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RESEARCH ARTICLE

COW PATHY IN MANAGEMENT OF IMMUNITY AND CANCER IN ANIMALS AND MAN

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ABSTRACT

Cancer is characterized by uncontrolled, uncoordinated purposeless proliferation of cell that invades the surrounding tissues and to cause metastatic lesions at different body places mainly through blood and lymph vessels. Extensive resources carried out during last century on the control of cancers include surgery, chemotherapy, radiotherapy, immunotherapy and various kinds of traditional natural and local therapies. Most of these therapies are not so successful because of the fact of rapid multiplication of cancer cells weekly in the host, depressed immunity and imbalance in the body fluids and hormones. Surgery is a good choice of removing the cancer nodule confined to a particular place and at initial stage, this is successful. However, if the metastasis occurred causing same kind of cancer at different body places, then in spite of surgery, the prognosis is very poor because removal of cancer from one site is not sufficient enough as there are many other remaining malignant cells in the body. Similarly, the radio therapy causes alteration in the genetic makeup of the cancer cell directed towards the destruction of rapidly multiplying cells may lead to either recovery or aggravation of the cancer. Almost everyone who receives cancer treatment experiences side effects, which vary according to the treatment and the area of the body undergoing treatment. Chemotherapeutic agents, sometimes called cytotoxic agents because they kill cells, produce toxic side effects on rapidly dividing host tissues such as bone marrow and intestinal mucosa. Some normal cells, including blood cells, hair, and cells lining the gastrointestinal tract are also rapidly dividing, and are most likely to be damaged. Cow urine enhances the immunocompetence and improves general health of an individual. It has vital potential to enhance the activity of macrophages and lymphocytes (both T and B cells), and has been reported to increase the humoral and cellular mediated immunity. Increased immunocompetence of an individual is a very essential parameter to prevent the development of cancers by several mechanisms, of which the upregulation of lymphocyte proliferation and stimulation activity, increased macrophage activity, higher antibody production and increased synthesis and secretion of cytokines (IL-1, IL-2) plays significant role by enhancing the recognition of tumor cells by the immune cells of the body and cytotoxic activities of the tumor killing cells, the lymphocytes. It is an efficient anti-aging factor, since prevents the free radical formation, which could help preventing cancers as the incidences of cancer increases as the one progresses towards old age. Cow urine efficiently repairs the damaged DNA, thus can be very effective for the cancer prevention and therapy, and can also reduce the spread of malignant cancers and help fighting tumors. During the past few years, cow urine therapy has provided promising and authentic results for the treatment of cancer, a deadly malady which is being faced by the mankind and the incidences of which are ever increasing in the current scenario of changed lifestyle and food habits along with exposure to predisposing factors of carcinogens such as tobacco chewing, smoking, alcohol intake, environmental pollutants, occupational health hazards etc. Anti-cancer potential of cow urine therapy has been reflected by several case reports, success stories and practical feedback of patients for the treatment of cancer.

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INTRODUCTION

Cancer is considered as most dangerous disease of human and animals throughout the world. Extensive research is carried out to treat, prevent and control cancer are not so fruitful because of the fact that cancer in itself is a very complicated and multifaceted disease syndrome which on one side causes the extensive growth of cancer cells utilizing the most of the energy of the body and on the other side

it suppresses the immunity of the body and bypasses/escapes the immunity for their own growth. Thus, cancer causes devastating and chronic wasting diseases leading to cachexia and death. Cancer is considered to arise from a single cell as a result of mutation in their genetic material. In most of the cases, cancer do arise from the stem cell or multipotential cell normally present in each and every kind of tissue of the body.

