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IMMUNITY IN MALIGNANCY AND HERBAL DRUGS USED IN MALIGNANCY

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ABSTRACT

Cancer is the second major cause of deaths worldwide. Probably 16 million patients will die by the year 2040. But the major problem of cancer patients is their immune system. They do not have better immune power as compared to healthy one. It is very important to study the immune system of cancer patients while cancer is growing inside them. This article mainly focuses on problems and remedies in the immune system while malignancy. It is important to use herbal origin drugs to support immunity of cancer patients and also due to their small possibility of side effects.

Keywords*:* - *Citrullus colocynthis*, health aspects, traditional uses, herbal medicine

INTRODUCTION

Malignancy is the disease state in which cell division takes place with uncontrolled rate and this spreads in healthy tissues which are near to infected tissues. Cancerous cells can also spread through the blood and lymph system to other body parts. There are several main types of malignancy. Carcinoma (in the skin or in tissues that line or cover internal organs), Sarcoma (in bone, cartilage, fat, muscle, blood vessels, or other connective or supportive tissue), Leukaemia (begins in blood-forming tissue, such as the bone marrow, and causes too many abnormal blood cells to be made) Lymphoma and multiple myeloma (malignancies that begin in the cells of the immune system) Central nervous system cancers are malignancies that begin in the tissues of the brain and spinal cord.

Malignancy and Immune System

Immune system in cancer patients is one of the important parameters in cancer patients which has to be taken into consideration. Because cancer weakens the immune system, also cancer treatment weakens the immune system and the immune system may help to fight cancer cells. It get very important to keep immune system active in malignancy.

Effect of cancer on immune system:

Cancer can weaken the immune system by spreading into the bone marrow. The bone marrow makes blood cells that help to fight infection. This happens most often in leukaemia or lymphoma, but it can happen with other cancers too. Cancer can stop the bone marrow from making so many blood cells. Certain cancer treatments can temporarily weaken the immune system. This is because they can cause a drop in the number of white blood cells made in the bone marrow. Cancer treatments that are more likely to weaken the immune system are: chemotherapy, Targeted cancer drugs, radiotherapy, high dose of steroids.

Low Immunity in Malignancy

People with malignancy have high chances of getting infected by pathogens. Main reason behind it is cancer itself which affects the immune system in different ways. Cancer treatment is also one reason behind it.

Cancer itself is one cause

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Chemotherapy:

Various chemos are given as injection or infusion and by mouth in pill form. Most common problem related to this is neutropenia which is a decrease in neutrophils.

Radiation –

Radiation works differently than chemo. It exposes your cells to high doses of radiation (high-energy beams) that damage their DNA (genetic material). This means cells either die or become unable to divide, which is how cells reproduce. This shrinks tumours or slows their growth. As with chemo, healthy cells are damaged by radiation, too. But radiation may have less of a damaging effect on the immune system in general. That's because radiation isn't systemic. Rather, it is targeted right at your tumour. Oftentimes, however, radiation does have to travel through areas of healthy cells to get to the tumour, so either those cells or cells nearby the tumour can be affected.

Immune system after cancer treatment

After chemo and radiation, your immune system can stay suppressed for several months. A study of people who had chemo for breast cancer found the immune system often took nine months or more to fully recovers. Several types of immune-system cells were depleted. In people who smoked, some immune cells were only at 50% of normal levels after nine months. That’s compared to an 80% rate in nonsmokers. Researchers say the immune-system damage could leave you vulnerable to some illnesses even if you’ve been vaccinated. These include tetanus (a bacterial infection) and pneumonia (inflection causing inflammation of the air sacs of the lungs). Specific chemo drugs have different effects. In the study, people given

the drug anthracycline (a type of chemotherapy that is an antibiotic) had normal immune function by the end of the study period. Those who took anthracycline plus taxane, a more traditional chemo drug, recovered much more slowly. While newer research has been illuminating, much remains to be learned about the specific immune-system effects of cancer treatments.

BOOSTING IMMUNE SYSTEM

After chemo and radiation, it is important to protect patients from infection. Patient can do this by following parameters and with some precautions -

Getting a flu vaccine every year, getting viral vaccines, following viral infection prevention strategies even if vaccinated, getting enough sleep, eating a healthy diet, avoiding unpasteurized dairy, cooking meat well, washing produce thoroughly, avoiding animal waste, such as from cleaning a litter box or picking up dog faeces, or soil contaminated with them, staying as active as you safely can, managing your stress, treating cuts and scrapes properly.

IMMUNOTHERAPY

Immunotherapy helps in detection and destruction of cancer cells by specific mechanisms. Immune system can recognize and kill cancer cells.

Different immunotherapies:

Monoclonal antibodies: they recognize and attack certain proteins on surface of cancer cell

Vaccines: introduce the immune system about particular types of cancer cells.

Cytokines: it boosts the immune system.

CAR T-cell therapy: it changes gene in a person's WBC

Side Effects of Immunotherapy

Skin Related Side Effects - swelling, soreness, and redness, and itchiness, rash

Flu-like Symptoms - fever, chills, weakness, dizziness, nausea or vomiting, muscle or joint aches, fatigue, headache, trouble breathing, low or high blood pressure.

Other Side Effects - swelling and weight gain from retaining fluid, heart palpitations, sinus congestion, diarrhea, infection, organ inflammation etc.

Detection of cancer cell

In Normal cells many MHC-1 molecules are present and in cancer cells very low MHC-1 molecules are present. So, it can be detected by T-Lymphocyte cells.

Lipid Asymmetry - In this, inside the cell different lipid molecules in the cell membrane. In this, certain molecules present inside and outside like phosphatidylserine (PS) present usually outside and phosphatidylethanolamine inside. Because modification or asymmetry this is reversed. So, it can be detected by an immune system cell.

