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2.1 Surgical System Diseases

2.1.1 Thromboangiitis Obliterans

Li and Zhang [1] reported the treatment of Thromboangiitis Obliterans with Danshen Tongmai Decoction (丹参通脉汤), taken orally and used for washing in 52 cases. The decoction included Danshen 30 g, mongolian milkvetch root (黄芪) 30 g, red peony root-drug (赤芍药) 30 g, Chinese angelica (当归) 20 g, earthworm (地龙) 20 g, leech (水蛭) 20 g, szechwan lovage rhizome (川芎) 40 g, peach seed (桃仁) 10 g, safflower (红花) 20 g, common achyranthes (牛膝) 30 g, sappsn wood (苏木) 30 g, tangerine peel (陈皮) 10 g, liquorice root (甘草) 10 g. The above drugs were decocted in water, one dose a day, for 15 days as one course of treatment. The remnants of the above drugs were decocted with water again for 5 min, and the liquid was used to wash the feet for 30 min, 1–2 times a day. The results showed that there were 25 (48.1 %) clinical recovery cases, 19 (36.5 %) marked effective cases, 5 (9.6 %) improved cases, 2 (3.9 %) ineffective cases, and 1 (1.9 %) deterioration case. The total effective rate was 98.1 %. The longest treatment period was 247 days, the shortest was 30 days, and the average was

81 days. It was concluded that the disease is closely related to blood stasis. The treatment should be performed mainly with drugs with the function of activating blood circulation and dissipating blood stasis, and the disease should be treated with the decoction modified by adding or subtracting certain drugs according to the specific types of symptoms; for example, drugs with the function of warming meridians and scattering cold, activating blood circulation and dredging collaterals, clearing away heat pathogens and expelling superficial pathogens, benefiting vital energy and nourishing blood, etc.

Zhongshan Hospital in Shanghai examined some patients cured by Danshen treatment with Doppler ultrasound, and the results showed that the pulse in their dorsalis pedis artery and anterior tibial artery was enhanced or recovered to normal levels, compared to their conditions before treatment.

2.1.2 Varicose Veins Complications

Sui et al. [2] reported the treatment of 39 patients with eczematous dermatitis by intravenous administration of 20 ml of Compound Danshen Injection, which was supplemented by local treatment. After one course of treatment, 7 of 12 cases with chronic leg ulcers were cured, and the total effective rate was 98 %. The mechanism of Danshen's effects are mainly its functions of improving microcirculation, increasing tissue blood supply, and promoting tissue repair and regeneration.

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2.1.3 Hepatic Veno-Occlusive

Hepatic veno-occlusive disease (VOD) is one of the key complications after hematopoietic stem cell transplantation, and early manifestations of the disease include jaundice, ascites, hepatomegaly, and other symptoms and physical signs. To prevent VOD, Zhang [3] used 6–12 ml of Danshen combined with prostaglandin E1 lipid microsphere (Lipo-PGE) in peripheral hematopoietic stem cell transplantation, and obtained satisfactory therapeutic effects. All 8 cases treated did not suffer from VOD nor any side effects. It was concluded that Danshen combined with prostaglandin E1 lipid microsphere is safe and feasible for the prevention of hepatic VOD.

2.1.4 Adhesive Intestinal Obstruction

Compound Danshen has the function of improving blood circulation and increasing plasminogen activator activity, which promotes the conversion of plasminogen into plasmin and induces fibrinolysis, preventing the formation of adhesion substances. Wang et al. [4] reported that Compound Danshen Injection was directly injected into the peritoneal cavity after enterolysis surgery in 47 cases of adhesive intestinal obstruction. 1–9 years of follow up showed an excellent therapeutic effect rate of 100 % in the treatment group. In the control group, where antibiotics were directly injected into peritoneal cavity in 38 cases, the excellent therapeutic effect rate was 73.7 %. The therapeutic effect in the treatment group was significantly better than that in the control group ($P < 0.01$).

2.1.5 Traumatic Subarachnoid Hemorrhage (t-SAH)

Shen et al. [5] reported 307 cases diagnosed with t-SAH, randomly divided into the treatment group (159 cases) and control group (148 cases). Besides treatment as in the control group, 20 ml of Danshen Injection in 5 % glucose was administered by intravenous drip to the patients

in the treatment group once a day. The results showed that there were significant differences in the fatality rate and disability rate between the two groups. It was concluded that significant therapeutic effects by compound Danshen on preventing and treating cerebral vessel spasm (CVS) after t-SAH were obtained, and CVS incidence, fatality rate, and disability rate were significantly reduced.

