in *Ayurveda* show similarity with cancer.

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. *tridosaj gulmas* (abdominal tumours like carcinomas of the stomach and liver or lymphomas), *Dushta Vrana*, *Dushta Vidradhi*.

Group III: Diseases with the possibility of malignancy, e.g. *Visarpa* (erysipelas), *asadhya kamala* (incurable jaundice) and *nadi vrana* (sinusitis)^[5,6]

Table 1: Classification of Cancer (Ayurvedic and Modern Classification).^[7,8]

On the basis of <i>Dosha</i>	On the basis of <i>Dhatu</i>	On the basis of Metastasis	According to site	According to Pathogenesis	On the basis of Treatment	Modern Classification
<i>Vataja</i> <i>Pittaja</i> <i>Kaphaja</i> <i>Tridoshaja</i>	<i>Raktarbuda</i> <i>Mamsarbuda</i> <i>Medojarbuda</i>	<i>Raktarubda</i> <i>Adhiarbuda</i> <i>Dviarbuda</i>	<i>Vartmarbuda</i> <i>Karnarbuda</i> <i>Nasarbuda</i> <i>Taluarbuda</i> <i>Galarbuda</i> <i>Mukharbuda</i> <i>Sira arbuda etc.</i>	<i>Naveen</i> <i>Jeeran</i>	<i>Sadhya</i> <i>Asadhya</i>	Benign Malignant

However, it should be noted that similarity between Ayurvedic and allopathic diagnosis and symptomatology is mentioned just for understanding and they are not exact translations of each other. While diagnosing a patient, from *Ayurvedic* point of view, who has undergone previous allopathic treatment such as surgery, chemotherapy or radiation and no visible tumor or growth is seen. **In Modern science** a physical examination and medical history, especially the history of symptoms, are the first steps in diagnosing cancer. In many instances, the medical caregiver 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 caregivers 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 caregiver 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.^[9]

Panchakarma

The words *Panchakarma* mean 'five actions' or 'five processes'. *Panchakarma* is a complete detoxification program that utilizes food, herbs, oils, simulative therapies to eliminate morbid or toxic matter from the elimination channels of the body, followed by rejuvenating therapies

that restore balance and health. The toxic burden of cellular environment is a reflection of the toxicity of our living environment, toxic components of our food, lifestyle, and our thoughts. These toxicities add up to generate abnormal cellular activity that may be expressed in the form of physiological imbalance, inflammation, and ultimately cancer. Cleansing the cellular micro-environment allows the natural healing mechanisms of the body to restore functional balance to the physiology of each cell.

Bio-purification is potential in emergency condition because only purgative drugs possess the property of immediate action. Bio-purification is also administered in Chronic Poisoning. In the current era also, human being is more exposed to acute and chronic poisoning, pesticide, chemical preservatives etc. so now also there is great need of bio-purification at least twice a year to purify the body from these harmful substances. It has now been scientifically shown that a natural purification treatment can successfully eliminate environmentally toxic substances such as polychlorinated biphenyl (PCB's) and pesticide from the body, without damaging side effects. A study of Institute of Science, Technology and Public Policy at Maharshi University of Management in Fairfield, Iowa in collaboration with a special laboratory at Colorado University demonstrated that classical *Panchakarma* treatment eliminates up to 50% of detectable toxins in the blood.^[10]

Aim of *Panchakarma* treatment

The *Dosha* that are pacified by *Sodhana* never recurs but those pacified by *Lnaghana*, *Pachana* etc. may occur.^[11] Aim of *Panchakarma* treatment is to cleanse & detoxify body, increase immunity & thus to restore health. In many Cancer patients, it helps to reduce sufferings, minimize side-effects of Chemotherapy & Radiotherapy. It also helps to prevent recurrence of Cancer. All disease occurs due to suppression and forceful expulsion of natural urges. *Panchakarma* is the best treatment for the diseases caused by suppression of natural urges (*Vega vidharna*). Suppression of natural urges affects gastrointestinal motility and continence of sphincters and later neuro-humoral control of glands. *Vatanuloman* is the prime line of treatment for diseases due to suppression of natural urges and *Basti* is best among *Vatanulomana* therapies.^[12]

