

## SIDE - EFFECTS OF CHEMOTHERAPY AND ITS TREATMENT BASED ON AYURVEDIC CHIKITSA SIDDHANT WITH REFERENCE TO EFFECT OF ANUBHUT YOGA IN CANCER PATIENT RECEIVING CHEMOTHERAPY

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### ABSTRACT

Cancer is the uncontrolled growth of cells which spreads to other parts of the body through blood and lymph systems. Cancer is the leading cause of death worldwide accounting for 8.2 million deaths in 2012. Cancer treatments are surgery, radiation, chemotherapy, biologic therapy. But chemotherapy does not always works because it has got ample of side-effects such as nausea, vomiting, anorexia, fever, cough, tastelessness; skin becomes red, tender, itchy; fatigue – breathlessness on exertion, alopecia, diarrhoea, digestive problems, myelosuppression, mucocitis. An *anubhut yoga* containing *guduchi*, *ashwagandha*, *bhumiamlaki*, *shankha bhasma*, *suvarna gairik*, *laghu sootshekhara rasa*, *mukta shukti pishti*. They have antitumor activity and acts against HL- 60 leukemic cells. They suppresses tumour growth through various mechanisms including Reactive Oxygen Species [ROS] generation proteasome inhibition, p53 stabilization, induction of endoplasmic reticulum stress inhibition of AKT phosphorylation and p38 MAPK activation 6-11. They have antimutagenic and anticarcinogenic action; antitumor, antioxidant and antihyperuricaemic properties. They have anti carcinogenic and anti-mutagenic actions. They also normalises the uric acid and creatinine level. In short, this *anubhut yoga* minimizes the side-effects of chemotherapy. Anubhut Yoga is an effective adjuvant therapy in protecting the patient from adverse effect of chemotherapy.

**Keywords:** Cancer, Chemotherapy, side-effects, Ayurvedic chikitsa, Anubhut Yoga,

### INTRODUCTION

Cancer is the uncontrolled growth of cells coupled with malignant behaviour: invasive and metastasis<sup>1</sup>. It is caused by interaction between genetic susceptibility and environmental factors<sup>2</sup>. Cancer cells spreads to other parts of the body through blood and lymph systems. Cancer is now one of the top causes of death in India, after heart attack, up from seventh position in 2000. India has some of the world's highest incidences of cancer: cervical, gallbladder, oral and pharynx. Cancer is the leading cause of death worldwide ac-

counting for 8.2 million deaths in 2012<sup>3</sup>. Globally, the number of cancer deaths is projected to increase from 7.1 million in 2002 to 11.5 million in 2030<sup>4</sup>. With 7,00,000 deaths, 1.1 million new cases every year, 3.3 million patients at any given time, cancer has emerged as a leading killer for the first time, snuffing out 70 % younger lives. Cancer treatments are divided into four main groups i.e. surgery, radiation, chemotherapy, biologic therapy. One may also have targeted therapy, immune therapy or hormone therapy<sup>5</sup> Chem-

otherapy is the significant medical modality of cancer which involves introduction of strong medicines. However, the important obstacle is the toxicity which it causes to normal tissues of the body. Chemotherapy does not always work, and even when it is useful, it may not completely destroy the cancer. Patients frequently fail to understand its limitations<sup>6</sup> Chemotherapy has got ample of side- effects such as nausea, vomiting, anorexia, fever, cough, tastelessness; skin becomes red, tender, itchy; fatigue – breathlessness on exertion, alopecia, diarrhoea, digestive problems, myelosuppression, mucocitis. ‘80 % of the patient on chemotherapy reported changes of their physical appearance’, By Roper starch Survey. The side – effects of chemotherapy adds anxiety, pain, fatigue and depression which makes quality of life of the patient all together more difficult. Attempt is made to apply the *mulbhut chikitsa siddhant* [basic medicinal principal] of *ayurveda* to these side effects of chemotherapy. An *anubhut yoga* containing *guduchi*, *ashwagandha*, *bhumiamlaki*, *shankha bhasma*, *suvarna gairik*, *laghu sootshekhar rasa*, *mukta shukti pishti*. Anti – cancer drugs i.e. chemotherapeutic treatments causes various kinds of toxicities.