The etiology of the cancer is multifaceted including physiochemical, biological factors that may cause alteration in either oncogene or in antioncogene or in their product proteins having both type of the mechanism carcinogenesis that are genetic and epigenetic mechanism. Cancer is characterized by uncontrolled, uncoordinated purposeless proliferation of cell that invades the surrounding tissues and to cause metastatic lesions at different body places mainly through blood and lymph vessels. Extensive resources carried out during last century on the control of cancers include surgery, chemotherapy, radiotherapy, immunotherapy and various kinds of traditional natural and local therapies. Most of these therapies are not so successful because of the fact of rapid multiplication of cancer cells weekly in the host, depressed immunity and imbalance in the body fluids and hormones. Surgery is a good choice of removing the cancer nodule confined to a particular place and at initial stage, this is successful. However, if the metastasis occurred causing same kind of cancer at different body places, then inspite of surgery, the prognosis is very poor because removal of cancer form one site is not sufficient enough as there are many other remaining malignant cells in the body. Similarly, the radio therapy causes alteration in the genetic makeup of the cancer cell directed towards the destruction of rapidly multiplying cells may lead to either recovery or aggravation of the cancer. Even it affects severely the other dividing cells of the body including skin, intestinal tract (G.I. tract), gonads. The chemotherapy also affects besides the cancer cell, the normal body cells and is not so successful in metastatic tumours. All these techniques of therapy are quite painful to the patient and are highly sophisticated requiring a lot of expenditure and moreover, the prognosis is 50-50. The main disadvantage of the allopathic therapies is the immune suppression in the patient means whether is surgery or radiotherapy or chemotherapy. All of these suppress the immunity of the body. If the patient's immunity is not optimum, it will facilitate the growth of the cancer cell and further invite several kinds of infections and other diseases.

Several kind of the mutations routinely occur in the body causing transformation of normal cell into cancer cell but it is the strong immune surveillance of the body which recognizes them and destruct them so that the body remains healthy. But when the immune system is weak or suppressed, it may not be able to control the newly developing or transformed cell and even opportunistic infections, there is a paucity of such products in the allopathic system of medicine which can enhance the immunity to an optimum level. Cancer is an emerging health hazard that has no geographical boundaries. Virtually in every country of the world, it is a big problem. Cancer is a disease involving dynamic changes in genome and is characterized by the uncontrolled, uncoordinated and purposeless proliferation of malignant cells and their ability to spread, either by growth in the adjacent tissue through invasion or by implantation at distant sites through metastasis. Immune system destroys any abnormal cell in the body through immune surveillance which can induce cancer but with the advancement of age, defense system becomes weak and thus cancer may pronounce in elderly people. Cancer has become one of the ten leading causes of death in India. Over 800,000 new cases and 300,000 deaths occur annually due to cancer. Though there are many therapeutic and preventive techniques available in allopathic system of medicine, but none of the fool/proof to cure cancer. Moreover, all are having severe side effects causing deleterious effects in body and pain to the patients. However, there are many herbs or Ayurvedic therapeutic approaches which either alone or in combination with allopathy may reduce cancer and its effects. Treating cancer is one of the most complex aspects of Veterinary care. Successful treatment of cancer requires elimination of all cancer cells, whether at the primary site, extended to local-regional areas, or metastatic to other regions of the body, and with the result that the specific cancer will not grow back. Treatment also varies based on the type of tumor, whether it is benign or malignant, and its location. If the tumor is benign and is located in a "safe" area where it will not cause symptoms or disturb the proper functioning of the organ, sometimes no treatment is needed. Sometimes benign tumors may be removed for cosmetic reasons. A variety of approaches are used to treat cancer that has spread beyond the

regional place like application of surgery, radiation, chemotherapy, hormone therapy, and immunotherapy using biologic response modifiers. If all of the cancer cannot be removed with surgery, the options for treatment include radiation and chemotherapy, or both. Some patients require a combination of surgery, radiation and chemotherapy. Cancer therapy involves a team that encompasses many types of doctors working together (for example, primary care doctors, gynecologists, oncologists, surgeons, radiotherapists, and pathologists) and many other types of health care workers (for example, nurses, physiotherapists, social workers, and pharmacists). Treatment decisions take into account many factors, including the likelihood of cure or of prolonging life when cure is not possible, the effect of treatment on symptoms, the side effects of treatment, and reduce the chance of spread (metastases). People undergoing cancer treatment hope for the best outcome and the longest survival with the highest quality of life. Even when a cure is impossible, symptoms resulting from the cancer can often be relieved with treatment that improves the quality and length of life (palliative therapy). However, people who are candidates for radiation therapy or anti-cancer drugs must understand the risks involved with treatment. Therefore, it should be ensured that people receive the most effective care with the minimal side effects.