2.1.6 Craniocerebral Injury

You Hongxing et al. (2003) investigated the optimal stage for using Danshen Injection to treat cerebral edema and increased intracranial pressure (ICP) after craniocerebral injury. 98 cases with craniocerebral injury were randomly divided into the administration group at the ultra-early stage (6–12 h after craniocerebral injury, T1), administration group at early stage (24–72 h after craniocerebral injury, T2), and the control group (C). The patients in the administration groups were treated with Danshen Injection, and the conditions of ICP at 1, 3, 5, 7 days and cerebral edema at 7, 14 days after craniocerebral injury were observed and compared among the groups. The results showed that ICP at 3, 5, 7 days after craniocerebral injury in group T1 was significantly lower than in group C ($P < 0.05$), and ICP in group T2 at 7 days was significantly lower than in group C ($P < 0.05$). The severe cerebral edema rate of group T1 at 7 days was significantly lower than that in group C ($P < 0.05$), and there was no significant difference between group T2 and group C ($P > 0.05$); the cerebral edema regression rate in group T1 and group T2 at 14 days was significantly higher than in group C ($P < 0.05$), but that in group T1 was more significant ($P < 0.01$).

2.1.7 Aphasia After Traumatic Craniocerebral Injury

Wang [6] reported that one patient with aphasia after severe craniocerebral injury was treated with normal western medicine, but no effect was

obtained. The patient was then treated with Compound Danshen by intravenous drip and cured. Danshen has the function of significantly improving brain tissue microcirculation, promoting collateral circulation production. In recent years, the scientists have also found that it has the function of promoting blood edema regression, eliminating lipid peroxides, and so on. These findings help elucidate the mechanism of Danshen's treatment of cerebral vascular diseases and confirm its clinical value.

2.1.8 Secondary Epilepsy

Li [7] reported the therapeutic effect of Compound Danshen Tablet combined with sodium valproate on the treatment of secondary epilepsy of children caused by external injury, tetanus, encephalitis, etc.

2.1.9 Skin Flap Necrosis After Breast Cancer Surgery

Xiang et al. [8] observed the therapeutic effect of Compound Danshen on preventing skin flap necrosis after breast cancer surgery. The results showed that in the group where Compound Danshen Injection was not used during the operation, 5 patients suffered from darkening of the skin flap (28.5 %), 2 patients suffered from local necrosis (7.4 %), and 1 patient suffered from partial dehiscence (3.4 %). In the group where Compound Danshen Injection was used, 3 patients suffered from skin flap darkening (10.7 %), and no necrosis or dehiscence was observed. Meanwhile, in the CDI group, pain symptoms were alleviated and pain time was shortened.

2.1.10 Postkidney Transplantation

Tian et al. [9] investigated the effect of Danshen on the recovery of transplanted kidney function after transplantation. 112 patients with renal transplantation received conventional treatments plus 60 ml of Danshen Injection administered

daily after operation for 10 days. Meanwhile, 109 patients with renal transplantation in the control group were administered conventional therapy without Danshen Injection. The following indexes were observed in the two groups: volume of urine, serum creatinine, endogenous creatinine clearance rate, incidence of delayed graft function and acute rejection reaction, blood viscosity, platelet aggregation rate, and blood flow resistance in the graft measured by color Doppler ultrasonography. Urinary production and endogenous creatinine clearance rate after operation for patients using Danshen Injection were significantly higher than those in the control group ($P < 0.05$). However, serum creatinine, delayed incidence of renal function recovery, blood viscosity, platelet aggregation, and blood flow and resistance were significantly lower than in the control group ($P < 0.05$). There was no significant difference in incidence of acute reject reaction between the two groups ($P > 0.05$). Danshen has the function of improving blood microcirculation and decreasing the incidence of renal function recovery retardation, so it is beneficial to the recovery of kidney function after transplantation.

2.1.11 Kidney and Ureter Stone Cramps

Song [10] treated kidney and ureter stone cramps with magnesium sulfate combined with Danshen in 108 cases. The patients in the treatment group received 20–30 ml of 25 % magnesium sulfate in 250 ml of 5 or 10 % GS injection, administered in two times by intravenous drip, and 20 ml of Danshen Injection in 250 ml of 5 % glucose or 0.9 % sodium chloride injection, administered by intravenous drip for 2–5 days. The patients in the control group received conventional treatment such as atropine, 654-2, and progesterone, etc., for 5–12 days. Neither group received painkillers. The pain remission time, therapeutic effects, and side effects were observed, and the patients were advised to drink larger amounts of water and to perform some jumping activities after drug administration. The results showed that in the treatment group, there were 36 cases with marked