Treatment Protocol of Cancer

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).^[13] Cancer is the second leading cause of death worldwide and chemotherapy is the commonly used treatment method. The dose-limiting toxicity and development of drug resistance hamper the treatment with chemotherapeutics in the clinic. Cancer patients, who are crippled with this disease and suffering from harmful side effects from chemotherapeutic drugs are turning back to natural remedies hoping for a better cure. Natural therapies such as Ayurveda, make use of plant-derived products in cancer treatment, which may reduce adverse side effects. This traditional Indian medicine of plant drugs has been successfully used in cancer treatment through various *Panchakarma* procedure from ancient time.^[14] Using different *Ayurvedic* Medication rich in anti-oxidants in the form of drinks to purify all the system of the body. Using meditation techniques namely *Yoga*, *Pranayam*, Sound therapy, Acupuncture, Acupressure for Healing Stress. *Sodhana chikitsa* (purification process), which eliminates vitiated *doshas*, have been primarily used for medical management of cancer. When both internal and external medications were given then it is called as *panchakarma chikitsa*. The other type of curative therapy is called *samana chikitsa*, which pacifies *dosha* and gradually relieves the disease. However, this treatment is prescribed only to weaker patients for whom *sodhana chikitsa* is contraindicated. In *Rasayana prayoga* (immunotherapy), certain poisonous plants, mercury like metals and animal products were rendered non-toxic and harmless by the use of alchemy and are used as rejuvenating drugs. Other methods of treatment include, *dhatwagni chikitsa* (correction of metabolic defects), *vyadhipratyanika chikitsa* (specific anti-cancerous drugs) and *lakshanika chikitsa* (symptomatic treatment).^[15] When medical treatment practices fail, then the case was left to surgeons. Surgical cancer management in *Ayurveda* include the principles of fomentation by means of external application, cleansing by internal medication, treatment to liquefy the contents of the swelling, opening the tumour surgically for evacuation of its contents, cauterisation to avoid recurrence and post-operative care for healing the wound.^[16]

Pre-procedures (*Purvakarma*)

Before the actual operation of purification begins, there is a need to prepare the body in prescribed methods to encourage the body to let go of the toxins. After *Deepana* (digestion of *Ama*), *Pachana* (separation of *Dosha* from *Dhatu*), *Snehan* and *Swedana* the *Dosha* should be expelled from nearest route at proper time according to the strength of *Roga* and *Rogi*.^[17] *Snehana* (Internal and external oleation) makes the body soft and disintegrates the toxins. Oil massage also makes the superficial and deep tissues soft and supple, thus helping to remove stress and to nourish the nervous system and other body tissues. *Snehana* is given daily for

three to seven days as indicated (plain or medicated). *Swedana* is sudation or sweating and is given every day, immediately following the *snehana*. An herbal concoction may be added to the steam to further loosen the toxins from the individual. *Swedana* liquifies the toxins and increases the movement of toxins into the gastrointestinal tract.

Main Procedure (*Pradhana Karma*)

Panchakarma is a type of *Shamshodhan Chikitsa*. It is not only activating the bodies self-healing ability but also calm the *Doshas* and *Gunas* including removing of aggravated *Doshas* and toxins from the body. In this body channels are cleansed and nourishment revitalization of *Dhatu*s is done with specific herbs according to causes, site and strength of patients (*Rog Avam Rogi Balanusara*). If a patient underwent chemotherapy and radiotherapy it is beneficial for both body and mind. After *Panchakarma* therapy *Rasayana* should be given prescribed along with immune-modulators and antioxidants (*Withania*, *Ginger*, *Podophyllum hexandra*, *Amla*, *Guduchi*, *Curcumin* etc.).^[18,19,20]

Table 2: (Classification of Main five Procedures According to their Appropriate conditions & Sites).

Sr. No.	Main Procedure ^[21]	Appropriate condition	Appropriate sites
1.	<i>Vamana</i> (Therapeutic emesis vomiting)	<i>Kapha</i> dominating symptoms in Cancer	CA of sites <i>Kapha Adhishthan</i> e.g. CA of Lung, CA of Breast etc.
2.	<i>Virechana</i> (Therapeutic purgation)	<i>Pitta</i> dominating symptoms in Cancer	CA of sites <i>Pitta Adhishthan</i> e.g. CA of Liver, CA of Pancreas etc.
3.	<i>Basti</i> (Medicated enema)	<i>Vata</i> dominating symptoms in Cancer	CA of sites <i>Vata Adhishthan</i> e.g. CA of Rectum, CA of Prostate etc.
4.	<i>Nasya</i> (Nasal medication to eliminate the <i>Doshas</i>)	<i>Kapha</i> and <i>Vata</i> dominating symptoms in Cancer	CA of sites above the level of clavicle e.g. CA of Brain
5.	<i>Raktamokshana</i> (Bloodletting)	Symptoms of aggravated <i>Pitta</i> and vitiated <i>Rakta</i> in Cancer	CA of blood dominating sites e.g. CA of Liver, CA of spleen etc.

