

Treatment of Chemotherapy- and Radiation-Induced Toxicities

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Editor's Note: This is the first article of a two-part series. [Part two](#) will appear in the March 2008 issue.

Chemotherapy and radiation are standard treatments for cancer in Western medicine. However, they are very toxic and affect numerous parts of the body. Many herbal formulas have been used with great success to alleviate side effects of chemotherapy and radiation. Among all of the formulas that have been used, the two most effective formulas include *Bu Zhong Yi Qi Tang* (Tonify the Middle and Augment the Qi Decoction) and *Shi Quan Da Bu Tang* (All-Inclusive Great Tonifying Decoction).

The information listed below is abbreviated monographs from *Chinese Herbal Formulas and Applications* by John Chen and Tina Chen.

Shi Quan Da Bu Tang (All-Inclusive Great Tonifying Decoction)

Pinyin Name: *Shi Quan Da Bu Tang*

Literal Name: All-Inclusive Great Tonifying Decoction

Alternate Names: *Shih Chuan Ta Pu Tang* (Wan), *Shi Quan Da Bu Tang* (Wan), Complete Nourishment Decoction (Pill), Ten Strong Tonic Herbs Decoction (Pill), Ginseng and Tangkuei Ten Combination.

Original Source: *Tai Ping Hui Min He Ji Ju Fang* (Imperial Grace Formulary of the Tai Ping Era) by the Imperial Medical Department in 1078-85.

Composition:

| | |
|---|-------|
| Ren Shen (Radix et rhizoma ginseng) | 8g |
| Bai Zhu (Rhizoma atractylodis macrocephalae), Bei (stone-baked) | 10g |
| Fu Ling (Poria), Bei (stone-baked) | 8g |
| Zhi Gan Cao (Radix et rhizoma glycyrrhizae praeparata cum melle) | 5g |
| Shu Di Huang (Radix rehmanniae praeparata), xi (washed) with liquor zheng (steamed) and bei (stone-baked) | 8-15g |
| Dang Gui (Radix angelicae sinensis), xi (washed) | 10g |
| Bai Shao (Radix paeoniae alba) | 8g |
| Chuan Xiong (Rhizoma chuanxiong) | 5g |

| | |
|---|-----|
| Huang Qi (Radix astragali) | 15g |
| Rou Gui (Cortex cinnamomi), do not expose to heat | 8g |

Dosage/Preparation/Administration

The source text states to grind equal amounts of the ingredients into a coarse powder. Cook 6g of the powder with three slices of *sheng jiang* (Rhizoma zingiberis recens) and two pieces of *da zao* (Fructus jujubae) in one large bowl of water until the liquid is reduced to 70 percent. Take the warm decoction at any time during the day. This formula may be prepared as a decoction, with the suggested doses in brackets.

Chinese Therapeutic Actions (Warms and tonifies *qi* and blood)

Clinical Manifestations:

1. Deficiencies of *qi* and blood accompanied by *yang* deficiency and cold manifestations: lassitude, low appetite, pale face, palpitations, insomnia, dizziness, intolerance to cold and seminal emissions.
2. General deficiency of the body: deficient cough, poor appetite, sallow appearance, weakness of the legs and knees, chronic ulcers, prolonged wound-healing, and seminal emissions in men and *beng lou* (flooding and spotting) in women.

Clinical Applications

Anemia, neutropenia, cancer, supportive therapy for chemotherapy and/or radiation, chronic atrophic gastritis, gastric prolapse, post-surgical recovery, Shwachman syndrome, Meniere's syndrome, and Sheehan's syndrome.

Explanation

Shi Quan Da Bu Tang (All-Inclusive Great Tonifying Decoction) treats general deficiency and weakness of the body; conditions that may be caused by overexertion, injuries and chronic illnesses. The original text states that this formula has a wide range of effects and can be used to treat a variety of syndromes marked by *qi* and blood deficiencies.

This formula consists of *Si Jun Zi Tang* (Four-Gentlemen Decoction) and *Si Wu Tang* (Four-Substance Decoction), plus *huang qi* (Radix astragali) and *rou gui* (Cortex cinnamomi). *Ren shen* (Radix et rhizoma ginseng), *bai zhu* (Rhizoma atractylodis macrocephalae), *fu ling* (Poria), and *zhi gan cao* (Radix et rhizoma glycyrrhizae praeparata cum melle) tonify *qi*. *Shu di huang* (Radix rehmanniae praeparata), *dang gui* (Radix angelicae sinensis), *bai shao* (Radix paeoniae alba) and *chuan xiong* (Rhizoma chuanxiong) nourish the blood. *Huang qi* (Radix astragali) tonifies *qi* and lifts *yang qi* to improve the general body condition. This herb also helps to speed wound-healing. *Rou gui* (Cortex cinnamomi) warms *yang* and dispels cold.

