

Moving the Blood and Transforming Stasis for Chronic Subdural Hematoma

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A 44-year-old female fainted when she went to the bathroom at midnight. There was a bruise over her right cheek when she regained consciousness. The patient had no headache or neurological defects on physical examination. The computed tomographic (CT) scan of the brain showed a chronic subdural hematoma over the right fronto-parietal lobe 12 weeks after the fainting episode. She took a modification of *xuě fǔ zhú yū tāng* (血府逐瘀湯, XZT, House of Blood Stasis-Expelling Decoction) for moving the blood and transforming stasis. The subdural hematoma disappeared 2 months after she began taking the formula. The mechanisms of XZT to treat chronic subdural hematoma might be (1) regulating the permeability of hematoma capsule to prevent recurrent bleeding, and (2) promoting the microcirculation around the hematoma to accelerate resolution of subdural collection. (*Chang Gung Med J* 2006;29(4 Suppl):47-53)

Key words: Chronic subdural hematoma, *xuě fǔ zhú yū tāng* (XZT, House of Blood Stasis-Expelling Decoction), moving the blood and transforming stasis.

Chronic subdural hematoma is an encapsulated collection of blood, mostly or totally liquefied and located between the dura mater and arachnoid. It most commonly occurs in the older age groups (80% of patients are older than 40 years). Generalized cerebral atrophy and increased venous fragility associated with aging are the major predisposing factors. With aging, the mass of the brain decreases leading to an increase in the space between the brain and skull. This causes stretching of the bridging veins and the greater movement of the brain within the cranium makes these veins vulnerable to trauma. Trauma is an important factor in the development of chronic subdural hematoma and symptoms might occur weeks or months after a trivial injury. However, history of a head injury is absent in about 30%-50% of these cases. Other predisposing factors include anticoagulation, alcoholism, epilepsy, bleeding diathesis, low intracranial pressure sec-

ondary to dehydration or after the removal of cerebrospinal fluid.⁽¹⁻²⁾

Treatment of chronic subdural hematoma is usually by surgical evacuation, although small hematomas may resolve spontaneously. For more than 40 years, investigators have attempted to treat patients with chronic subdural hematomas using medical means. Various combinations of bed rest, corticosteroids, mannitol, and other hypertonic solutions have been used. Medical management has the highest likelihood of success in small size hematomas, with minimal mass effect, and few neurologic symptoms.^(1,3,4)

Chronic subdural hematoma is described as the blood away from the channel, which means static blood according to the theories of traditional Chinese medicine (TCM). Some physicians used Chinese herbal formulas to treat hematomas by moving the blood and transforming stasis.⁽⁵⁻⁷⁾

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CASE REPORT

Mrs. Sun, a 44-year-old housewife, had medical history of β -thalassemia minor and lead poisoning. About 10 years ago, she had an episode of abdominal pain and fainted on the way to the bathroom at midnight. She suffered from abdominal pain again at midnight on January 9, 2003. She had blackouts and fainted on the way to the bathroom similar to the prior incident 10 years earlier. When she regained consciousness, a bruise over her right cheek was noted. She visited our emergency department. Her blood pressure was 120/80 mmHg. Her consciousness was clear. She had no headache or vomiting. The neurological examination results were normal. The results of the electroencephalogram, electrocardiogram, 24-hour Holter electrocardiogram were all normal. The hemoglobin was 12.3 g/dl (reference, 12.0-16.0 g/dl), platelet was $177 \times 10^3/\mu\text{l}$ (reference, $140\text{--}400 \times 10^3/\mu\text{l}$), and plasma lead was 1.7 $\mu\text{g}/\text{dl}$ (reference, 0-30 $\mu\text{g}/\text{dl}$).