Side Effects of Cancer Therapy: Almost everyone who receives cancer treatment experiences side effects, which vary according to the treatment and the area of the body undergoing treatment. Chemotherapeutic agents, sometimes called cytotoxic agents because they kill cells, produce toxic side effects on rapidly dividing host tissues such as bone marrow and intestinal mucosa. Some normal cells, including blood cells, hair, and cells lining the gastrointestinal tract are also rapidly dividing, and are most likely to be damaged. All chemotherapy drugs affect normal cells and cause side effects, varying according to the type of drug. Chemotherapy commonly causes nausea, vomiting, loss of appetite (anorexia), weight loss, fatigue, and low blood cell counts that lead to anemia and risk of infections. People often lose their hair. Cytopenia, a deficiency of one or more types of blood cell like abnormally low numbers of red blood cells (anemia), white blood cells (neutropenia or leukopenia), or platelets (thrombocytopenia), can develop because of the toxic effect of drugs on bone marrow. These drugs also can cause nerve dysfunction, heart and kidney damage, hearing loss, bone marrow suppression, injure lining of stomach and decreased fertility. Cytotoxic chemotherapy has an independently negative effect on bone cells (primarily osteoblasts) and can induce premature ovarian failure in patients with breast cancer, which leads to estrogen deprivation, which in turn leads to loss of bone mineral density (BMD). Radiation therapy is also associated with a significant number of adverse reactions, which depend on the part of the body being irradiated, how large an area is being treated, the dose and schedule given, and the tumor's proximity to sensitive tissues. It can damage normal tissues adjacent to the tumor, especially tissues in which cells normally divide rapidly such as skin, the bone marrow, hair follicles, and the lining of the mouth, esophagus, and intestines. Radiation can also damage the ovaries or testes. Skin and hair are most noticeably affected by radiation treatment, resulting in skin lesions, burning, redness, and possibly hair loss. The most common complaints are fatigue, malaise, anorexia, decreased libido, hair loss, mucositis, and bone marrow depression. Others are low blood counts, difficult or painful swallowing, erythema, edema, desquamation (shedding or sloughing-off of the outer layer of skin), increased skin pigment (hyperpigmentation), atrophy, skin itching (pruritus), skin pain, changes in taste, lack of appetite, nausea, vomiting, gastritis/enteritis, diarrhea. fetal damage (in a pregnant woman) and increased susceptibility to infection. Acute adverse reactions occur within the first few weeks of treatment and subside after a few weeks. These effects are more severe with higher doses or the concomitant use of chemotherapy. Subacute adverse reactions develop within weeks to 6 months after radiotherapy, like the radiation pneumonitis. Late adverse reactions appear months or even years after therapy, depending on the total radiation dose, and are usually caused by damage to vascular or connective tissue, like fistulas, fibrosis, necrosis, edema, and secondary neoplasms.