Vamana Karma and its scientific explanation

Vamana is a process in which vitiated *Dosha* are expelled through the upper route. i.e., mouth. Chakrapani mentions that *Urdhavabhaga* should be considered as *Urdhvamukha*.^[22] *Vamana Karma* is not merely a gastric lavage as done now a day to empty the content of stomach, but it is a complete management of systemic and metabolic diseases caused by *kapha*. *Amashaya* is the seat of action of *Kapha*. The principle of *Vamana* drug taken orally is

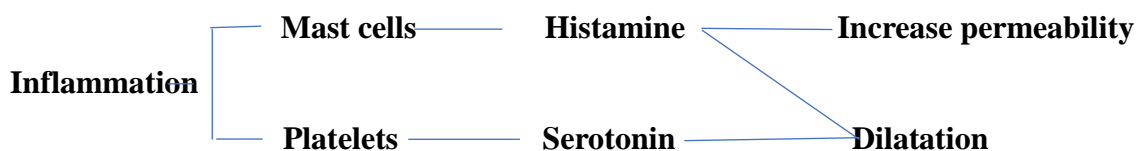
absorbed from the stomach into circulatory system, where from it is circulated to all over body. On reaching at the site of lesion (*Dodha Sanghata*), which is at the cellular level, it breaks the nexus of *Dosha* and brings back the toxic substance thus released into the stomach, where from they are expelled out the body by the action of *Vamana*. It is considered generally that the drug given orally cures the diseases originating from the stomach in better way, as it is the main seat of *Kapha*. Mild inflammation is essential for purificatory action. It is noticed that most of the drugs employed in *Vamana* have mild irritation effect and produced mild inflammation facilitates the quick absorption of the active principles (*Virya*) of the drug in the initial stage. Later on, it facilitates the excretion of the morbid matters, which generally are not supposed to be excreted out. It is possible only because inflammation increases the permeability of the capillaries, which in turn allow the absorption as well as excretion of the substances, which are not allowed in normal conditions. The softening (*Vishyandana*) action of the drugs may be understood from the example of fatty degeneration, the saturated molecules are chemically inert and do not respond to any chemical reaction. But the suitable catalytic agent is applied, then it will later on react to the other chemicals also to break them into smaller molecules. The smaller molecules thus formed can be driven out of the cell due to the normal function of the cell or by the action of drug thus the cell is freed from the harmful substance leading to the cure of the degeneration. The *Vamana* drugs are given in full stomach when the pyloric end of stomach remains closed and all the local activities of the *Vamana* drugs are limited to stomach only. As the drug have irritant action, so a mild inflammation of the stomach mucosa is produced. It will increase the permeability of the capillaries of the stomach, which in the beginning facilitate the absorption of the active principles of the drug and later on facilitates the excretion of the toxins and metabolites into the stomach where from they are thrown out of the body by the process of the *Vamana*.^[23]

Virechan karma and its scientific explanation

The process in which, the elimination of morbid humors occurs through the *Adhobhaga* is known as *Virechana*. Chakrapani while commenting on *Adhobhaga* clarifies it as the *Guda* (anal route).^[24] It is most widely used purificatory procedure especially for *Pattika* diseases because its simplicity, eliminating the *Dosha* in more quantity with less stress and having lesser complication compared to *Vamana*.^[25] In modern text while explaining laxatives said that they probably induce limited low-grade inflammation in the small and lower bowel to promote accumulation of water and electrolytes and stimulate intestinal motility. From the above view we can say that *Ayurvedic Shodhana* are mild irritant to the stomach and the

intestinal mucosa respectively, to cause inflammation. Due to this the permeability of the membrane changes and those substance come out due to changed permeability which cannot come out in normal condition. This medically produced mild inflammation facilitates quick absorption of the active principles (*Virya*) of the drug in initial stage. Later on, it facilitates the morbid matters, which generally are not supposed to be excreted out through the mucosa of the gut. It is possible only because inflammation increases the permeability of the capillaries, which in turn allow the absorption, as well as excretion of such substances which are not allowed in normal condition (Gurdip Singh, 2003). The gross signs of inflammation are redness, heat, swelling, pain and loss of functions. These signs occur due to following changes at microscopic level.