For example, 5- fluorouracil, a common chemotherapeutic agent, is known to cause myelotoxicity<sup>7</sup> cardiotoxicity<sup>8</sup>, and has even shown to act as vasopastic agent in rare but documented cases<sup>9</sup> Another widely used chemo drug, doxorubicin causes cardiac toxicity<sup>10</sup>.renal toxicity<sup>11</sup>, and myelotoxicity<sup>12</sup>. Similarly, bleomycin a well known chemotherapeutic agent, is known for its pulmonary toxicity<sup>13</sup>, cutaneous toxicity<sup>14</sup>. Cyclophosphamide, a drug to treat many malignant conditions, has been shown to have bladder toxicity in the form of hemorrhagic cystitis, immunosuppression, alopecia and at high doses cardiotoxicity<sup>15</sup>. These acute and chronic sides – effects of chemotherapy delays in further treatment and also stops the further treatment.

#### AIMS AND OBJECTIVES

To establish the diagnosis of side – effects of chemotherapy, based on the *ayurvedic nidana panchaka siddhanta* and application of *chikitsa siddhant* [*ayurvedic treatment protocol*] accordingly by studying the efficacy of herbomineral formulations [*anubhut yoga*] in side – effects of chemotherapy.

#### MATERIAL AND METHODS

**Table no. 1: Contents of Anubhut Yoga:**

Sr. No.	Sanskrit Name	Latin /English Name	Parts used	Choorna / dose	Reference
1.	<i>Guduchi</i>	<i>Tinospora cordifolia</i>	Bark satva	500 mg.	BV. P.
2.	<i>Ashwagandha</i>	<i>Withania somnifera</i>	Roots	500 mg.	BV. P.
3.	<i>Bhumiamlaki</i>	<i>Phyllanthus niruri</i>	Leaves	500 mg.	BV. P.
4.	<i>Shankha Bhasma</i>	Calcium Carbonate	Bhasma	500 mg.	R.T. 12/17
5.	<i>Suvarna Gairik</i>	Iron ore	Bhasma	500 mg.	R.T.22/115
6.	<i>Laghu sootshekhar rasa</i>	Rasa yoga	Rasakalpa	250 mg.	R.T.
7.	<i>Mukta Shukti pishti</i>	Pearl	Pishti	250 mg.	R.R.S. 4/15

BV.P. – Bhavaprakash Poorvakhanda ,  
R.T. – Rasa Tarangini

R.R.S. – Rasa Ratna Sammucchayya  
**Inclusive Criteria:**

- Patient undergoing chemotherapy or after completion of chemotherapy representing with side- effects of chemotherapy as follows :
- Hb – 8-10 gm % for male, 10- 12 gm % for female.
- Thrombocytopenia, platelets > 400 \*10000 cu mm.
- Leucocytosis, white blood - < 6000 per cu mm.

**Exclusive Criteria:**

- Patient suffering from illness like diabetes mellitus, myocardial ischaemia, or any other life threatening illness for which patient having medication.
- Patient has not taken chemotherapy drug anytime during the treatment.
- Patient having following pathological blood limits :
- Hb - < 4-8 gm %
- Platelet count < 150 \* 10000.

**Investigations:**

- Haemoglobin
- Platelet count
- WBC count

**Treatment schedule:** As per synopsis fulfilment of 30 cancer patients was a great task in *ayurvedic* hospital. So an application was made for the reduction of patients from 10 to 30, which was accepted by the

concerned board in the university and the study was completed with 10 patients. So, there was only one group of 10 patients having side – effects of chemotherapy which were given *anubhut yoga* [Herbomineral formulation]. Follow up was taken after every 15 days during the trial till 45 days.

**Source of data and method of collection:**

10 patients were collected from the OPD of samhita siddhant of SMT. K.G.M.P. Ayurved Hospital, Charniroad, Mumbai-02.