effect, 20 cases with effect, 5 cases without effect, and the total effective rate was 91.8 %. In the control group, there were 20 cases with marked effect, 16 cases with effect, 11 cases with no effect, and the total effective rate was 76.6 %. It was concluded that Danshen has the function of dilating arteriola and improving microcirculation, enhancing hypoxia tolerance of tissues, and blocking calcium ion channels. The drug can be used to treat urinary pain and has the function of dilating spasmodic ureter arteriola and improving ureter spasm caused by ischemia and anoxia conditions. In addition, the drug blocking calcium ion channels and thus can directly act on the ureter smooth muscle, inhibiting the slow internal flow of calcium to smooth muscle cells during repolarization and thus inhibit ureter smooth muscle constriction. The above pharmacologic actions can effectively relieve ureteral cramps and improve the functions of the heart, brain, and other organs, so it is especially suitable for old patients. Intravenous administration of magnesium sulfate and Danshen Injection has the effects of spasmolysis and pain relief on the smooth muscle of the urinary tract. The two drugs have synergistic effects, and if used alternatively, the function time can be prolonged. There was no significant toxicity or side effects.

2.1.12 Cervical Lymphadenitis

Zhang [11] reported the application of Compound Danshen Tablet combined with erythromycin ethylsuccinate in the treatment of cervical lymphadenitis in 20 cases; significant synergistic effects were obtained, and the course of treatment was significantly shorter than that of the control group. It was concluded that Danshen has the function of activating blood circulation and dissipating blood stasis, cooling blood, treating boils, nourishing blood, and calming the nerves. Modern pharmacological research has shown that tanshinone in Danshen has anti-inflammatory function, reduces body temperature, inhibits the transmigration and ambulation of leucocytes in inflammatory areas, and enhances the

anti-inflammatory actions of antibiotics. The combination of the two drugs has the function of significantly shortening the course of treatment.

2.1.13 Acute Mastitis

Wang [12] injected compound Danshen into the acupoint Xi Shang (郗上) on the forearm contralateral to the breast. A total of 57 cases were treated, and the cure rates were 95 %.

2.1.14 Bartholin's Cyst

Cai [13] reported the application of Compound Danshen Injection in the treatment of Bartholin gland cysts in 62 cases. The method was to pierce the cyst and aspirate the fluid, and inject CDI, in the amount of one-half volume of the fluid, into the cyst. In the control group, after local drainage or laser fenestration, anti-infection and sitz baths were performed. The results showed that the cure rate and recurrence rate in the treatment group were better than those in the control group. It was concluded that Danshen has the function of activating blood circulation and dissipating blood stasis, inhibiting platelet aggregation, cleaning oxygen radicals, improving prostaglandin metabolism and inhibiting chemotaxis and aggregation reactions of leucocytes, protecting glandular cells and blood vessel epithelial cells, promoting microcirculation, reducing effusion, enhancing absorption, and avoiding and reducing lipid peroxides of gland epithelial cells, thus protecting glands and reserving their function, and helping the recovery.

2.1.15 Anal Fissure

Xiang [14] used CDI to treat 200 cases of Anal fissure. A 10-ml syringe was used to draw 4 ml of CDI, 3 ml of 2 % lidocaine, and 5 mg of 654-2, and the syringe was connected to a No. 5 dental needle. Before treatment, patients were allowed to empty their stool and lie in the lateral position.

After regular local disinfection, the index finger of the left hand was inserted into the anus for conducting, avoiding penetration of the anus vessel wall or into the rectum. The needle was inserted at the bottom of the anal fissure and 0.5 cm from the anal verge, and the physic liquor was slowly injected; the depth was about 3 cm. The needle was withdrawn to subcutaneous tissue, then injected on the two sides of the anal fissure in fan shape; after light massage for a moment, two index fingers were inserted into the anus to perform anal dilatation. The accompanied hypertrophy of anal papilla, sentinel pile and subcutaneous fistula were removed after anal dilatation. The dosage for one injection was 3–7.5 ml. The patients were re-examined 1 week later, and if necessary, the injection was performed again. Usually 1–3 injections were needed. The results showed that among the 200 cases in the treatment group, 172 cases were cured, 25 cases showed clinical effect, and 3 cases showed no effect. 172 cured patients were followed up with for 2–36 months, with an average period of 18 months. Recurrence was not observed in 48 cases in Phase I and 92 cases in phase II. Among the 32 Phase III cases, there were 4 cases of recurrence within 1 year, 3 cases of recurrence within 2 years, and 4 cases of recurrence within 3 years; partial internal sphincterotomy combined with anal dilatation was performed for the patients and all of them recovered. It was concluded that Danshen has the function of improving microcirculation, increasing local blood flow, promoting the repair and regeneration of tissue, etc., and its function can be enhanced by combining with 654-2. CDI can significantly relieve local tissue ischemia, nutritional disorders, and pain caused by spasms of the internal sphincter, and can reduce inflammatory effusion on the wound surface and accelerate tissue regeneration and repair, thus promoting the healing of the ulcer.

