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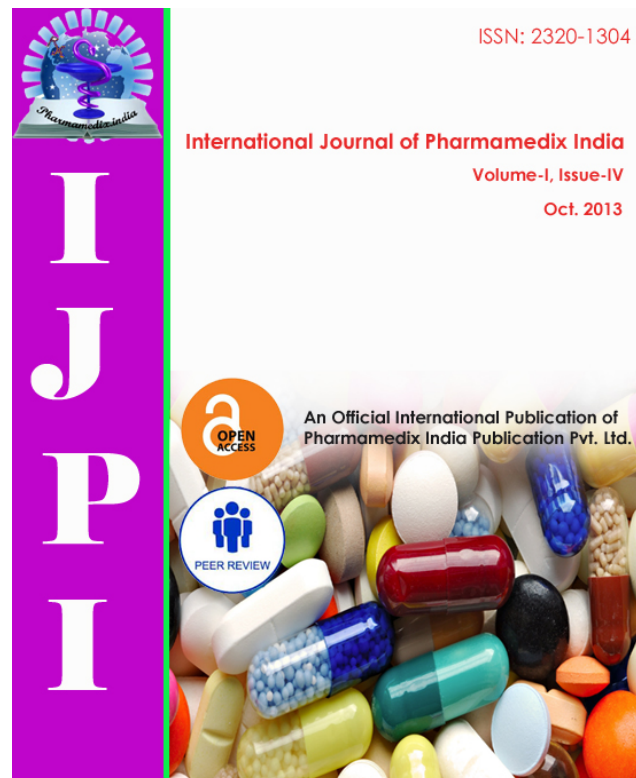
“Cancer (*Sartan*) and Its Management in *Unani* (Greco-Arab) System of Medicine.”

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Abstract:

Cancer patients are specially exploring the use of complementary and alternative medicine, because of the high risk of mortality and long-term morbidity associated with surgical procedures of cancer management and high side effects of chemotherapy. *Sartan* is an *arabic* word which means crab (cancer). According to *Unani* (Greco-Arab) medicine *sartan* is essentially disease of black bile (*sauda*) i.e. excessive production and collection of *sauda*. *Sartan* mostly occurs in soft tissues (*Az'ae Ratab*) like breast, uterus, stomach, intestine, pancreas, prostate, oral cavity & lungs etc. According to Ibn Sina *sartan* is a tumor arising from “burning” of *sauda* humor, by burning it is meant that the increase of innate heat, it become pathological. The Unani philosophy is that; cancer is end stage of the degeneration of metabolic efficiency of the body, the extinguishing of the innate heat brought on primarily by incorrect diet and other imbalances in various aspect of patient's life usually occurring over a period of time. So, the principle of management of *sartan* described in unani medicine is totally emphasized upon to prevent the collection of *sauda* with the help of *venesection* (*fas'd*), use of *melanagogue* drugs like *Cuscuta reflexa*, *Citrullus colocynthis* and non irritative moderate resolvent drugs along with some dietary regimen like *nabeez*(arisht), *kashkusshaeer* (easily digestible food), *maul jubn*(cow's churned milk), strained vegetables(*bathwa*, *kaddu*) and squash(*Kasni*, *chola*) etc.

Keyword: *Sartan*, Cancer, Natural compounds, Traditional Medicine, Unani Medicine.

Introduction

The knowledge of *Sartan* (cancer) in the Unani (Greco-Arabian) systems of medicine can be traced to ancient times (131-200 A.D.). Cancer is hyperproliferative disorder that involves transformation, dysregulation of apoptosis, proliferation, invasion, angiogenesis and metastasis. ^[1] Millions of people die every year with different types of

cancer such as lung cancer and mesothelioma from inhaling asbestos fibers and tobacco smoke, or leukemia from exposure to benzene at their workplaces. In the developing countries, cancer rank third as a cause of death and accounts for 9.5 % (3.8 million) all of the death. *Sartan* all forms are causing about 12 % of the death throughout the world. In the developed countries, cancer is the

second leading cause of death accounting 21 % (2.5 million) of all mortality.^[2] In the last century, great advances were made in modern medical system in cure and prevent of this disease. However, success rates are very low.