Please refer to *Si Jun Zi Tang* (Four-Gentlemen Decoction) and *Si Wu Tang* (Four-Substance Decoction) for a detailed explanation of these two formulas.

Cautions/Contraindications

Because *Shi Quan Da Bu Tang* is a warm formula, it is contraindicated in patients with heat or excess conditions.

Pharmacological Effects

Immunostimulant: Administration of *Shi Quan Da Bu Tang* was associated with immune-enhancing effects because it increases the number and/or the activities of the macrophages, B-lymphocytes, T-lymphocytes and natural killer cells.¹

Hematopoietic: In one study, the administration of *Shi Quan Da Bu Tang* for up to 10 days effectively treated mice with anemia caused by profuse blood loss. The use of this formula was associated with an increase in hemoglobin and red blood cells.² In another study, *Si Wu Tang* (Four-Substance Decoction), *Si Jun Zi Tang* (Four-Gentlemen Decoction) and *Shi Quan Da Bu Tang* were given orally to mice to evaluate their effect for treatment of anemia. The study concluded that *Shi Quan Da Bu Tang* was most effective, followed by *Si Wu Tang* and *Si Jun Zi Tang*.³ The mechanism of action was attributed to increased activity of CSF.⁴

Anti-neoplastic: In one study in mice, the administration of *Shi Quan Da Bu Tang* was associated with an inhibitory effect on the growth of cancer cells. The mice that received the herbs survived longer in comparison to the control group. Also, it was noted that the use of herbs minimized the side effects associated with chemotherapy treatments.⁵

Anti-tumor and anti-metastatic: According to one in vivo study, use of *Shi Quan Da Bu Tang* was associated with marked anti-tumor and antimetastatic activities. The proposed mechanism of this action included enhancement of phagocytosis, cytokine induction, antibody production, and induction of the mitogenic activity of spleen cells. As a complement to Western medical treatment, *Shi Quan Da Bu Tang* showed anti-tumor effects when combined with surgical excision, anti-tumor effects with or without other drugs, and protection against the deleterious effects of anti-cancer drugs as well as radiation-induced immunosuppression and bone marrow toxicity.⁶ Specifically, in liver metastasis, one study reported that administration of *Shi Quan Da Bu Tang* had a dose-dependent inhibition of liver tumor colonies and significant enhancement of survival rate, without side effects, as compared with the untreated control.⁷

Anti-cancer: One study reported a promising preventative effect for endometrial cancers with use of *Shi Quan Da Bu Tang*. According to this study, this formula suppressed estradiol-17 beta (E2)-induced expression of c-fos/jun in uterine corpus and inhibited N-methyl-N-nitrosourea and E2-induced endometrial carcinogenesis in mice.⁸ According to another study, *Shi Quan Da Bu Tang* suppressed primary melano-cytic tumors through potentiation of T-cell-mediated anti-tumor cytotoxic immunity *in vivo*.⁹

Anti-tumor: Administration of *Shi Quan Da Bu Tang* was associated with a preventive effect on endometrial carcinogenesis in mice. The anti-tumor effect of *Shi Quan Da Bu Tang* was attributed in part to the contents of *Si Wu Tang*, as the administration of these four herbs was found to have an inhibitory effect on estrogen-induced expression of c-fos, interleukin (IL)-1alpha and tumor necrosis factor (TNF)-alpha in uteri of ovario-ectomized mice.¹⁰

Clinical Studies and Research

Cancer: According to one report that screened and evaluated 116 herbal formulas for treatment of cancer, *Shi Quan Da Bu Tang* was determined to be the most effective as a potent biological response modifier. Clinical benefits of *Shi Quan Da Bu Tang* included extremely low toxicity, self-regulatory and synergistic actions of its components in immunomodulatory and immunopotentiating effects, enhanced therapeutic activity in chemotherapy and radiotherapy,

inhibited recurrence of malignancies, prolonged survival and reduced adverse toxicities of many anti-cancer drugs.¹¹

Anemia: Administration of *Shi Quan Da Bu Tang* effectively increased hemoglobin, red blood cells and platelets in 41 patients with post-surgical proteinemia.¹²