Late complications are not usually spontaneously reversible and they do not generally respond to treatment. Hormonal therapies can cause endometrial cancer, blood clots, hot flashes, erectile dysfunction (impotence), abnormal liver function test and fluid retention. These therapies, such as selective estrogen replacement modulators (SERMs) and aromatase inhibitors have been shown to cause bone loss in premenopausal women with breast cancer. Androgen deprivation therapy may cause hypogonadism, which increases risk for fracture. Monoclonal antibodies can cause allergic reaction. Biologic response modifiers can also show toxicity, alpha-IFN produces a flu-like syndrome (headache, fever, chills, respiratory distress, myalgia and bone marrow suppression). The toxicities of IL-2 are more serious and include a flu-like syndrome along with significant fluid accumulation, which can lead to renal or cardiac insufficiency. Cancer therapy can also cause lactose intolerance and mouth ulcers. Some cancer treatments cause "dumping syndrome" i.e. food is "dumped" into the jejunum (small intestine) 10 or 15 minutes after being swallowed and the presence of undigested food in the jejunum leads to abdominal fullness, nausea and crampy abdominal pain. Other symptoms include feeling warm, dizzy, and faint and there can be rapid pulse and cold sweats immediately after eating. Bone loss also can be caused by cytotoxic therapy directed toward the tumor or by surgical or hormonal therapy leading to estrogen or androgen depletion. This is referred to as treatment-related osteoporosis or cancer-treatment-induced bone loss (CTIBL). So it can be caused by glucocorticoids, gonadal ablation or suppression (ovarian and testicular), and radiation therapy to bone (causing osteonecrosis and reduced function and number of osteoblasts). Surgically induced menopause by oophorectomy will decline estrogen levels and produce negative bone health. Seeing the several side effects of cancer therapies, preventive and corrective measures should be followed in cancer treatment. Careful doses of treatment modalities are required in well monitored hospital settings. Relieving side effects is an important part of treatment. Symptomatic treatment can be given for some of the side effects. A registered dietitian, which is a trained health professional in the area of nutrition, can assist in nutritional planning for people with cancer.

Indian system of cancer control: As the popularity of complementary/alternative medicine (CAM) grows, patients are incorporating more CAM therapies into their conventional cancer care. Some people turn to alternative medicine including certain medicinal herbs to treat their cancer, instead of or in addition to standard treatment. However, most types of alternative medicine have not been subjected to careful scientific studies. Very little is known about the effectiveness of alternative medicine in treating cancer. It is generally believed that the use of alternative medicine may be toxic, may interact with standard treatment, thus reducing the effectiveness of chemotherapy, it may be costly, reducing the person's ability to afford standard treatment. Therefore, these points have to be clarified via scientific basis and practical implications / clinical trials. Of these Ayurvedic medicine, herbal products, homeopathy and cow urine therapy can share the high standards of medicine. In the next section of this review, cow urine therapy will be discussed in details.

Cowpathy: Indian cow urine has been described in 'Sushrut Samhita' and 'Ashtanga Sangraha' to be the most effective substance/secretion of animal origin with innumerable therapeutic values. The medicines made from cow urine are used to cure several diseases. Taken in measured quantities, cow urine or gaumutra has a unique place in Ayurveda and is suggested for improving general health. Exploring its antimicrobial activities, it is being used to produce a whole range of Ayurvedic drugs. Cow urine therapy has a long history. It is recognized as 'water of life' or "Amrita" (beverages of immortality), the nector of the God in Vedas, sacred Hindu writing, which is said to be the oldest books in Asia. In India, drinking of cow urine has been practiced for thousands of years. It is an important ingredient of panchgavya, which has been tested by various workers for its immunomodulatory properties and have been reported that it enhances both cellular and humoral immune response. It has also been experimentally proved that among all sorts of urines, the urine of the Indian cows is most effective and interestingly almost nil or few

medicinal properties with regards to immunomodulation are present in the urine of crossbred, exotic cows and buffaloes. The immunomodulatory property of indigenous cow urine is due to the presence of a "Rasayan" which has been found absent in urine of other animals on HPLC analysis. Cow urine singularly has got all such chemical properties, potentialities and constituents that are capable of removing all the ill effects, imbalances in the body. Cow urine contains 24 types of salts. Its main contents are water 95%, urea 2.5%, minerals, salt, hormones, and enzymes-2.5%. It contains iron, calcium, phosphorus, carbonic acid, potash, nitrogen, ammonia, manganese, iron, sulfur, phosphates, potassium, urea, uric acid, amino acids, enzymes, cytokine and lactose etc. Copper has the power to destroy diseases and act as an antidote. Cytokines and amino acids might play a role in immune enhancement. Since the urine of the cow contains all beneficial elements in it, hence it is natural and universal medicine that fulfills the deficiency of elements and reduces the increased elements in the body. It is the unique quality of the urine, which helps in curing even the most incurable diseases. There is evidence that the urine of the cow works as the best appetizer. It smoothens and nourishes the heart and adds to the power of wisdom of man, and increases their physical strength as well. It increases life span and purifies blood from all sorts of impurities. Cow urine is entirely sterile after secretion and has antiseptic effect. It acts like a disinfectant and prophylactic agent and thus purifies atmosphere.

