

Boosting Bone Marrow and Immune Function During Cancer Treatment

One of the main consequences of undergoing chemotherapy or radiation is damage to the bone marrow. This directly affects one's total immunity by impacting the production of marrow stem cells, white blood cells, red blood cells, and platelets. Most patients develop significant anemia and even thrombocytopenic purpura. The damage to immune agents is so significant that patients risk a reoccurrence of their original cancer, and are at increased risk for opportunistic infections.

Medical Treatments

In North America, chemotherapy is applied to most cancers, even when the science and demographics indicate limited or no effect. Cancers with a high proliferation rate respond well to chemotherapy, and include uterine, leukemia and lymphoma, accounting for about 3% of cancers. Chemotherapy has minimal and only temporary effect on cancers with a low proliferation rate such as lung, liver or the colon. The application of chemotherapy in these cancers induce serious side-effects of fatigue, nausea and immune inhibition, but more significantly, can accelerate a downward spiral ending in an earlier

death. Chemotherapy damages normal tissue, destroys white blood cells, and damages the mucous-membrane lining of the gastrointestinal tract. It also damages neurons, causing peripheral neuropathies and loss of cognitive function. In addition, cancerous cells exposed to chemotherapy rapidly mutate, causing drug resistance. Multiple drugs are then given simultaneously.



Radiation is best applied in small or isolated tumors, such as tongue, nasopharyngeal, larynx and thyroid. It is the preferred treatment for prostate cancer, isolated lymphoma, and rectal cancer. It is also used to treat margins after surgical removal of a tumor found in the breast, lung, kidney, and brain. Radiation causes burning and the side effects of dry throat, fever, etc.

Combined TCM-Western Approach

The integration of Chinese herbal medicine with Western therapies for cancer has been studied extensively for the last 30 years. It is now customary to combine the two, with evidence showing improved immune function, increased survival rates, and reduction of common side effects. It also enhances the effectiveness of both chemo and radiation, allowing for smaller doses.

Side effect reduction is commonly used for digestive symptoms of poor appetite, nausea or vomiting, and diarrhea. Herbs are also used to reduce fever, canker sores, palpitation, insomnia, fatigue. Specific to our topic is the negative effects on bone marrow, affecting white blood cell count, red blood cell count, and platelet count.

The TCM strategies for minimizing the side effects of chemotherapy are these: replenish *qi* and blood, invigorate and harmonize spleen and stomach, nourish liver and kidney, and clear toxic heat, if present. The treatment principles for radiation are these: clear toxic heat, nourish *yin* to generate

fluid, cool and replenish *qi* and blood, invigorate spleen and harmonize stomach, and nourish liver and kidney.

Treating Bone Marrow Damage

Both radiation and chemotherapy lower white blood cells (WBC), red blood cells (RBC) and platelets. The most serious consequence is the destruction of WBC neutrophils. In radiation therapy, counts can go as low as $.6 \times 10^9/l$; (normal is 3.8 - 10.8 with optimal at 5.0 - 7.5).

Damage due to chemo is dependent on which chemo-toxic agents are used. Bone marrow suppression occurs one to three weeks after onset of chemotherapy, and continues for two to four weeks following completion of chemotherapy. In China, it is recommended that chemo/radiation treatment be discontinued when the WBC reaches less than 3.0 or platelets reach less than $80 \times 10^9/l$. Dangerously low levels of WBC would be $<2.0 \times 10^9/l$, and especially if neutrophils become less than 0.5. And yet, 28% of patients will show neutrophils dropping below 0.1, at which point there is great risk of bacterial septicemia.

Chinese Herbal Medicine

In China, it has been determined that secondary infections are markedly reduced by taking Chinese herbs before, during and after administration of radiation or chemotherapy. Treatment principles are to tonify *qi* and blood, nourish kidney and liver *yin* and *jing*, clear toxic heat, and boost *yang* in *yang* deficient patients. According to, *Alleviating the Side Effects of Cancer Treatment* (People's Medical Publishing House, 2007) there are two different ways to deal with bone marrow suppression. The first is to apply a basic chemotherapy or radiation formula further modified to address bone marrow suppression. The second is to directly address bone marrow suppression, regardless of whether it is due to radiation or chemotherapy. (Doses here represent ingredient proportions based on a 100g prescription.