**Duration:** 45 days.

**Dose:** 750 mg of Herbomineral powder twice a day.

**Anupan :** warm water.

**Time:** *prana* and *vyana kala* [After lunch and dinner ].

**EFFICACY CRITERIA FOR ASSESSMENT:**

Assessment of overall effect has been made on the basis of symptoms such as nausea and vomiting, mucocitis, fatigue, alopecia, Hb gm% and tastelessness. Gradations and scoring of each patient was done according to the symptoms.

Gradation of symptoms:

Symptoms	Criteria for assessment	Grade
<b>1. Nausea and Vomiting</b>	None	0
	Able to eat and 1 episode in 24 hours	1
	Oral intake significantly decreased 2-5 episode in 24 hours	2
	6 episode, No significant intake requiring IV fluids	3
	> 6 episodes in 24 hours.	4
<b>2. Mucocitis</b>	None	0
	Erythema of the mucosa	1
	Patch pseudo membranous reaction	2
	Confluent pseudo membranous reaction	3
	Narcosis of deep ulceration may include bleeding not induced by minor abrasion	4

<b>3. Fatigue</b>	None	0
	Increased fatigue over base line, but not altering normal activities	1
	Moderate or difficulty in performing some activities	2
	Severe or loss of ability to perform some activity.	3
	Bedridden or disabling	4
<b>4. Alopecia</b>	Normal	0
	Mild hair loss	1
	Moderate	2
	Severe hair loss	3
	Alopecia totalis	4
<b>5. Hb gm %</b>	> 12 gm %	0
	10-12 gm%	1
	8 -10 gm %	2
	6-8 gm %	3
	< 6 gm %	4
<b>6. Tastelessness</b>	Normal	0
	Slightly altered	1
	Markedly altered	2
	Severely altered	3
	No taste at all	4
<b>7. Platelet count</b>	1.5 million	0
	1.5-2.5 million	1
	2.5-3.5 million	2
	3.5-4.5 million	3
	>4.5 million	4
<b>8. WBC Count</b>	>6,000	0
	6,000- 5,000	1
	5,000- 4,000	2
	4,000- 3,000	3
	3,000- 2,000	4

**OBSERVATION:**

**Table no.2 : Effect of therapy on Nausea and Vomiting in Chemotherapy with Anubhut Yoga [CT+AY] Group**

CT – Chemotherapy, AY – Anubhut Yoga

Duration	Mean	% Found	SE	P
Before Treatment [BT]	1.5	-	0.25	> 0.05
15 days	1.42	4	0.38	> 0.05
30 days	0.57	61	0.23	> 0.01
45 days	0.21	85	0.21	< 0.001

In treated group, the mean score after 45 days treatment was 85 % which was statistically highly significant.

**Table no.3 : Effect of therapy on Mucocitis in CT+AY Group**

Duration	Mean	% Found	SE	P
BT	1.4	-	0.27	< 0.02
15 days	0.92	17	0.37	< 0.02
30 days	0.71	40	0.37	< 0.02
45 days	0.39	76	0.25	< 0.05

In treated group , the mean score after treatment was 76 % which was statistically significant.

**Table no.4 : Effect of therapy on Fatigue in CT+AY Group**

Duration	Mean	% Found	SE	P
BT	2.07	-	0.21	< 0.05
15 days	1.92	7	0.21	< 0.05
30 days	1.57	24	0.18	< 0.01
45 days	0.85	58	0.13	< 0.001

In treated group, the mean score after treatment was 58 % which was statistically highly significant.

**Table no.5: Effect of therapy on Hb gm % in CT+AY Group**

Duration	Mean	% Found	SE	P
BT	1.64	-	0.25	> 0.05
15 days	1.78	8	0.23	> 0.01
30 days	1.21	26	0.23	> 0.01
45 days	0.85	48	0.25	> 0.05

In treated group, the mean score after treatment was 48 % which was statistically insignificant.