Types of cancer Described in Unani Medicine:

According to *Rhazes* (Zakaria Rhazi) in his book *Kitab Al-Mansoori* he describes *Sartan* as *marz-e-muhlik* (fatal disease). While remaining faithful to Hippocrates's humoral theory, Galen extended Hippocrates' definitions of cancer and classified tumours into three major types, (i) *Onkoi* (lumps or masses) (ii) *Karkinomas* (non-ulcerating) cancers & (iii) *Karkinos* (malignant ulcers).^[3, 4]

Etiology & pathogenesis of Sartan (Cancer):

It is known fact that the majority of the malignant tumor occurs in incessantly renewing tissues. In *sartan*, swelling is an appearance of this black bile matter boiling at its junction with the organ. Cancerous tumor also sends out crab like track and there is a tendency towards blackness, green and heat. Ibn Sina quotes that *sartan* occurs mostly in hollow organs and that is why it is more frequent in women. It is also common in the nerves, muscles, tendon and lymph.^[5]

It is important to remember that the modern concept of cancer is very different from the ancient one: the word cancer derives from the father of medicine, Hippocrates, who used the

Greek word *Karkinos* to describe tumours, but the history of cancer actually begins much earlier. It is difficult to identify the diagnosis of cancer in ancient texts, just from the literary description. The cause and development of cancer are multifactorial i.e. excess production and abnormal changes occur in *sauda*. There are five types of abnormal changes occurs in *sauda*- excess production of normal *sauda*, burning of normal *sauda* in to abnormal *sauda*, formation of *sauda* due to burning of blood, formation of *sauda* due to burning of phlegm and formation of *sauda* due to burning of *saфра* (bile).^[6] Tobacco and alcohol consumption, few occupation, environmental exposure to carcinogen, genetic factor, radiation, viruses etc. play key role. However, the exact reason and process of cancer formation & metastasis spread is not clearly understood even today.

Unani principle for the management of Cancer (Sartan):

On the basis of Unani system of medicine, firstly regaining the humoral balances by giving purgatives, laxatives, bloodletting, emetics, diuretics and enemas were employed to rid the body of excess and morbid humors. Preventive aspects in the form of advice on how to get a balanced diet and get adequate exercise were common place. *Unani* physicians also recognized the natural healing process as critical in achieving best possible health. Diseases were themselves natural and

it was the physician's job to help nature to heal, ^[7] *Unani* physicians recommended following *usool-e-ilaj* (Principle of treatment) in given successive steps:

1. Venesection (*fas'd*) in *vareede akhal* (Median Cuboidal Vein).^[8]
2. Evacuation of morbid humor from the body (*tanqiyae mawad*) with the help of *munzijate sauda* (concoction of black bile) & *mushilate sauda* (purgation of black bile). Drugs use as *munzijate sauda* are- Bisfaij (*Polypodium vulgare*), Ustukhuddus (*Lavendula stoechas*), Parshiyonshan (*Adiantum capillus*), Gaozaban (*Borago officinalis*), Badrajboya (*Mellisa officinalis*), Aslussus (*Glycerrhiza glabra*), Badyan (*Foeniculum vulgare*), Unnab (*Zizphus sativa*), Shahtara (*Fumaria officinalis*), Sapistan (*Cordia latifolia*).^[6,9] Drugs for *mushilate sauda* are- Aftimoon (*Cuscuta reflexa*), Shahamhanzal (*Citrullus colocynthis*), Elva (*Eloe barbadensis*), Halela Siyah (*Terminalia chebula*), Turbud (*Ipomea turpethum*), Badranjboya (*Mellisa officinalis*), Barge Sena (*Cassia angustifolia*), Ghariqoon (*Agaricus alba*), with *shikanjabeen* & *maul asl* (honey water),^[1 5,6] Non-irritative neutral resolvent (*Moatadil mohallilat*) like- Kasni (*Chicorium intybus*), Marzanjosh (*Oliganum vulgare*), Baranjasif

(*Artemesia vulgare*), Baboona (*Matricaria chammomilla*).

