



Review Article

REVIEW ARTICLE ON EFFECT OF *KSHARA* IN CANCER

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ABSTRACT

Cancer in nut shell is a disorder in cell metabolism. This review article ends by highlighting and discussing areas of future research by including chances and hopes of *Kshara* in cancer treatment. The articles reviewed in this article were published in year between 2024 and 2017 in journals like International Ayurvedic Medical Journal, Journal of Ayurveda and Integrated Medical Sciences and Indian Journal of Applied Research. Till on 21st century cancer is the deadliest challenged and most dangerous disease in the world. Even though there are so many drastic and excellent developments in medical and other field related to health, cancer is still remains as an unresolved puzzle. The new food habits, stress environment, new lifestyle, environmental factors all contribute to these deadly diseases. To fight against this deadly disease all the medical systems should unite, i.e., an integral approach is needed. If any patient who is not fit for doing chemotherapy or radiation the integrated approach will surely help. Not only during treatment post treatment phase is also important. The palliative or rehabilitation phase help the patient to regain immunity and health.

INTRODUCTION

Looking into *Kshara karma* its *Ksharana* quality has got *Chedana*, *Bhedana* effects^[1] which can act against excessively overgrown cells i.e., cancer cells. The plant *Apamarga* is well known for its medicinal properties. It has *Katu* and *Kashaya rasa Ushna* property, *Katu vipaka*, balances *Vata kapha*^[2]. Like *Apamarga*, *Snuhi* also have many *Gunas* that make *Snuhi* responsible for its pharmacological activities like *Katu rasa*, *Katu vipaka*, *Ushna virya*, *Laghu-Teekshna guna Kapha vata hara*, *Vedhanasthapaka*, *Lekhana*, *Tikshna virechaka*, *Rakthasodhaka*, *Shothahara*, *Kaphanissaraka* and *Twakdosahara karma*^[3].

Uncontrolled cell growth and division lead to cancer. Its pathophysiology involve multiple complex processes. Over all it is a result of combination of genetic and epigenic changes that destroy normal cellular process which further leads to uncontrolled growth, Metastasis and Invasion of cancer cells.

Coming to Genetic Mutations

The mutation in DNA of non-cancerous can be inherited or caused by cancerous cells environmental Factors like UV radiation, chemicals, smoking, food Substances etc., and gradually affect genes that regulates cell growth, division and apoptosis. And these mutations lead to oncogenes which over active i.e., expressed beyond limits. Next is the tumour Suppressor genes which promote apoptosis become minimally expressed.

The other factor is cell cycle. The changes in all cycle is mainly due to cyclins and cyclin dependent kinase There proteins regulate the progression of cell cycle through cell cycle^[4]. Mutation will lead to excessive cell division. Along with cyclin dependent kinase tumour suppressor gene like P53 also involved^[5].

Beyond evading apoptosis cancer cells have sustained angiogenesis. Cancer cells can Stimulate the growth of new blood vessels by releasing factors like VEGF i.e., vascular endothelial growth factor, which is a key mediator of angiogenesis. These ensures adequate supply of oxygen and nutrients to the tumour.

The most dangerous property of cancer cell is the invasion and metastasis. This properly involve the disruption of extra cellular of MMPs- Matrix

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metalloproteinases, then migrate through blood vessels and establish second degree tumors in distant places or tumors^[6].

Last but not least the Warburg effect which refers to a phenomenon where cancer cells preferentially produce energy through glycolysis which convert glucose to lactate rather than through oxidative phosphorylation which is used by more efficient and normal cells, even in the presence of sufficient oxygen^[7].

German biochemist Otto Warburg observed this in 1920s, Oxidative phosphorylation takes place in mitochondria producing more ATP in normal cell when oxygen is available. But in cancer cells due to glycolysis the lactate production increased which is a hall mark in cancer metabolism. Due to Warburg effect cancer cells get several advantages like Increased biosynthesis, acidic environment and adaptation to low oxygen^[8].

Understanding the Warburg effect has influenced cancer research, particularly in the research for targeted therapies which can interfere with cancer metabolism to stop or slow its growth.