**Table no.6: Effect of therapy on Alopecia in CT+AY Group**

Duration	Mean	% Found	SE	P
BT	2.21	-	0.44	> 0.01
15 days	2.42	9	0.49	> 0.1
30 days	1.85	16	0.39	> 0.1
45 days	1.21	45	0.27	> 0.1

In treated group, the mean score after treatment was 45 % which was statistically insignificant.

**Table no.7: Effect of therapy on Tastelessness**

Duration	Mean		% Found	SE	P
	BT	AT			
Group CT+ AY	1.28	0.85	33	0.21	> 0.05

In treated group, the mean score after treatment was 33 % which was statistically insignificant.

**Table no. 8 : Effect of therapy on Platelets Count**

Duration	Mean	% Found	SE	P
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	BT	AT			
<b>Group CT+ AY</b>	2	0.05	68 %	0.11	< 0.001

In treated group, the mean score after treatment was 68 % which was statistically highly significant.

**Table no.8: Effect of therapy on WBC Count**

Duration	Mean		% Found	SE	P
	BT	AT			
<b>Group CT+ AY</b>	1	0.07	92 %	0.6	< 0.001

In treated group, the mean score after treatment was 92 % which was statistically insignificant. In treated group of CT+AY, total 10 patients completed their total course of therapy. 6 patients showed moderately improvement and total 4 patients showed marked improvement in their symptoms.

## DISCUSSION

Anubhut Yoga has Rasayan properties like Jeevaniya, Balya and Bruhaneeya. Being madhura vipaka it imparts Vata- pitta shamaka and Kapha vardhaka properties. Chemotherapy causes aggravation of Vata-pitta and Kapha kshaya. Madhura vipaka is presumed to nourish the depleted Kapha and thus nourishes the body i.e. *Bruhaneeya*. These drugs decrease the side-effects of chemotherapy which is mentioned here.

- *Guduchi* : Palmatine is a quaternary protoberberine alkaloid, typically yellow in colour. It is most important pharmacological active constituent of a number of plants such as *Tinospora cordifolia*. It is close structural analogue of berberine that shows significant antitumor activity against HL- 60 leukemic cells<sup>16</sup>.
- *Ashwagandha*: Withaferrin – A inhibits cancer cell growth by blocking STAT3 transcriptional activity. Withaferrin – A suppressed tumor growth through various mechanisms including Reactive Oxygen Species [ROS] generation proteosome inhibi-

tion, p53 stabilization, induction of endoplasmic reticulum stress inhibition of AKT phosphorylation and p38 MAPK activation 6-11. It inhibits proliferation and migration of HCT116 cells.

- *Bhumiamalaki* : *Phyllanthus niruri* species has demonstrated an antimutagenic and anticarcinogenic action, antitumor, antioxidant, and antihyperuricemic properties<sup>17</sup> It has been evaluated to treat hypercalciuria also. Intraperitoneal treatment with *Phyllanthus niruri* methanol extract showed 1.69 folds increase in urinary uric acid excretion when compared to the hyperuricemic control animals<sup>18</sup>.
- *Shankha Bhasma* : Meta analysis study shows that calcium ( all salts) modestly decreases tumor incidence in rats and that some calcium salts are more protective than others<sup>19</sup>. Prophylactic administration of oral calcium carbonate at a low dose is an easy and cost-effective way to prevent citrate – related toxicity<sup>20</sup>

They have anti carcinogenic and antimutagenic actions. They also normalise the uric acid and creatinine level. In short, this *anubhut yoga* minimizes the side-effects of chemotherapy.

## CONCLUSION

Anubhut Yoga is an effective adjuvant therapy in protecting the patient from adverse effect of chemotherapy such as

nausea, vomiting, anorexia, fever, cough, tastelessness; skin becomes red, tender, itchy; fatigue – breathlessness on exertion, alopecia, diarrhoea, digestive problems, myelosuppression, mucocitis. Anubhut Yoga has antitumor activity and thus inhibits the proliferation of HCT116 cells. Thus, this yoga was found to decrease the plight of chemotherapy patients by decreasing the side-effects.

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