2.1.16 Hemorrhoids

Wang [15] reported the application of CDI by *injectio ad acumen* in the treatment of hemorrhoids. The method was to find the pain spot

along the Tai Yang lung meridian under the acupoint Chi Ze (LU 5), around acupoint Kong Zui (LU 6), perform normal local disinfection, and after needle sensation and no blood coming with the withdrawing needle, inject 2 ml of CDI. The patients were treated once every 2 days for 5 times as one course of treatment, with 3 days between two courses. The patients were usually cured in 1–2 courses of treatment. A total of 20 patients were treated this way and were all cured. The theoretical foundation of the treatment might be that lung controls the skin and hair, and the lung and the large intestine being interior–exteriorly related, thus hemorrhoids can be treated by acupoint Kong Zui, and the double effects of acupuncture and medication can be obtained.

2.2 Skin Diseases

2.2.1 Lupus Erythematosus

Lupus erythematosus is an autoimmune disease. There are two TCM theories about its etiology, namely the deficiency of the kidney and blood stasis. For patients whose main symptom is blood stasis, Danshen can be administered by intravenous drip and by intramuscular injection during the consolidation phase. Danshen has significant effects on Raynaud's disease and skin damage regression, but has no significant effects on immunological indexes. The injective preparation of tanshinol, one of Danshen's many components, has the same effect as Danshen on the treatment of lupus erythematosus. Li et al. [16] reported the application of CDI in the treatment of systemic lupus erythematosus in 32 cases. CDI was administered by intravenous drip, 16–20 ml per day, for 14 days as one course of treatment. The results showed that the marked effective rate was 81.3 %, the effective rate was 93.8 %, and the effect was significantly different compared with the group treated with prednisone ($P < 0.01$). The treatment of systemic lupus erythematosus with compound Danshen mainly depends on its anticoagulation function, which can improve blood circulation in the tissues and

organs, and relieve wide small vasculitis changes induced by systemic lupus erythematosus.

2.2.2 Scleroderma

Scleroderma is accompanied by a series of blood stasis (e.g., blood circulation disturbance). Research has shown that Danshen has the function of regulating blood vessel function, improving blood circulation, and anti-inflammation. Qin [17] reported the application of Danshen Injection in the treatment of scleroderma. 16 patients with scleroderma were administered by intravenous drip with 8–16 ml of Danshen Injection in low molecular dextran or 500 ml of 5–10 % glucose solution. The total effective rate was 68.8 %. Tanshinol, the water-soluble component of Danshen, has a similar effect on the disease.

2.2.3 Dermatomyositis

The characteristics of dermatomyositis include inflammation of the skin, muscle, and small blood vessels. Shan Yijun (1986) reported the application of Danshen in the treatment of the disease. 4 ml of Danshen Injection was administered by intramuscular injection each time, 1–2 times a day. 50 patients were treated, with 40 cases of marked effect, and the therapeutic effects for patients with blood vessel damage were enhanced by intravenous drip.

2.2.4 Sjogren's Syndrome

The disease is closely related to collagen diseases, and it also belongs to chronic inflammatory autoimmune diseases. During the treatment, it was found that the therapeutic effect could be enhanced by the combination of common Threewingnut root (雷公藤) with Danshen tablets or tanshinol injection by intramuscular or intravenous administration, and symptom improvement was better than that when treated by common Threewingnut root alone.

2.2.5 Infectious Diseases

Gao Yugui et al. (1993) reported the application of Danshen extractive tablets for oral use and 2 % total tanshinone in Vaseline for external use in the treatment of *Staphylococcus aureus* and beta-*Streptococcus* infection. 455 cases with symptoms of furuncle, phlegmon, traumatic infection, and burn infection were treated. Clinical observations confirmed that Danshen indeed has antibacterial and anti-inflammatory functions, and can activate blood circulation and dissipate blood stasis, promote wound surface healing, etc. The total effective rate was 90 %. It has the advantage of high therapeutic effects and no side effects for long term use. It has relatively good therapeutic effects on infections of the drug resistant strains of *Staphylococcus aureus*.