Mrs. Sun had her menstrual cycle every 21 to 25 days before. Her last menstrual period was February 10, 2003 and she menstruated again on February 25, 2003. The amount of bleeding was moderate. A painful skin colored papule over her left axilla was noted before menstruation. She came to our outpatient department of traditional Chinese medicine on March 4, 2003 for further evaluation and treatment. According to the four physical examination categories of TCM, the inspection showed moderate body form and pinkish tongue with an uneven thin slimy white fur. The listening and smelling examination results were normal. Her oral intake, defecation, urination, and sleep patterns were normal on inquiry. Palpation revealed a skin colored papule over her left axilla and her wrist pulses were string-like and rough. We prescribed *jiā wèi xiāo yáo sǎn* (加味逍遥散, JXS, Supplemented Free Wanderer Powder) for coursing liver (treating emotional depression) and nourishing blood, *xiān fāng huó mìng yǐn* (仙方活命饮, XHY, Immortal Formula Life-Giving Beverage) for dispersing swelling and dissipating binding, and *liù wèi dì huáng wán* (六味地黄丸, Six-Ingredient Rehmannia Pill) for enriching kidney yin (regulating gonadal function). She menstruated on March 21, 2003 and the papule over the left axilla had dispersed slightly. We continued the prescriptions of JXS to

regulate menstruation and XHY to disperse the axillary papule. Her menstruation cycles returned to normal.

The CT scan of her brain without contrast enhancement was done on April 3, 2003 (Fig. 1). It showed a chronic subdural hematoma over the right fronto-parietal lobe with brain swelling and the midline slightly shifted to the left. The neurosurgeon suggested an operation. Mrs. Sun hesitated. She continued to do well and do not have headaches and the neurological examination results were normal. Chinese herbal therapy was started after detailed discussion. If the hematoma was not absorbed, then the operation would be performed. We prescribed 2 g *Xuě fǔ zhú yū tāng* (血府逐瘀汤, XZT, House of Blood Stasis-Expelling Decoction) for moving the blood and transforming stasis, 2 g JXS for coursing liver and nourishing blood, and 1 g XHY for dispersing swelling and dissipating binding to be taken four times per day. The follow-up CT scan of her brain without contrast enhancement on June 21, 2003 (Fig. 2) showed that the right fronto-parietal chronic subdural hematoma had disappeared and the brain swelling subsided without midline shift.

DISCUSSION

Trauma is an important factor in the development of chronic subdural hematoma. The initial trauma to the bridging veins results in hemorrhaging in the subdural space. A day after hemorrhage, the outer surface of the hematoma is covered by a thin layer of fibrin and fibroblasts. Migration and proliferation of the fibroblasts lead to formation of a membrane over the clot within 1 week. The outer membrane progressively enlarges and the fibroblasts invade the hematoma and form a thinner inner membrane within 3 weeks and liquefaction of the hematoma occurs due to the presence of phagocytes. The hematoma may either resorb spontaneously or slowly increase in size resulting in a chronic subdural hematoma.^(1,8)

Two major theories have been proposed to explain the growth of chronic subdural hematomas. Osmotic theory was based on the hypothesis that the liquefaction of the hematomas increases the protein content and oncotic pressure in the encapsulated fluid, thus attracting fluid from the neighboring vessels into the cavity due to osmotic pressure gradient