3. Dietary regimen- Diet should be *jaiyyadul kaimus, ghizae latif* & reduce the excess productin & accumulation of *sauda* and also made to cool and refresh the body, like- Kaddu (*Cucurbita maxima*) acts as anticancer activity, ^[10] Khurfa (*Portulacca oleracea*), Cholai (*Amaranthus polygamus*), Bathua (*Chenopodium album*), Kheera (*Cucumis sativus*), Qisa (*Cucumis melo*), Maul Jubn (Cow's churned milk), Maus-Shaeer (water of *Hordeum vulgare*), Nabeez (Arisht).^[5,11]
4. Pain associated with cancer can also controlled with oral administration of ash of *tootiya* (Copper sulphate) mixed with milk. ^[11]
5. Local medication for cancer- Ibn Sina describe in his book *Al-Qanoon*, there are four purpose to such treatment; (i) total arrest of the cancer (ii) preventing its progress (iii) preventing ulceration & (iv) treatment of ulceration. For the healing purpose for the ulcer *Unani* physician recommended zinc oxide mixed with essential oil of rose and other flowers and also mentioned "*Marhame Aksheer*." ^[5,8,11,12,13]
6. An illustrative description of one such cancer treatment is included in one of Galen's texts: "*If you attempt to cure*

cancer by surgery, begin by cleaning out the melancholic tumour by cathartics. Make accurate incisions surrounding the whole tumour so as not to leave a single root. Let the blood flow and do not check it at once, but make pressure on the surrounding veins, so as to squeeze out the thick blood. Then treat as in other wounds.
[14]

Aim and objectives:

Herbs and minerals are considered as main source of drugs since centuries in Indian System of medicine especially *Unani* and *Ayurveda*. Most of the available drugs today we have, taken directly or indirectly from plant and minerals. The continuous research in the search of natural source as medicine reveals that large numbers of plants possess anti-cancerous activities. Among all of them, Aftimoon (*Cuscuta reflexa*), Haldi (*Curcuma longa*), Asgandh (*Withania somnifera*), Sadabahar (*Vicea rosea*), Tahlab (*Arthrospira maxima*), Kalonji (*Nigella sativa*), Methi (*Trigonella foenum*), Halela (*Terminallia bellerica*), Balela (*Terminalia chebula*), Amla (*Embellica officinalis*), Elva (*Aloe vera*) etc., are of great importance.

The aim of this review is to collect the data on plants having anti-cancerous activity has also been validated by pharmacological studies; which already indicated in *unani*

system of medicine for the management of *Sartan*. These are:

Aftimoon (*Cuscuta reflexa*);

The chloroform and ethanol extract of *C. reflexa* possess significant antitumor activity and increased the life span of tumor bearing mice.^[15,16,17] Bangladesh uses as the folk medicine to cure tumours,^[18] hypoglycemic effect,^[19] antimicrobial activity,^[20] antibacterial activity,^[21] anti-steroidogenic activity,^[22] anti-epileptic activity.^[23] Phytochemical investigation of *Cuscuta reflexa* indicates the presence of kaempferol-3-O-glucoside, astragallin,^[24] myrecetin, benzopyrones,^[25] glucopyranosides,^[26] propenamide, flavonols,^[27] quercetin and quercetin-3-O-glucoside, β -sitosterol, and bergenin,^[28] Swarnalin and cis-swarnalin are two new tetrahydrofuran derivatives with free radical scavenging activity, from the aerial parts of *C. Reflexa*^[29] crude water extracts of *C. reflexa* shows anti-HIV activity and methanol extract of *C. reflexa* shows anti-bacterial and free radical scavenging activity.^[30]