(i) **Hyperemia:** it occurs due to capillary dilatation and arteriolar dilatation mechanism.



➤ **Vasoactive polypeptides:** These causes vasodilatation.

(ii) **Exudation:** Exudation is increased passage of protein rich fluid through the vessel wall, in the intestinal tissue. The advantages result of fluid increases is dilution of toxins. Some chemical factors are also responsible which increases the permeability in response to acute inflammation. Some of above factors may be responsible for increase permeability of the intestinal mucosa, in response to inflammation caused by *Virechana Yoga*.

Following mechanism may be responsible for fluid accumulation and gastro intestinal motility in the lumen:

- Inhibition of Na^+ , K^+ cycle in crypt cell, hence increase the secretion of water and electrolytes.
- PAF a Phospholipid pro-inflammatory mediator and it produces significant stimulation of colonic secretion and gastro intestinal motility.
- Nitric Oxide (NO) also involved in stimulation of intestinal secretion via prostaglandin and cyclic-GMP- dependent mechanism, in addition, NO may inhibit segmenting contraction in the colon, promoting laxation.
- A variety of laxatives both osmotic and stimulant have been found increase the activity of NO synthesis and to increase the biosynthesis of PAF in the gut.^[26]

Basti Karma and its scientific explanation

Basti therapy is considered as *Chikitsardha* among all therapy and some physician recognize it as complete therapy because Basti has vast field of therapeutic action, *Shodhana* quickly and comfortably.^[27] It not only cure Vatika disorders but also Samsarga and Sannipata condition of *Dosha*, *Kaphaja* and *Pittaja* disorder, *Shakhagata* and *Koshthagata Roga* by combination of different types of Basti *Dravya*. As per the contemporary view, in last part of intestine, digestion occurs through bacterial action and no enzymes are secreted by colon. These beneficial bacteria or micro flora mainly resides in colon synthesize vitamin K, B and convert indigestible or partially digested saccharides (e.g. Lactose) into short chain fatty.^[28] It has been observed that, pectin is almost completely digested in the colon.^[29] Apart from this, Short chain fatty acids (SCFAs) formed by digestion intestine are absorbed by the colon. The current knowledge on colonic metabolism and absorption of medium-chain fatty acids (MCFAs) is limited. In a study it was found that colonic epithelium serves to absorb and partially metabolize MCFAs. For patients with a compromised small-bowel function, colonic absorption of MCFAs 50-70% could represent an important way of receiving calories.^[30] SCFAs also affect epithelial tissue and promote Calcium absorption from the large intestine in vitro. The enhancement of Ca transport induced by SCFAs might be absorbed from the paracellular transport mechanism.^[31] Elimination of the waste products of digestion and metabolism in the form of stool in the main function of colon. A large fraction of fecal mass is of non-dietary origin because substantial amounts of feces continue to pass during prolonged starvation (Harrison's Principles and Practice of Internal Medicine). It denotes the elimination of systemic waste product. Water moves in both direction across the mucous membrane of both small and large intestine until the osmotic pressure of the intestinal contents equal to that of plasma (William F. Ganong, Physiology). Colon normally absorbs 1-2 liters/day but is capable of absorbing almost 6 liters/day (Robbins, Physiology). Various nutritive end products are absorbed from the mucosa of gastrointestinal tract mainly through the Na⁺ channels and other ion channels (William F. Ganong, Physiology). The absorptive capacity of the mucosa of the large intestine is great, Na⁺ is actively transported out of the colon, and water follows the osmotic gradient thus generated (ibid). Although the rectum is not a usual site for absorption of indigested nutrients, drugs introduced by rectum may be absorbed there. Thus, drugs introduced by this route may have systemic effects as well as local effects (Harrison's Principles and Practice of Internal Medicine). Certain irritant and unpleasant drugs can be put into rectum as suppositories or retention enema for systemic effects (K.D. Tripathi, Pharmacology). Drugs absorbed into external hemorrhoidal veins

(above 50%) by passes liver but not that absorbed into internal hemorrhoidal veins (C.C. Chatterjee, Physiology). Colon mucosa under the effect of medication can be made to absorb the unusual substances also (Guyton, Physiology).^[32]

***Nasya karma* and its scientific explanation**

Nasya is the most important therapy as it is used for the treatment of *Urdhvajatrugata* diseases. The drug administered through nose as *Nasya* reaches the brain and eliminates only the morbid *Dosha* responsible for producing disease because nose is the gateway of head.^[33] *Nasya* not only beneficial for *Urdhvajatrugata Roga* but also for some systemic disease such as Cancer, *Kampvata Pumsvana* etc.^[34] The mode of action of the drug is a most complex phenomenon and at times it becomes difficult to pin point the therapeutic action in a very precise and scientific manner. According to basic principles of *Ayurvedic* Pharmacology, the drug can act by its *Prabhava*. Some of the hypothetical views given by research workers on the modus operandi of *Nasya* are mentioned as (i) through the general and specific blood circulation, (ii) through the lymphatic channels including CSF (iii) through the neuro-endocrinal and Neuro-vascular stimulations.