In Ayurveda Acharya Susruta discusses detailed about various treatment modalities using Yantra, Sashtra and Anusastras. Kshara, Agni, Jalouka which come under Anusastra are extensively detailed by Acharyas. Kshara is categorized into two types Paneeya and Pratisaraneeya which again divided into three - Mridu madhyama and Teekshna^[9]. Kshara can be a multiple combination of many herbs or may be from a single herb. Kshara has different formulations which can be used both internally and externally. Internally can be used in the forms like Kshara gutika, Vati, Avaleha, and Ghritha. Externally as Kshara pichu, Kshara sutra, Kshara plotha, Kshara varthi. It is a caustic chemical nature is alkaline and obtained from ashes of a single or multiple plant. It is known as Kshara due to its Ksharana property i.e., the power of Kshara to destroy the tissues or muscle. Thus, Kshara karma has been considered as a strong weapon in Ayurvedic pharmacopeia.

Documented Articles on Kshara Therapy and Cancer

Teekshna Pratisaraneeya Apamarga Kshara in Oral Mucocoele^[10]

The plant Apamarga, *Achyranthes Aspera* is well known for its medicinal properties. It has Katu and Kashaya rasa Ushna property, Katu vipaka, balances Vata kapha. Prathisaraneeya kshara has indications in treating different conditions like Kushta, Kitibha, Dadru, Mandala, Kilasa, Bhagandara, Arsha, Arbuda, Dushtavrana, Nadi, Charmakeela, Tilakalaka, Nyachha, Vyanga, Mashaka, Baahya vidradhi, Krimi, Visha, Sapta mukha rogas. Due to its Lekhana and Chedana property it has the ability to scrape or remove

unhealthy tissue, eliminate necrotic tissue and facilitate healthy granulation.

It was a clinical study with 30 subjects who are having oral mucocoele along with pre and post-test design and the intervention done is Kshara karma with Teekshna pratisaraneeya apamarga kshara which is prepared according to classical method. Mucocoeles are the most common variety of lesions which is benign, found in oral cavity. These lesions are developed as a result of retention or extravasation of mucus from minor salivary glands. They are generally not painful, it is smooth, round or oval swellings containing fluid which is translucent and fluctuate. The assessment is done using Friedman test, size of swelling and colour of swelling.

They correlate oral mucocoele with Kshataja oshta or Jalarbudha where Kshara pratisarana is one among the treatments.

Patient experienced gradual sloughing off and healed with epithelization. Due to Ksharas ushna, Teekshna, Anu and Sukhanirvapy gunas it goes deep in tissues. And it causes Vilayana of Kapha, Anulomana of Vata and Pachana of Mamsa and Medas which further leads to Bhedana, Chedana, Lekhana followed by Ropana of the wound that formed after Kshara application. The alkalinity of Pratisaraneeya kshara (>12 pH) will lead to liquefaction necrosis of surface epithelium and sub mucosa, creates saponification and liquefaction of proteins enabling deep penetration and target tissue damage leaving soft brownish black gelatinous eschar which sloughs off gradually with simultaneous or early epithelization. Aside from burning sensation during treatment there is no other discomfort to patient during and after the treatment. The results were both statistically and clinically significant with no side effects or complication and they concluded that Teekshna pratisaraneeya apamarga have a significant, effective role in the management of oral mucocoele.

In Vivo Anticancer Activity of Snuhi Kshara Against 1,2- Dimethylhydrazine Induced Colon Cancer^[11]

The colorectal cancer which is characterized by uncontrolled growth by abnormal cells in colorectal area. The Snuhi plant *Euphorbia nerifolia* Linn is one among the major Upavisha. There are so many Gunas that make Snuhi responsible for its pharmacological activities like Katu rasa, Katu vipaka, Ushna virya, Laghu-Teekshna guna Kapha vata hara, Vedhanasthapaka, Lekhana, Tikshna virechaka, Rakthasodhaka, Shothahara, Kaphanissaraka and Twakdosahara karma. Snuhi extracts and isolated flavonoids possess anti-cancer activity which makes Snuhi and its formulations towards the use as an anticancer drug.

It is an in vivo study carried out in Crystal Biological Solutions Limited, Pune, according to

CPCSEA in 30 female Wistar Albino Rats and were randomized and allocated into five groups with six animals. The assessment parameters were body weight, colon length and weight and Aberrant crypt foci along with histopathological and haemetological examinations. In this study they concluded that *Snuhi kshara* possess anti cancerous activity against DMH induced colon cancer under the evidences obtained in reversal of altered total colon length, body weight proximal and distal colon ACF count and histopathological findings.