Kalonji (*Nigella sativa*);

For thousands of year, the seeds, oils, extracts and whole plant as a whole of. *Kalonji* (*Nigella sativa*) have been used as an anticancer agent by *Unani*, *Ayurveda* and the Chinese system of medicine that have originated from the Arab, India, Bangladesh

and China, respectively.^[31] Seeds of *N. sativa* contain both fixed and essential oils, proteins, alkaloids and saponin,^[32] described the quantification of four pharmacologically important components: thymoquinone, dithymoquinone, thymohydroquinone and thymolin the oil of *N. sativa* seed by HPLC. Much of the biological activities of the seeds have been shown to be due to thymoquinone, the major component of the essential oil, which is also present in the fixed oil,^[31] Alpha (α)-hederin, a pentacyclic triterpene saponin isolated from the seeds of *N. sativa*, was also reported to have potent *in vivo* antitumor activity.^[33,34,35,36] Thymoquinone is a relatively safe compound, particularly when given orally to experimental animals.^[37]

¹Thymoquinone exhibits anti-proliferative effect in human myeloblastic leukemia HL-60 cells.^[38] Aqueous and alcohol extracts of *N. sativa* were found to be effective *in vitro* in inactivating MCF-7 breast cancer cells.^[39] Anti-neoplastic and pro-apoptotic against colon cancer cell line HCT116.^[40] ¹The cytotoxic activity of *N. sativa* seed was tested on the human hepatoma HepG2 cell line,^[41] anti-cervical cancer,^[42] anti-prostate cancer,^[43] anti-renal cancer,^[44] anti-skin Skin cancer etc.^[45]

Methi (*Trigonella foenum graecum*);

The main chemical constituents of *T. foenum graecum* are fibers, flavonoids, polysaccharides and saponins.^[46,47] Many phytochemical studies on constituents of the

methi seeds have been reported,^[48] flavonoids and catechins were first shown to be apoptotic in human carcinoma cells.^[49] Similar observation has since been extended to lung tumor cell lines,^[50] colon cancer cells, breast cancer cells, prostate cancer cells,^[51,52] stomach cancer cells,^[53] brain tumor cells,^[54] head and neck squamous carcinoma,^[55] and cervical cancer cells.^[56] Genistein, quercetin, rutin, and other food flavonoids have been shown to inhibit carcinogenesis in animal models.^[57] They all induce apoptosis in tumour cells,^[58,59,60,61] hypoglycaemic activity,^[62,63] antioxidant effects,^[64,65,66,67] cholesterol-reducing effect,^[68] immunomodulatory effects etc.^[69]

Haldi (*Curcuma longa*);

Curcumin has been studied in multiple human carcinomas including melanoma, head and neck, breast, colon, pancreatic, prostate and ovarian cancers,^[70,71] ethanolic extract of *C. longa* (curcumin) acts as anticancer activity against the cell line of human hepato cellular liver carcinoma,^[72,73] anti-inflammatory agent inhibits the proliferation of several tumor cells,^[74] anti clastogenic,^[75] anti-cancer potential,^[76,77,78] anti-oxidant activities,^[79,80] anti-inflammatory activity.^[81,82] Curcumin enhances wound healing,^[83] hepatoprotective effect.^[84,85] Curcumin is one of the most studied chemo-preventive agents. It is a natural compound extracted from the rhizome of *Curcuma longa* L. that allows suppression,

retardation or inversion of carcinogenesis. Curcumin has also been shown to possess anti-tumour activity in a variety of in-vitro tumour models (cell lines from solid tumours and leukaemia) as well as in tumour animal models. Its particular toxicological profile (doses up to 8000 mg/day are still safe) has allowed the development of a large number of phase II studies.^[86,87]

Tahlab/Spirulina (*Arthrospira maxima*);