Practitioners of Ayurvedic medicine (from India) routinely use urine as a remedy. A number of ailments could be treated by cow urine therapy. Most of the medicines are made by distilling urine and collecting vapours termed as 'ark' (distillate). Improvements have been shown or reported with those suffering from flu, sinus, allergies, colds, ear infection, rheumatoid arthritis, bacterial/viral infections, tuberculosis, chicken pox, hepatitis, leprosy, asthma, gastric ulcer, heart disease, depression, hypertension, fatigue, burns, skin infections, eczema, tetanus, morning sickness, fever, obesity, etc. It is also used as a diuretic, laxative and for treatment of chronic malaria, enteritis, constipation, edema, baldness, headaches, fever, chemical intoxication, aging etc. It is proved as a universal curer of blood disorders, leucorrhoea and even leprosy. The urine of the cow cleans the intestines and removes the deposited material. Hence diseases like fever, mouth and skin diseases menstruation disorders, asthma, giddiness, increase of cough and urinary irregularities in humans are cured by its regular use without any side effects. It is non-toxic in nature. Cow urine can kill the number of drug resistant bacteria and viruses. Even this therapy has been reported to be beneficial for dreaded diseases like cancer, AIDS and diabetes.

Cow's urine has immunostimulant activity in plants and animals. Recent researches showed that cow urine enhances the immune status of an individual through activating the macrophages and augmenting their engulfment power as well as bactericidal activity. In poultry, cow urine has been reported to enhance the immunocompetence of birds and provide better protection along with vaccination and increases egg production and egg quality. *In-vivo* cow urine treatment to developing chicks marginally upregulated the lymphocyte proliferation activity. The cow urine (Kamdhenu ark' / cow urine distillate) is a potent and safe immunomodulator, which increases both humoral and cell mediated immunity in mice. It was observed that cow urine enhances both T and B cell proliferation and also increases the titre level of IgG, IgA and IgM antibodies. It increases the secretion of interleukin-1 and 2 also. The level of both IL-1 and 2 in mice got increased by 30.9 and 11.0%, respectively and in rats these levels were increased significantly by 14.75 and 33.6%, respectively. The cow urine exert its protective effect on lymphocytes of birds undergoing apoptosis and suggested the exploitation through experimental trails for specific use of cow urine as an adjunct to vaccination. Thus the cow urine not only maintains the immunity of body but also modulate it in the positive direction to an optimum level. Beneficial effects of cow urine were seen on serum biochemical profile (total serum protein, glucose, calcium and cholesterol of laying birds. Its usefulness as antimicrobial agent, positive effect on body weight gain and hematological profiles have also been reported.

It has been suggested that cow urine can be used as a feed additive for layer birds in order to get good quality eggs and immune-enhancer. A cow urine distillate fraction (ark) has been identified as a bioenhancer of the activities of commonly used antibiotics, anti-fungal and anti-cancer drugs. Recently the cow urine has been granted U.S. Patents (No. 6896907 and 6410059) for its medicinal properties, particularly for its use along with antibiotics for the control of bacterial infection and fight against cancers. The activity of Rifampicin, a front-line anti-tubercular drug used against tuberculosis, increases by about 5-7 folds against *E. coli* and 3-11 folds against Gram-positive bacteria. Bioenhancers are substances, which do not possess drug activity of their own but promote and augment the bioactivity or bioavailability or the uptake of drugs in combination therapy. Such bioenhancers have been earlier isolated only from plant sources. It has now been found that cow urine also acts as a bioenhancer and increases the efficacy of the antibiotics against infectious agents. The molecule of invention helps in the absorption of antibiotics across the cell membrane in the animal cells, gram positive and gram negative bacteria. Bioenhancement has also been observed with other drugs viz. Ampicillin, Isoniazid, Clotrimazole, Cyanocobalamine etc. Bioenhancer activity has been found to reduce the antibiotic dose per day and duration of treatment in tuberculosis patients. The Indigenous cow urine contains "Rasayan" tatva, which is responsible to modulate immune system and act as bioenhancer.