The pharmacological studies performed by the Institute of Materia Medica of Chinese Academy of Sciences showed that Danshen has strong antibiotic activity against Gram-positive cocci, especially *Staphylococcus aureus*. 58 strains resistant to penicillin, erythromycin and various antibiotics were tested in drug sensitivity tests, and the results showed that all strains were sensitive to Danshen. They also discovered that Danshen has antibacterial action against hemolytic *streptococcus* and human tubercle *bacillus*. Danshen extracts were used to treat *Staphylococcus aureus* infection in 354 patients, and satisfactory therapeutic effects were observed. No toxicity, side effects, or resistance was observed after long-term application.

2.2.6 Alopecia Areata

Huang Shunde et al. (2002) reported the application of Danshen in the treatment of alopecia areata. 25 ml of prednisone, 2 ml of compound Danshen and 2 ml of 2 % lidocaine were mixed and subcutaneous punctiform blocking was performed. 50 cases were treated in this manner once every 1–3 weeks for 1–3 times. The patients were administered with 25 mg of doxepin, 3 times/day. The results showed that 34 cases

(70.8 %) recovered, 13 cases (27.1 %) had clinical effect, 1 case (2.1 %) had no effect, and the total effective rate was 97.9 %.

2.2.7 Acne

Acne is a skin damaging disease with very high incidence. The causes of the disease include endocrine disorder, infection by acne *Corynebacterium*, increase in blood viscosity, etc. Tanshinone is the ethanol extract of Danshen studies have shown that it can significantly inhibit Gram-positive bacteria and *Corynebacterium*; it has the function of antibiotics and male hormones. It also has an anti-inflammatory function similar to hydrocortisone. There was no endocrine disorder or other side effects after long-term usage.

Wang [15] reported the application of CDI by *injectio ad acumen* in the treatment of acne and its induced pigmentation. The therapeutic method was to select acupoints Hegu (LI 4) and Zusanli (ST 36), perform normal local disinfection, insert the needle and after needle sensation and no blood coming with the withdrawing needle, inject 2 ml of CDI in each acupoint, alternating left and right with the acupoint injections, once every 2 days for 10 times as one course of treatment. There was a 5-day interval between 2 courses of treatment, and 1–3 courses were usually needed. Among the 45 cases treated, 36 cases were cured (the skin returned to normal and pigmented spots disappeared by 90 % or more), 7 cases were improved (symptoms changed from severe to mild, pigmented spot area shrank by 10 % or more, or pigment turned lighter), and 2 cases showed no effect (no significant change after treatment). Facial acne and pigmentation are usually caused by blood deficiency, lack of nutrients in the face; or obstruction of the meridian by blood stasis preventing blood from reaching the face. CDI has the function of improving blood circulation, and the face is split in the fields of Hand and Foot-Yang Ming Channels, which are distributed on the face. Thus, Hegu and Zusanli acupoints were selected for CDI injection, and significant therapeutic effect were obtained.

Yu et al. [18] reported the curative effect of tanshinone on acne. 100 patients diagnosed with common type acne and without a history of general medication within 1 month were selected. The patients were 14–32 years old (20.41 ± 4.18), and the course of the disease ranged from 3 months to 10 years (median: 113 days). The skin lesions of the patients were all mainly facial damage, and some were accompanied by damage on the back, shoulder, and chest. The above patients were randomly divided into two groups: 56 people in the treatment group; 21 male, 35 female, 24 papule type, 20 pustule type, 8 cyst type, and 4 conglomerate type. 44 patients in the control group, 15 male, 29 female, 20 papule type, 16 pustule type, 6 cyst type, and 2 conglomerate type. The age, gender, course of disease, disease typing, and severity in the two groups were similar. The patients in the treatment group were administered orally with 4 capsules of tanshinone (3 capsules for patients between 15 and 17 years old and with body weight less than 50 kg), 3 times a day, for 4 weeks. The patients who were not cured continued to be treated, but the treatment would not last more than 6 weeks. The patients were applied externally with chloramphenicol tincture, three times a day. The patients in the control group were administered orally with 0.25 g of erythromycin, 4 times a day, and chloramphenicol tincture was applied externally. All patients were examined once each week for 6 weeks. 56 cases in the treatment group and 44 cases in the control group were observed regularly, and a rank test was performed for therapeutic effects, with a significant difference observed. The therapeutic effect of the treatment group was better than that of the control group. The onset times of effectivity in the tanshinone treatment group were: 8 cases after 1 week, 29 cases after 2 weeks, and 13 cases after 3 weeks. The onset time for most patients (80 %) with marked effect was 2–3 weeks after treatment. The clinical characteristics of tanshinone treatment showed varying degrees of efficacy on various types of acne. It was observed that tanshinone treatment had very good efficacy on pustule type and papule type acnes, but poor efficacy on cyst type and conglomerate type acnes. The adverse reactions during tanshinone treatment involved

4 females who suffered from different degrees of excessive menstruation, and they recovered to normal after drug reduction. No abnormality was observed by examination of blood routine, blood clotting time and liver function before and after treatment.