The antioxidant and immune modulation effect of Spirulina act as anticancer activity. Spirulina have phycotene which destruct the tumour cell and also arrest their growth a study at the Harvard University showed that an extract from spirulina is highly successful in the treatment of cancer. Experimental studies in animal models have demonstrated an inhibitory effect of Spirulina algae on oral carcinogenesis. The only human study on the effect of Spirulina on chemoprevention of cancer, who studied the effect of Spirulina on oral leukoplakia (a precancerous lesion) in *pan* tobacco chewers in Kerala (India),^[88] in this study involving 44 subjects in the intervention group and 43 in the placebo group, they found that supplementation with Spirulina at 1 g/day for 1 year resulted in complete regression of lesions in 45% of the intervention group and 7% in the control group. Spirulina derived phycocyanin had a cytostatic and cytotoxic activity against squamous cell carcinoma in human and

hamster.^[89] Algae extract was believed to prevent cancer development by stimulating an immune response to selectively destroy small initial foci of developing malignant cells. Calcium spirulan (Ca-SP), novel polysaccharide isolated from *Spirulina platensis*. Seven intermittent i.v. injections of 100 µg of Ca-SP in mice caused a marked decrease of lung tumour colonization of B-16-BL6 cells in a spontaneous lung metastasis model.^[90] A polysaccharide extract of spirulina inhibit the proliferation of ascetic hepatoma cells of mice injected at a dose of 200 mg/kg. The group treated with the extract after the transplantation of the tumour showed a 54% reduction in tumour progression.^[91]

Hayyul Alam (*Vincea rosea*):

The extracts of Vinca (also known as *Sadabahar*) have demonstrated significant anticancer activity against numerous cell types.^[92] Vinca alkaloids are isolated from the periwinkle plant *C. roseus*, also known as *V. rosea*. Extracts of *Vinca* have many therapeutic effects including anti-tumour activity. Vincristine, vinblastine and vindesine are the first vinca alkaloids with anti-tumour activity to be identified. Vinorelbine is the first new second-generation vinca alkaloid to emerge from structural modification studies in the velbanamine or “upper” portion of the vinblastine structure.^[93] The most extensively recognized mechanism of resistance to vinca alkaloids is due to the

multi drug resistance-associated P-glycoprotein (P-gp).^[94] The vinca alkaloids are dimeric asymmetrical compounds consisting of two multi-ringed sub units; vindoline and catharantine, linked by carbon-carbon bridge. Vinca alkaloids disrupt the mitotic spindle assembly through interaction with- tubulin. In particular, they bind specifically to tubulin and block its capability to polymerize with α -tubulin into microtubules. This leads to the assassination of actively dividing cells by inhibiting development through mitosis. However, newer vinca alkaloids, such as vinorelbine and vinflunine, have proved to be weak binders in contrast to with the strong binding of vincristine and the intermediate level of vinblastine. Evidence suggest that vinorelbine and vinflunine affect microtubule dynamics differently from vinblastine.^[95] Vinca alkaloids are mainly administered weekly by short I.V. injection (1–15 min), more rarely by continuous infusion. Vinorelbine is the sole alkaloid available orally and it is administered as a single dose weekly.^[96] Classical vinca alkaloids are largely used in the treatment of haematological and lymphatic neoplasms (especially vincristine) as well as in several solid tumours (e.g. vinblastine in breast, testicular cancer, choriocarcinoma; vindesine in non-small cell lung cancer, breast cancer, etc.). The newer medicine is mainly used in solid tumours, such as breast, lung and ovarian cancers. Side

effects frequent to these drugs are myelosuppression and neurotoxicity. Vinorelbine is used for the treatment of non-small cell lung cancer and metastatic breast cancer. The chief toxic effect of vinorelbine is granulocytopenia with only modest thrombocytopenia and less neurotoxicity than other vinca alkaloids.^[97]

Elva (*Aloe vera*):