Chemotherapy- and radiation-induced toxicities: *Shi Quan Da Bu Tang* was shown in one study to have a marked protective effect against chemotherapy and radiation in cancer patients, including but not limited to such drugs as mitomycin, cisplatin, carboplatin, cyclophosphamide, and 5-fluorouracil.¹³ Moreover, many journals reported that *Shi Quan Da Bu Tang* demonstrated effectiveness as a supportive therapy for cancer patients treated with chemotherapy and/or radiation. In one study, 50 patients with cancer (stomach, large intestine and breast) who were treated with chemotherapeutic agents (FT-207, 5-FU, UFT, MMC, CDDP and ADM) and this herbal formula for one month showed good tolerance for the treatments. In another report, 30 women with malignant cancer of the uterus and ovaries were treated with the herbal formula, with marked improvement such as more energy, better appetite and warmer extremities. Use of the formula also has proven effective in reversing bone marrow suppression induced by such drugs as MMC, Ara-C and MTX. In one study with 26 patients, the use of the herbal formula inhibited the reduction of white blood cells and red blood cells associated with the drugs. It was noted in another study that the use of the herbal formula had a protective effect for white blood cells, red blood cells and platelets against radiation treatment in 15 cancer patients. Finally, administration of *Shi Quan Da Bu Tang* starting one week before chemotherapy was associated with 88 percent effectiveness in alleviating nausea and vomiting associated with EAP treatment (adriamycin, cisplatin and etoposide) for stomach and pancreatic cancer.¹⁴

Chemotherapy-induced toxicities: One study reported significant benefits using *Shi Quan Da Bu Tang* in cancer patients treated with chemotherapeutic agents. *Shi Quan Da Bu Tang* potentiates the therapeutic effect of many anti-cancer drugs, such as mitomycin, cisplatin, cyclophosphamide and fluorouracil. It also counteracts adverse side effects of these anti-cancer drugs, such as gastrointestinal disturbances such as anorexia, nausea, vomiting, hepatotoxicity, immunosuppression, leukopenia, thrombocytopenia, anemia and nephropathy.¹⁵

Chemotherapy- and radiation-induced neutropenia: One study reported 84.32 percent effectiveness using *Shi Quan Da Bu Tang* to treat decreased white blood cell count induced by chemotherapy and/or radiation in 134 patients (39 with stomach cancer, 28 with lung cancer, 17 with breast cancer, 13 with rectal cancer, 12 with lymphatic cancer, 12 with liver cancer, seven with bladder cancer and others).¹⁶

Cyclophosphamide- or prednisolone-induced immunosuppression: One study demonstrated that the use of *Shi Quan Da Bu Tang* and *Ren Shen Yang Ying Tang* (Ginseng Decoction to Nourish the Nutritive Qi) effectively prolonged the survival rate and life span in mice with candida infection associated with immunosuppression induced by cyclophosphamide or prednisolone.¹⁷

Carboplatin- or cisplatin-induced myelosuppression: One study reported that administration of *Shi Quan Da Bu Tang* in mice prevented myelosuppression induced by nine times intraperitoneal administration of 15 mg/kg carboplatin or 3.0 mg/kg cisplatin, without affecting the anti-tumor activities of these agents.¹⁸

Cisplatin-induced toxicities: According to another study, daily administration of *Shi Quan Da Bu*

Tang in mice protected against nephrotoxicity, immunosuppression, hepatic toxicity, and gastrointestinal toxicity caused by intraperitoneal administration of 3.0 mg/kg cisplatin nine times (on days 3, 4, 5, 6, 7, 8, 10, 11 and 12). Furthermore, the anti-tumor effect of cisplatin was not reduced.¹⁹

Cis-diamminedichloroplatinum-induced nephrotoxicity and bone marrow toxicity: Administration of *Shi Quan Da Bu Tang* was effective in treating nephrotoxicity and bone marrow toxicity caused by intraperitoneal administration of cis-diamminedichloroplatinum (CDDP), a chemotherapeutic agent. Furthermore, use of the herbs did not affect the anti-tumor activity of CDDP. This beneficial effect is attributed in part to *dang gui* (*Radix angelicae sinensis*) and its constituent sodium L-malate.²⁰

Interferon-induced toxicities: One study reported a synergistic effect to potentiate the anti-tumor effect and decrease the toxicity using interferon-alpha and *Shi Quan Da Bu Tang* for treatment of lung metastasis of murine renal-cell carcinoma. Interferon-alpha has been shown to significantly inhibit the metastasis of cancer cells, but also is associated with marked loss of body weight. This study demonstrated that the combination treatment of suboptimal doses of interferon-alpha and *Shi Quan Da Bu Tang* has marked effects to augment the anti-metastatic effect without causing any loss of body weight, as compared to either treatment alone.²¹

Rifampin-induced neutropenia: Administration of modified *Shi Quan Da Bu Tang* in 11 patients was effective in reversing neutropenia induced by rifampin within seven days. The white blood cell count was below 3,000 cells/mcl in four patients, and between 3,000 and 4,000 cells/mcl in seven patients.²²

Toxicology

In a toxicology study, the LD50 for the oral administration of the formula in herbal extract was 15 g/kg in mice. The herbal extract was prepared by cooking 1.5g of *gan cao* (*Radix et Rhizoma glycyrrhizae*) and 3g of the other nine herbs in 285 mL of water for one hour to yield 2.3g of herbal extract. The study concluded that the formula has very little toxicity.²³

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