2.2.8 Burns and Scalds

Zhong et al. [19] reported the application of CDI in the treatment of 50 cases of sub-second degree burns and scalds. The patients in the control group received conventional therapy, which was washing with 1 % benzalkonium bromide (benzalkonium bromide), cutting off the dead skin and blisters, cleaning the necrotic tissue, spraying gentamicin and lidocaine in physiological saline for disinfection and pain relief, applying burn moist paste, which was changed once everyday, and irradiating with ordinary 60–100 W incandescent lamps until a scab formed. The patients in the treatment group received the conventional therapy plus 5–50 ml of CDI by intravenous injection; the exact dosage was determined based on the area of the burn and scald, deepness and gradient of infection, and body weight. The results showed that compared with patients in the control group, patients in the treatment group had less wound exudate, milder edema, and slighter pain; the average wound healing times in the treatment group and control group were 12 and 20 days, respectively. The times for the scab to crack and come off in the treatment group were 8–13 days, and in the control group, 10–16 days. There were significant differences in wound surface infection rate and healing times between the two groups. Therefore, integration of CDI into the comprehensive treatment of burns and scalds is beneficial to the tissue regeneration and repair. Danshen has the function of antiplatelet aggregation and activating blood circulation and dissipating blood stasis, improving microcirculation, increasing blood flow supply to wound surface, especially to the muscular layer under the infection lesions, enhancing local cell metabolism, supplying nutrients, and promoting granulation, thus promoting tissue repair at an early stage. Due to

improvements in local blood circulation, immunological substances increased in the body and the body's phagocytic capacity and resistance to damage were enhanced, such that it could prevent and control infection.

2.2.9 Infected Wounds

Ren and Ren [20] reported the treatment of 63 patients with infected wounds with Mayinglong Shexiang Zhichuang Haemorrhoids Paste (马应龙麝香痔疮膏) combined with Danshen Injection. The wounds were cleaned thoroughly and the paste was applied on the surface of the wounds. For patients with deep wounds, the paste was applied on the surface of a drainage strip and the drainage strip was inserted in the wound. The drug was changed every 3 days. In addition to the anti-infection treatment, 250 ml of Danshen was administered by intravenous drip, once a day for 15 days as one course of treatment. The second course of treatment was performed 1 week after drug discontinuance. The results showed that all 63 patients were cured within 2 months: 44 cases within 10–15 days, 16 cases within 15–30 days, and 3 cases within 2 months. The average healing time was 12.5 days, and there was a significant difference in therapeutic effect before and after the treatment. No adverse effects were observed.

2.2.10 Stasis Eczema

Li and Gao [21] reported that 6–10 ml of CDI in 250 ml of 5 % glucose was administered by intravenous drip to 25 patients with stasis eczema, once a day. The results showed that the drug could cure the disease. There was mild pigmentation or decrescence after the treatment. One month later the patients recovered, with no recurrence observed. Compound Danshen Injection has the function of activating blood circulation and dissipating blood stasis, and thus can improve the skin's blood supply, enhance immunologic function in the lesions, and promote the disappearance of inflammation.

2.2.11 Keloids

Yang Wei (2002) reported that 40 cases of keloid were treated with Danshen Injection or Compound Danshen Injection by external application and local obturation. 20 cases received external application treatment, which was performed as follows: a disinfected absorbent cotton or bandage was saturated with Danshen Injection and used to cover the skin lesions until the liquid dried naturally, 2–3 times a day, with a daily dosage of 2–8 ml. 20 cases received local obturation: the skin was disinfected and a No. 5 dental needle or 25 ml syringe for single use was used for injection in the skin around the lesions. The needling directions were inclining to the muscle under the lesions, and 1–4 sites were selected based on the conditions of the lesions, 0.5–1 ml each site, for 10 days as one course of treatment, with 2–3 days between two courses. The above two methods were performed until the color of the damaged skin turned to normal, the damaged skin became soft, and severe itching disappeared; the treatment time ranged from 6 days to 9 months. It was concluded that the methods were effective, quick, low-cost, and without toxicity and side effects.