Cow urine possesses anti-cancer properties. Studies highlight the role of cow urine in curing cancers and that cow urine enhances the efficacy and potency of anti-cancer drugs. Recently, this significant achievement has been validated by the grant of U.S. Patent (No. 6896907) in the field of treatment of cancers. Scientists have proved that the pesticides even at very low doses cause apoptosis (cell suicide) in lymphocytes of blood and tissues through fragmentation of DNA. Distilled cow urine protects DNA and repairs it rapidly as observed after damage due to pesticides. It protects chromosomal aberrations by mitocyc in in human leukocyte. Cow urine helps the lymphocytes to survive and not to commit suicide (apoptosis). It has been reported the prevention of pathogenic effect of free radicals through cow urine therapy. These radicals cause damage to various tissues and attack enzymes, fat and proteins disrupting normal cell activities or cell membranes, producing a chain reaction of destruction leading to the ageing process of a person. By regular use of cow urine one can get the charm of a youth as it prevents the free radical formation. *In-vitro* study on Animal cell culture showed the anti-cancerous effect of *Taxus baccata* nd CUD alone and in combination. Out of various combinations, aqueous extract of *Taxus baccata* and CUD was found most promising anti-cancerous preparation in *in-vivo* studies. Cow urine enhances the immunocompetence and improves general health of an individual. It has vital potential to enhance the activity of macrophages and lymphocytes (both T and B cells), and has been reported to increase the humoral and cellular mediated immunity. Increased immunocompetence of an individual is a very essential parameter to prevent the development of cancers by several mechanisms, of which the upregulation of lymphocyte proliferation and stimulation activity, increased macrophage activity, higher antibody production and increased synthesis and secretion of cytokines (IL-1, IL-2) plays significant role by enhancing the recognition of tumor cells by the immune cells of the body and cytotoxic activities of the tumor killing cells, the lymphocytes. It is an efficient anti-aging factor, since prevents the free radical formation, which could help preventing cancers as the incidences of cancer increases as the one progresses towards old age. Cow urine efficiently repairs the damaged DNA, thus can be very effective for the cancer prevention and therapy, and can also reduce the spread of malignant cancers and help fighting tumors.

During the past few years, cow urine therapy has provided promising and authentic results for the treatment of cancer, a deadly malady which is being faced by the mankind and the incidences of which are ever increasing in the current scenario of changed lifestyle and food habits along with exposure to predisposing factors of carcinogens such as tobacco chewing, smoking, alcohol intake, environmental pollutants, occupational health hazards etc.

Anti-cancer potential of cow urine therapy has been reflected by several case reports, success stories and practical feedback of patients for the treatment of cancer. Cowpathy, mainly indigenous cow urine distillate increases the number of NK cells in peripheral blood indicating increased immune surveillance against viral infections and/or cancer. In an preliminary experiments in Wistar rats, NK cells were found to increase more than double after treatment of rats with cow urine distillate (CUD) for a period of about one month. Increase in number of NK cells is indicative of more preventive and control on viral infections and cancer, because these NK cells are responsible for killing the virus infected and cancer cells. In recent years there have been significant advances in the discovery of the molecular mechanism that govern the reactivity of NK cells against tumor cells and virally infected cells. Cowpathy plays an important role in enhancement of NK cells leading to immunomodulation and control of cancer.

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