Destruction of cancer cell by immune system

Macrophage engulf the cancerous cell; it is also called an antigen presenting cell. After engulfment it holds on peptide inside the cell and through MHC II molecules more immune cells come and recognize cancer cells. Help of cytotoxic killer cell- It is also called T-Lymphocyte, through the MHC, natural killer cells recognize cancer cells and release factors eventually kill the cell, it releases hydrolytic enzymes like perfins and major one Granzymes. Immune cells detect cancerous cells and interact with them and attach with them. This kind of cell releases the mediators, usually cytokines like interleukins and follow the pathway of apoptosis which leads to cancerous cell death.

IMMUNOSTIMULANTS USED IN CANCER TREATMENT

Immunostimulants are used to boost the immune system. This includes adjuvants, cytokines, monoclonal antibodies which have great potential for malignancy treatment. For improving delivery of immunotherapeutic, nanoparticulate carriers have become an emerging strategy. Biomimetic Nano delivery vehicles can alter the current cancer immunotherapy.

HERBAL DRUGS

We can use herbal origin drugs as a complementary and alternative medicine. They can enhance the immune system in cancer patients.

HERBAL ORIGIN DRUGS USED IN MALIGNANCY

Astragalu- aka ***Ashwagandha***

Astragalus is a large genus of over 3,000 species of herbs and small shrubs, belonging to the legume family Fabaceae. Plant astragalus shows that it reduces side effects of platinum-based chemotherapy agents such as cisplatin and carboplatin. These are two of the most effective chemotherapy drugs for mesothelioma. In 2012 Chinese study published in Medical Oncology found improved quality of life among lung cancer patients who received a combination injection of astragalus, cisplatin and vinorelbine compared to patients who only

received cisplatin and vinorelbine. Patients who received astragalus had good physical function, improved appetite, and less fatigue, pain, nausea and vomiting.

Burdock Root

Inflammopharmacology discusses laboratory studies of burdock root that indicate the herb has anti-inflammatory, antibacterial, anti-cancer and liver-protecting properties. It hasn't been proven to treat cancer in humans, but it may reduce inflammation and help patients recover from liver damage after cancer treatment. It should be noted that a commercially available type of burdock root tea was found contaminated with atropine in the 1970s. Cancer patients should closely monitor the effects of any herb they try.

Ginger

This herb shows anti-inflammatory and anti-cancer effects in lab studies. It can also reduce chemotherapy-related nausea and vomiting, according to a 2000 review published in the British Journal of Anaesthesia. But ginger should be strictly avoided before and after surgery. It promotes bleeding and should be avoided by patients with a low platelet count.

Aloe Vera

Studies indicate that the use of aloe vera mouthwash may benefit leukaemia and lymphoma patients in reducing chemotherapy and radiation-induced mucositis in head and neck cancer patients. However, the scientific evidence suggesting the benefits of oral ingestion of aloe vera juice by cancer patients undergoing chemotherapy or radiation therapy is minimal. In 2009 study showed potential benefits of oral aloe in reducing tumour size, controlling disease and improving the 3-year survival.

Turmeric

Turmeric is also known as Indian saffron, jiang huang, haridra and haldi. It is a spice grown in many Asian countries. It belongs to the ginger family. Research has shown lower rates of certain cancers in countries where people eat more curcumin. This is at curcumin levels of about 100mg to 200mg a day over long periods of time. This herb contains a compound known as curcumin. 2011 study published in Cancer Chemotherapy and Pharmacology shows that curcumin extract may be safe to combine with gemcitabine chemotherapy in pancreatic cancer patients. A few laboratory studies on cancer cells have shown that curcumin has anti-cancer effects. It seems to be able to kill cancer cells and prevent more from growing. It has the best effects on breast cancer, bowel cancer, stomach cancer and skin cancer cells.

Dong Quai -

Angelica sinensis, commonly known as dong quai or female ginseng, is a herb belonging to the family Apiaceae, indigenous to China.Dong quai' root have the potential to stop the cell cycle and cause cell death in cancerous cells. Research suggests that dong quai can potentially kill cancer cells for brain tumours, leukaemia, and colon cancer. Traditional Chinese Medicine uses the herb dong quai to support overall wellness. The herb may offer additional benefits to cancer patients receiving doxorubicin, which is a chemotherapy drug used in the treatment of mesothelioma.In a 2007 study published in Basic and Clinical Pharmacology and Toxicology found dong quai may protect against heart damage caused by doxorubicin. A 2006 study published in Oncology Reports found dong quai may protect against lung inflammation caused by radiation therapy.

Herbs That May Help Treatment Side Effects-

Several herbs may help control the side effects of conventional cancer treatment. However, doctors do not recommend that cancer patients take herbal medicine while undergoing cancer treatment. If a patient wants to try herbal medicine during cancer treatment, talk to your oncologist about it so they can monitor patients response and warn about potential drug interactions. Some of these herbs might be safe to take after cancer treatment is completed.

CHINESE HERBAL MEDICINES

CHM can enhance the efficacy of chemotherapy, immunotherapy, radiotherapy, targeted therapy. It lessens the damage caused by cancer therapy. Main herbs used are FU-ZENG (health strengthening) and QU-XIE (pathogen eliminating) herb. These are mainly functioned as immune regulatory in malignancy.

CONCLUSION

Immunity of malignant patients is one important parameter to consider. Lower immunity in them leads to serious health issues. Chemotherapy, radiation and cancer itself weakens the immune system in malignant patients. Hence for boosting immunity various treatments like immunotherapy, immunostimulants are in use. Herbal drugs can be also used in malignancy as complementary and alternative medicine.

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