2.2.12 Verruca Planae

Ma et al. [22] reported the application of fresh Danshen leaf in the treatment of 26 patients with Verruca plana. Fresh Danshen leaves were gathered, washed clean with water, and used to rub the damaged skin until the wart and its surrounding skin turned reddish and the patients felt a burning pain, indicating that Danshen leaf juice had penetrated the verruca plana. The debris was washed off with water 1 h later. The treatment was performed twice a day, once in the morning and once in the evening. All 26 patients were cured, the skin was smooth and glossy, and no scar was formed, and no toxicity or side effects were observed.

2.2.13 Psoriasis

Wang and Zhang [23] observed the effect of Danshen on the treatment of 32 patients with psoriasis. Patient profile: 20 male and 12 female; 26–42 years old; course of disease 6 months to 5 years; psoriasis vulgaris 30 cases (guttiform skin 5 cases, map like 12 cases, coin like and plaque 13 cases), erythrodermic psoriasis 2 cases; 12 cases had been treated by antitumor drugs. All patients were administered with 20 ml of CDI in 500 ml of 5 % glucose solution by intravenous drip, once a day, for 15 days as one course of treatment. There was a 5-day interval between two courses, and no other treatments were applied during the treatment period. The therapeutic effects were observed and nail fold circulation was reviewed. The results showed that 21 cases were cured (erythema and scaling were dissipated), and 11 cases were improved (attenuation of skin damage, partial dissipation of erythema and scaling). Among the cured patients, the shortest time of treatment was two courses, and the longest was four courses. During the treatment period, there were 3 cases with mild dizziness, but no other adverse reactions were observed in the other patients. The nail fold microcirculation in the left ring finger before and after treatment was observed. Among the 30 cases with blurred blood vessels, 28 cases became clear after treatment; among the 20 cases with reduced capillary loop density, 18 cases returned to normal after treatment; among the 19 cases with widened and enlarged capillary loops, all returned to normal after treatment; among the 22 cases with distorted and disorganized capillary loops, 21 cases returned to normal after the treatment; among the 20 cases with slow blood flow, all returned to normal after treatment; among the 18 cases with shrunken diameter in input part and enlarged diameter in output part, 17 cases returned to normal after treatment; among the patients with erythrocyte aggregation, 11 cases mild, 16 cases moderate, and 5 cases severe, all symptoms disappeared after treatment.

2.2.14 Herpes Zoster

Deng et al. [24] reported the application of CDI combined with acyclovir in the treatment of herpes zoster in 60 cases. Both control and treatment groups received acyclovir treatment, but the patients in the treatment group received an additional 20 ml of CDI which was mixed with 500 ml of 5 % glucose and administered by intravenous drip once a day for 7 days as one course of treatment. The results showed that the incidence of neuralgia was significantly reduced in the treatment group. The mechanism may be through Danshen's function of improving the permeability of blood capillary microcirculation, promoting absorption of antiviral drugs, inhibiting ganglion and hyperemia of corresponding sensory nerve fibers, edema and necrosis, and preventing adhesions, thus preventing the occurrence of neuralgia.

2.2.15 Scrotal Eczema

Li [25] reported the application of anti-itching lotion combined with Danshen tincture in the treatment of 30 patients with scrotal eczema with satisfactory therapeutic effects. The 30 patients were 18–65 years old and the course of the disease ranged from 3 days to 5 years. All patients suffered from flushing in the scrotum and perineum, intense itching, pleomorphic skin damage, erythema or papule, blister or pustule, and a few with erosion, and chronic patients could have scale and moss like damage. Clinically, there was a tendency of recurrence, fusion, and effusion. The therapeutic method was to apply the anti-itching lotion on the lesions, which consists of the following drugs: light yellow sophora root (苦参) 60 g, common cnidium fruit (蛇床子) 60 g, common capsicum fruit (鹤虱) 30 g, hydnocarpus (大枫子) 30 g, belvedere fruit (地肤子) 30 g, dense fruit pittany root-bark (白鲜皮) 30 g, amur corktree bark (黄柏) 30 g, radix et rhizoma rhei from sichuan of china (川军) 30 g, paniculate swallow wort root or herb (徐长卿) 30 g, hairyvein agrimony herb (仙鹤草) 30 g, raw almond (生杏仁) 13 g, sessile stemona root

tuber (百部) 13 g, sulfur (硫黄) 10 g, and wasps nest (蜂房) 15 g.