Efficacy of *Apamarga Kshara* in Cervical Cancer Cell Lines^[12]

Among women the most common cancer after breast cancer is cervical cancer in India. *Apamarga* (*Achyranthes aspera*) is a common tropical weed found in abundance. It contains *Kshara* as a main active principle. It has *Katu* and *Kashaya rasa Ushna* property, *Katu vipaka*, balances *Vata kapha*. The *Kshara* which have *Ksharana* quality has got *Chedana bhedana* effects which can destroy or desiccate the malignant cells.

This is an invitro study carried out in HeLa and SiHa cell lines which were procured from NCCS Pune. The aims and objectives were to prepare *Pratisaraneeeya Apamarga kshara* as mentioned in *Sharangadhara samhita*, and to evaluate the efficacy of *Apamarga kshara* in cervical cancer cell lines. The result was over all in between the two cell lines SiHa at 48 hrs incubation with respect to different concentrations of *Apamarga kshara* showed maximum cell death compared HeLa cell lines. In SiHa cell line 50% cell death occurred at the concentration of 20 micro gm/ml. The observation of this experimental study has shown mild effect of *Apamarga kshara* on HeLa cell lines and moderate effect of *Apamarga kshara* in SiHa cervical cancer cell lines.

DISCUSSION

According to an article named cancer - An Ayurvedic Understanding published in JAISMS in 2023. When coming to cancer and Ayurveda we can correlate cancer to so many conditions that described in classic texts of Ayurveda. Generally, cancer which clinically represent as a growth in anywhere in the body which is palpable on or under the skin can be correlated to *Granthi* or *Arbuda*.

The metastasis property of cancer can be correlated to the *Visarpa* nature of *Granthi visarpa* and *Sannipatika visarpa*.

Cancer is a metabolic problem that cause in cellular level. In Ayurveda the metabolism is carried by *Samana vayu* near *Pachakagni* in both tissue level and cellular level. Due to any disturbance occur to the normal functioning of *Samana vayu* at cellular level the waste products got accumulated and will cause *Sroto dushti* and result in abnormal growth of cells and thereby result in any type of growth.

It is very logical to think about *Mamsavaha srotodushti* if there is any gland, tumour or abnormal swelling. From *Charaka Samhitha sutrasthana* 28th chapter.

शृणु मांसप्रदोषजान्॥१३॥

अधिमांसार्बुदं कीलं गलशालूकशुण्डिके।

पूतिमांसालजीगण्डगण्डमालोपजिह्विकाः॥१४॥

विद्यान्मांसाश्रयान्॥१५॥

According to concept of *Samanya vishesha sidhantha* carcinogenic substances cause cancer, now a days all food substances contain hormone injections for early ripening and preservation. Consuming food with these qualities may increase the speed of abnormal cell growth in human body

According to *Sushruta Kshara* which is an inevitable part of *Shalyatantra* which holds a great place due to its potency and qualities like *Pachana*, *Bhedana*, *Vilayana*, *Chedana*, *Tridoshagna*, *Lekhana*, *Sodhana*, *Ropana*, *Stambana*, destroys *Krimi*, *Aama*, *Kapha Kushta*, *Visha* and *Meda*. In the area of oncology Ayurveda could do miracles in prevention, anti-cancerous therapy, palliative care, rehabilitation, adjuvant to chemotherapy and improving quality of life. Further experimental and clinical studies with a broad spectrum are required to know the exact mechanisms of *Kshara* therapy in cancer treatment.

CONCLUSION

Among *Sastra* and *Anusastra Kshara* is the best and also mentioned as one of the *shashtirupakrama* for wound management. Due to its properties, it is having a great result in cases like internal and external haemorrhoids, fistula in ano, pilonidal sinus, warts and wound. As the growth of cancer involve muscle tissues the treatment of *Mamsavaha srotodushti* can be applied i.e., *Shastra kshara agni karma*. To avoid other complications like metastasis, lethargy and as a palliative measurement along with *Kshara karma* treatments like *Grithapana*, *Virechana*, *Raktha mokshsana* and *Vasti* can also be done. All these cited articles the proven evidence for the action of *Kshara* in cancer.

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