(i) Through the general and specific blood circulation: The absorption of drug material through the Nasal mucosa is a well-established fact. Now a day, many drugs including hormones can be administered through the nose for their effective therapeutic results. In this instance the drug is believed to have rapidly absorbed through the mucous membrane and enter to the general blood circulation of the body. But some comparative intravenous drug administration has also shown equal effect thereby creating a doubt regarding a different pharmacological pathway involved in the drug action. This includes the absorbed drug in to the facial vein through which the back flow of the blood occurs through the inferior Ophthalmic Vein and so the Venous sinuses of the brain.

(ii) Through the Lymphatic channels including the cerebrospinal fluid: The drugs delivered in to the nose can easily be absorbed through the mucous membrane particularly the lipid soluble substance can easily and rapidly be transported across the epithelial membrane eg. Tail *Dravya*, *Kshira* etc. These lipid soluble substances also gain in to the lymphoid tissue. Thus, a rapid circulation through the lymphatic channels is a positive phenomenon, on other hand, the extended arachnoid sleeve from the brain to the absorption of drug material directly to nose. It has been observed that the experimental administrations of the contraceptive hormones in the animals were found to be of higher concentration in the CSF and their concentration was equal with the intravenous infusion of the same drug.

(iii) **Through the neuro- endocrine and Neuro Vascular stimulation:** The stimulation of the

Olfactory system during the course of *Nasya Karma* is another possibility. The Olfactory nerve functions by mean of Chemoreception. The chemical characteristics of the practical that has reached to the nose will be identified by nerve which carries the stimuli to the Olfactory bulbs. Further, the massage will be carried out to the highest centres probably involving the hippo campus, limbic system, hypothalamus etc. Here, the drug absorption deeper in to the tissues will not be required. A brush border effect can mediate to the highest centres in the brain. The modus operandi of the *Nasya Karma* is also said to influence upon the neuro vascular functioning which may help in better drug availability to the brain.^[35]

Raktamokshana karma and its scientific explanation

Raktamokshana is a unique Para-surgical measure indicate in various disease where gross vitiation of *Rakta* is present. The *Siravedhya* is considered as the *Ardhachikitsa* (half treatment) in *Salya tantra*^[36], as the Basti is considered in *Kayachikitsa*. By *Siravedhya* alone all the disease will be cured from their roots, just like rice and other crops in the field dry out completely by removing the bunds of field.^[37] According to modern science *Raktamokshana* reduces the workload on liver and spleen, stimulates the liver and spleen to perform their normal functions, removes the damaged blood cells and helps in formation of new blood cells, reduce blood pressure so useful in malignant HTN. Reduced the viscosity of the blood and thus prevent the thrombus formation, so useful in DVT, thromboembolism, polycythemia etc. Reduced the volume of the blood and thus the pressure & workload on heart; in this way it is useful in CCF, Acute pericarditis, Pneumonia, Pulmonary edema etc.

Leech therapy: Leeches applied on skin, it sucks the blood at superficial level might be from capillaries or extra cellular so it may be more impure other than body channels, *Jaloka* can easily suck impure blood due to superficial distribution of veins. This action may be due to effect of saliva of Leech which containing enzymes like Hirudin which works as anticoagulant & diuretics, antibiotic action, Calin which prevents blood coagulation, Eglin, Hyaluronidase acts as antithrombin, antitrypsin and anti-chymotrypsin etc. Leech application has counter irritant effect on lesion, which creates new cellular division, which takes place removing dead cell layer and result in reduction of local swelling and lichenification. Leech sucks blood from restricted area and when leeches applied in only pathogenic area so it can be said that leech expelled blood from where the pathologic state more so ultimately blood of

that area comparatively more vitiated than other area. Following are probable of ways of action of Leech therapy-