2.2.16 Progenital Hypopigmentation

Xu Chengkang et al. (2003) reported the therapeutic effect of Compound Danshen Injection on the treatment of progenital hypopigmentation. 50 patients with progenital hypopigmentation who had been unsuccessfully treated by other methods were divided into 3 groups. The 25 cases in the research group received 5–10 ml each of 1 % procaine and CDI injected into the lesions, twice a week, for 8 times as one course of treatment. The 15 cases in the procaine control group received 1 % procaine by local injection, and the dosage and courses of treatment were the same as in the research group. The 10 cases in the blank control group received no treatment. The therapeutic effects were compared among the 3 groups 1 month later. The results showed that in the research group there were 12 cured cases (48 %), 8 improved cases (32 %), and the total effective rate was 80 %. There were no cured cases and 3 improved cases (20 %) in the procaine control group, and the total effective rate was 20 %. There were neither cured nor improved cases in the blank control group. The differences among the three groups were statistically significant ($P < 0.01$). It was concluded that satisfactory therapeutic effects could be obtained by local injection of CDI and 1 % procaine to treat progenital hypopigmentation, and it could be used as a complementary method to the conventional therapy.

Zhang Yanqin (2000) reported the application of CDI in the treatment of white lesions of the vulva in 46 cases. The patients were 16–70 years old, with an average age of 43, and 2 cases were under 40 years old; 35 cases were from the countryside and 11 cases from cities; the shortest course of disease was 2 months, and the longest was 3 years. The therapeutic method was to disinfect the area around acupoint Hui Yin (RN 1) with iodine tincture and alcohol, pierce needle straight into the acupoint, and after no blood coming with the withdrawing needle, inject 4 ml

of CDI. After injection, the patient usually had the sense of defecation, soreness and numbness. The drug was administered once each day 10 times as one course of treatment, with 2–3 days between the courses. Normally after one course of treatment improvement could be observed, and recovery achieved in 2–4 courses. Among the 46 patients in the treatment group, there were 43 recovery cases (93.48 %) and 3 improvement cases (6.52 %), and the total effective rate was 100 %.

2.2.17 Pigmentary Purpuric Dermatitis

Yu Huijuan (2002) reported the application of Dantonice™ with vitamin C in the treatment of pigmentary purpuric dermatitis (PPD). Among the 40 PPD patients, 11 had pigmentary purpuric dermatitis, 15 had pigmentary purpura, and 14 had purpura annularis telangiectodes. 9 cases were accompanied with cardiovascular disease. 10 pills of Dantonice™ were administered each time, three times a day; 0.1 g of vitamin C was taken orally, three times a day. One course of treatment lasted for 20 days, and 2 courses of treatment were observed. The results showed recovery in 9 cases (22.5 %), marked effect in 13 cases (32.5 %), effect in 11 cases (27.5 %), and no effect in 7 cases (17.5 %); the total effective rate was 82.5 %. pigmentary purpuric dermatitis belongs to the category of lymphocytic periductal capillaritis, which is similar to “blood malnutrition” disease in tradition Chinese medicine. Gravity and increased venous pressure can cause slowed blood circulation in the lower limbs, which could cause stagnation and generate heat after a prolonged period, damaging blood vessels and the collaterals. The blood fails to circulate in the vessels, thus leading to the disease. The disease can be treated by drugs for activating blood circulation and dissipating blood stasis, cooling blood and removing ecchymoses. It is believed in TCM that Danshen has the function of cooling blood, activating blood circulation, and eliminating stasis; Sanchi has the function of activating blood circulation and dissipating blood stasis, and stopping bleeding; synthetic borneol

has the function of clearing heat, activating blood circulation, and dredging collaterals. Dantonice™, which contains the three drugs, can be used in the treatment of PPD to reduce capillary permeability and intravascular pressure by dilating the capillaries and increasing the opening of capillary beds, improving microcirculation, regulating body fibrinolysis and blood clotting, promoting blood flow speed in blood capillaries, promoting normal hemorheology, and promoting the absorption of hemorrhage, edema and stagnant blood. Vitamin C has the function of reducing the permeability and fragility of capillary walls. The two drugs have synergistic effect, so good efficacy was achieved.

In summary, Danshen is a suitable and common drug for the treatment of diseases in the departments of surgery and dermatology. Stagnant blood can be easily induced by wound and surgery, and there is a close relationship between the stagnation of blood stasis and lupus erythematosus, scleroderma, keloid, and psoriasis. Animal and clinical experiments have demonstrated that Danshen has the function of activating blood circulation and dissipating blood stasis, clearing the heat and expelling toxin; thus the drug is effective and safe.

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