The basic chemotherapy formula is as follows: *huang qi* (Radix Astragali) 12g., *dang shen* (Radix Codonopsis) 12g, *bai zhu* (Rhizoma Atractylodis Macro) 9g, *nü zhen zi* (Fructus Ligustri Lucidi) 8g, *gou qi zi* (Fructus Lycii) 8g, *tu si zi* (Semen Cuscutae) 8g, *ban xia* (Rhizoma Pinelliae) 8g, *fu ling* (Poria) 9g, *chen pi* (Pericarpium Citri Reticulatae) 8g, *ji nei jin* (Endothelium Corneum Galli Gigeriae) 8g, *shen qu* (Massa Fermentata) 8g.

In this formula, *huang qi*, *dang shen* and *bai zhu* tonify *qi* for 34% of the formula, with *tu si zi* tonifying the *yang* and *gou qi zi* nourishing blood and *yin*. *Ban xia*, *fu ling* and *chen pi* are three of the four herbs found in *Er Chen Tang*. When combined with *ji nei jin* and *shen qu*, they address stomach phlegm and food stasis, which commonly manifests during chemotherapy, causing nausea.

For Radiation therapy, the basic formula is as follows: *huang qi* (Radix Astragali) 11g, *bai zhu* (Rhizoma Atractylodis Macro) 7g, *sheng di huang* (Radix Rehmanniae) 11g, *mai men dong* (Radix Ophiopogonis) 7g, *shi hu* (Caulis Dendrobii) 7g, *nü zhen zi* (Fructus Ligustri Lucidi) 7g, *ban xia* (Rhizoma Pinelliae) 7g, *zhu ru* (Caulis Bambusae) 7g, *huang lian* (Rhizoma Coptidis) 6g, *jin yin hua* (Flos Lonicerae) 7g, *fu ling* (Poria) 8g, *chen pi* (Pericarpium Citri Reticulatae) 7g, *ji nei jin* (Endothelium Corneum Galli Gigeriae) 7g.

Here, *jin yin hua* and *huang lian* clear heat due to burn, while *mai men dong*, *shi hu* and *nu zhen zi* nourish the *yin*. Additional herbs support *qi* and blood, and clear phlegm and food stasis. For either

chemotherapy or radiation, the basic formula can be modified to reestablish bone marrow integrity. Choose and add from *he shou wu* (Radix Polygoni Multiflori), *shu di huang* (Radix Rehmanniae Praep), *dang gui* (Radix Angelicae Sinensis), *rou cong rong* (Herba Cistanches), *bu gu zhi* (Fructus Psoraleae), *e jiao* (Asini Corii Gelatinum), or *gui ban* (Concha Chinemys/Testudinus).

Treating Bone Marrow Directly

One can use the individualized formulas above, or apply a dedicated formula for replenishing bone marrow directly. The herbs are: *dang shen* (Radix Codonopsis), *tai zi shen* (Radix Pseudostellaria Heterophylla), *ren shen* (Radix Panax Ginseng), *huang jing* (Rhizoma Polygonati), *dang gui* (Radix Angelicae Sinensis), *shu di huang* (Radix Rehmanniae Praep), *e jiao* (Asini Corii Gelatinum), *he shou wu* (Radix Polygoni Multiflori), *gui ban* (Concha Chinemys/Testudinus), and *ji xue teng* (Radix Spatholobi/ Millettiae).

Here, *dang shen*, *tai zi shen*, *ren shen* and *huang jing* tonify *qi*, while *dang gui*, *shu di huang*, *e jiao* and *he shou wu* tonify blood. *Gui ban* astringes the formula into the bone marrow and *ji xue teng* helps bone marrow distribute blood outwards. The lead herb, *xian he cao*, is classically assigned to the stop bleeding category. Modern research indicates a synergistic effect of boosting platelets and red blood cells.

Overall, integrating Chinese herbal therapy with conventional chemo or radiation therapy has been shown to help bone marrow recover from damage and significantly promotes production of blood cells and immune agents.

Resources:

1. *Alleviating the Side Effects of Cancer Treatment*, 2nd Edition, Zhang Dai-zhao etc, People's Medical Publishing House, Beijing, 2007.
2. *Cancer Treatment with Fu Zheng Pei Ben Principle*, Pan Mingji, Fujian Science, 1992.
3. *Integrating Conventional and Chinese Medicine in Cancer Care, A Clinical Guide*, Tai Lahans, Churchill Livingstone, 2007.
4. *Management of Cancer with Chinese Medicine*, Li Pewen, Donica Publishing, 2003.

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