- Normalization and improvement of capillary circulation, express anti-inflammatory effect.
- Anti-stress and adapto-genic effect, anticoagulant.
- Anti-bacterial effect, enhances wound healing, remove carcinogenic chemicals.
- Reduced the high blood pressure and blood viscosity.
- Anesthesia, immune stimulation and immunomodulating effect.
- Improvement of an intracellular exchange.^[38]

Post-procedures (*Pashchat Karma*)

Immediately after Panchakarma, Digestion Power (*Jatharagni*) becomes weak. To improve it slowly, the patient should follow special diet regime i.e. *Samsarjana Krama*. It lasts for 3 to 7 days. It contains-Thin rice gruel (*Peya*), Thick rice gruel (*Vilepi*), Plain bean soup (*Akruta Yusha*), Medicated bean soup (*Kruta Yusha*), Plain non-veg soup (*Akruta Mansarasa*), Medicated non-veg soup (*Kruta Mansarasa*). The general rule is that the aggravated *Doshas* should be eliminated by the nearer path in the body. Thus, a specific type of Panchakarma has to be done in specific type of Cancer under the guidance of experienced physician.^[39]

Chemicals stored in body fats

According to the International Journal of Cancer, the United States has the highest adult cancer rate in the world. Even though mortality rates due to cancer have fallen slightly due to decreased tobacco use and better treatment, cancer is now the second highest cause of death, and this is mostly attributable to environmental causes. The same is true throughout the developed world. A bone tumor, is a neoplastic growth of tissue in bone. Abnormal growths found in the bone can be either benign (noncancerous) or malignant (cancerous). Bone tumors may be classified as "primary tumors", which originate in bone or from bone-derived cells and tissues, and "secondary tumors" which originate in other sites and spread (metastasize) to the skeleton. Carcinomas of the prostate, breasts, lungs, thyroid, and kidneys are the carcinomas that most commonly metastasize to bone. Secondary malignant bone tumors are estimated to be 50 to 100 times as common as primary bone cancer.

Control of Growth of Tumor Mass and Metastasis

Using different Herbal and Mineral based Medication which works as immune-modulators to control tumor growth and metastasis. Using different anti-inflammatory herbs to control pain associated with tumor. Bringing body pH to 7.36 which becomes inhospitable environment for metastasis. Using enzymes which help dissolve the external layer of tumor making it vulnerable for immune cells and tumor necrosis factor. Using anti-angiogenesis agents which reduces the new blood vessel growth for tumor required for its growth. Using anti-mitotic herbal products to suppress the growth. Herbal decoctions consisting of various herbs with anticancer property are commonly used in Ayurveda. Many of the herbs used in Ayurveda have scientifically proven for their anticancer properties, e.g., *Andrographis paniculata*, *Annona atemoya/muricata*, *Phyllanthus niruri/amarus*, *Piper longum*, *Podophyllum hexandrum linn.*, *Tinospora cordifolia*, *Semecarpus anacardium* etc.^[40]

Rejuvenation

After long term use of medication, body losses its normal strength which can be brought back with help of *Rasayan Chikitsa* of Ayurveda. *Rasayana* therapy is one of the eight special branches of classical Ayurveda, designed to promote molecular nutrition in the body through provision of richer nutrients, enhanced digestive and metabolic activities, optimized microcirculation and tissue perfusion leading in turn to better qualities of cells and tissues. It includes supplementing the body with medication rich in essential amino-acids, minerals, vitamins, etc.^[41]

Palliative Therapy

Palliative therapy can be an option for patients that are specific to the sense of approaching death. These may include Psychological interventions (*Mantras japa*, Prayer), relaxation techniques, cognitive behavioural therapy (Pranayama, Dharna, Dhyana, Samadhi), Counselling, music, therapy, emotional support from parents and relatives. Palliative therapy can be prescribed like *Pranayama*, *Yoga*, *Dharna*, *Dhyana*, *Samadhi*, Meditation, Prayer and chanting of *Mantras*, nutritional diet plans and intervention along with psychotherapy and astrology.^[42]

CONCLUSION

Ayurveda Panchakarma therapy has the potential to solve a major world health problem. Integrated approach of Cancer treatment is highly effective to improve quality of life and survival rate. *Ayurvedic* treatment, healthy diet, lifestyle modification and mind-body

treatment are beneficial for Cancer patients to improve immunity. Rejuvenating treatment and Panchakarma treatment have proved to be effective in preventing recurrence and metastasis. Side effects of Radiotherapy and Chemotherapy are remarkably reduced with complimentary *Ayurvedic* Treatment.

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