Aloe is a genus and one of the widely known species is *Aloe vera* or also known as *Aloe barbadensis* Miller. Aloe-emodin is the well-known anthraquinone active compound that can be found in some species of *Elva*.^[98] *Aloe vera* leaves contain, aloe-emodin a hydroxyl-anthraquinone glycoside, has a specific *in vitro* and *in vivo* anti-neuroectodermal tumor activity. The growth of human neuro-ectodermal tumors is inhibited in mice with severe combined immunodeficiency without any appreciable toxic effects on the animals. The compound does not inhibit the proliferation of normal fibroblasts nor that of hemopoietic progenitor cells. The cytotoxicity mechanism consists of the induction of apoptosis, whereas the selectivity against neuro-ectodermal tumor cells is founded on a specific energy-dependent pathway of drug incorporation. Taking into account its unique cytotoxicity profile and mode of action, Aloe emodin might represent a conceptually new lead antitumor drug.^[99] Some other chemical constituents of *elva* shows different activity

like, Aloesin and barbaloin which shows antioxidant, anti-inflammatory & anticancer activity,^[100,101] aloe emodin is for the treatment of breast cancer,^[102] phytosterol of *elva* acts as hypoglycemic effect on type- 2 diabetes mellitus,^[103] polysaccharides shows immunomodulator & antioxidant activity.^[104]

Asgandh (*Withania somnifera*):

Pharmacological activity of *asgandh* has been attributed to two main alkaloids withanolides, withaferin A and withanolide D. Further chemical analysis has shown the presence of the following: Anaferine (Alkaloid), Anahygrine (Alkaloid), Beta-Sisterol, Chlorogenic acid (in leaf only), Cysteine (in fruit), Cuscohygrine (Alkaloid), Iron, Pseudotropine (Alkaloid), Scopoletin, Somniferinine (Alkaloid), Somniferiene (Alkaloid), Tropanol (Alkaloid), Withanine (Alkaloid), Withananine (Alkaloid) and Withanolides A-Y (Steroidal lactones).^[105,106]

Various studies have been conducted to evaluate the effectiveness of *asgandh* in prevention and treatment of different kinds of cancers.^[107] In colon cancer *asgandh* significantly altered the level of leucocytes, lymphocytes, neutrophils, immune complexes and immunoglobulins (Ig) A, G and M in experimental colon cancer in mice induced by azoxymethane.^[108] Leaf extract of *asgandh* has been shown to produce antiproliferative activity on MCF-7 (breast) human tumour cell line (Jayaprakasam B), Withaferin-A

enhanced radiation-induced apoptosis in human renal cancer cells (Caki) cells through ROS generation, down-regulation of Bcl-2 and Akt dephosphorylation,^[109] blood cancer,^[110] pancreatic Cancer,^[111] skin Cance,^[112] prostate cancer,^[113] fibrosarcoma etc.^[114]

Conclusion

The medical treatment of cancer has made substantial improvements since the early years of modern anti-tumour drug research. Nature is still today a rich source of active principles against cancer cells. Natural products produced by plants and their synthetic derivatives are expected to play an important role in the development of innovative agents to inhibit the onset of cancer. Currently, in some parts of the world, there is a renaissance of interest in traditional remedies. Many investigators now believe that traditional medicine is a promising source of new therapeutics against cancer, like the anti-cancer activities of *Cuscuta reflexa*, *Nigella sativa*, *Curcuma longa*, *Vincea rosea*, *Aloe vera*, *Withania somnifera* etc., components were recognized thousands of years ago but proper scientific research with this important Unani/traditional medicine is a very recent story. Modern technology in combination with established Unani health principles will yield rich dividends in the near future in improving health, especially among people who do not have access to the use of

costlier western systems of medicine. There is need to ensure that what is known is made use of, for financial gain, and for improvement of the health of people. In conclusion, the application of natural compounds in the treatment of cancer, the very common “plague” of our modern times, has resulted in increased therapeutic efficacy. Several experimental studies have proved plants for traditional claims and also explored novel therapeutic actions. However there is a need to explore other hidden beneficial potential of above mentioned plants which describe in *Unani System of Medicine* (Traditional medicine).

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