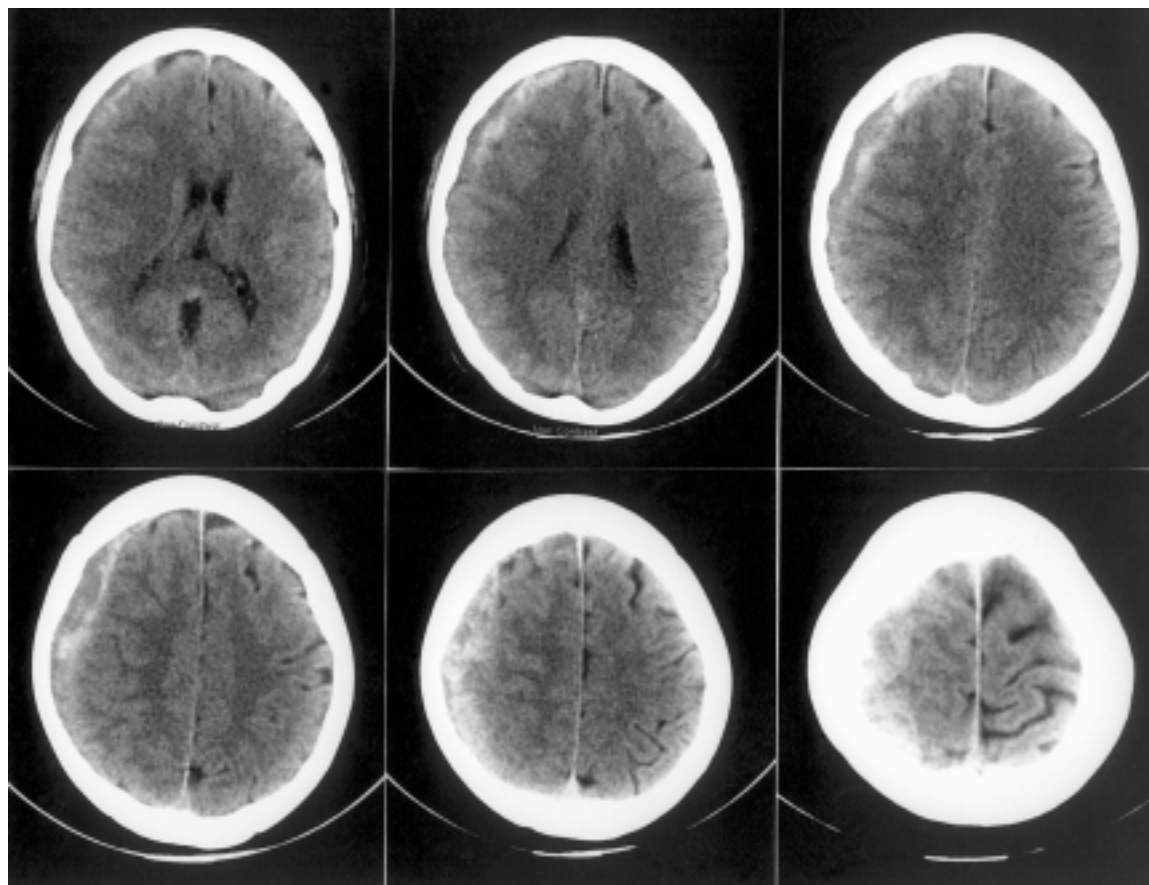


Fig. 1 CT scan of brain without contrast enhancement 12 weeks after head injury shows a chronic subdural hematoma over right fronto-parietal lobe, brain swelling, and midline slightly shifting to the left.

across the semipermeable membrane. However this theory was disproved by Weir in 1971, who demonstrated no significant difference in the osmolality of the contents of chronic subdural hematoma compared with cerebrospinal fluid and serum. Recurrent bleeding from the hematoma capsule is the proven and more widely accepted theory. The hematoma capsule has abnormal and dilated blood vessels with incomplete basement membranes causing protein and red blood cells to leak through the defective capillary endothelium into the evolving chronic subdural hematoma. Increased fibrinolytic activity and coagulation abnormalities may also play a part in the expansion of chronic subdural hematoma.^(1,8)

The clinical presentations of chronic subdural hematoma include altered mental state (confusion, drowsiness, coma), alternations in personality or intellect, focal neurological deficit (hemiparesis,

weakness, difficulty in speaking), headache, falls, seizures, and transient neurological deficits (disturbance in language, hemiplegia, hemisensory deficit). The presentation in the elderly is different from that in younger adults. The normal atrophy of the brain associated with aging results in more intracranial spaces in which the hematomas can develop. Symptom onset in older patients is typically more insidious, and symptoms are more likely to manifest as changes in cognition or focal findings rather than increased intracranial pressure. Younger patients are more likely to present with signs of increased intracranial pressure such as papilledema, vomiting, and headaches.^(1,2,9)

Computed tomography is the procedure of choice for the initial evaluation of suggested chronic subdural hematomas. A chronic subdural hematoma is a dynamic lesion and its appearance on computed

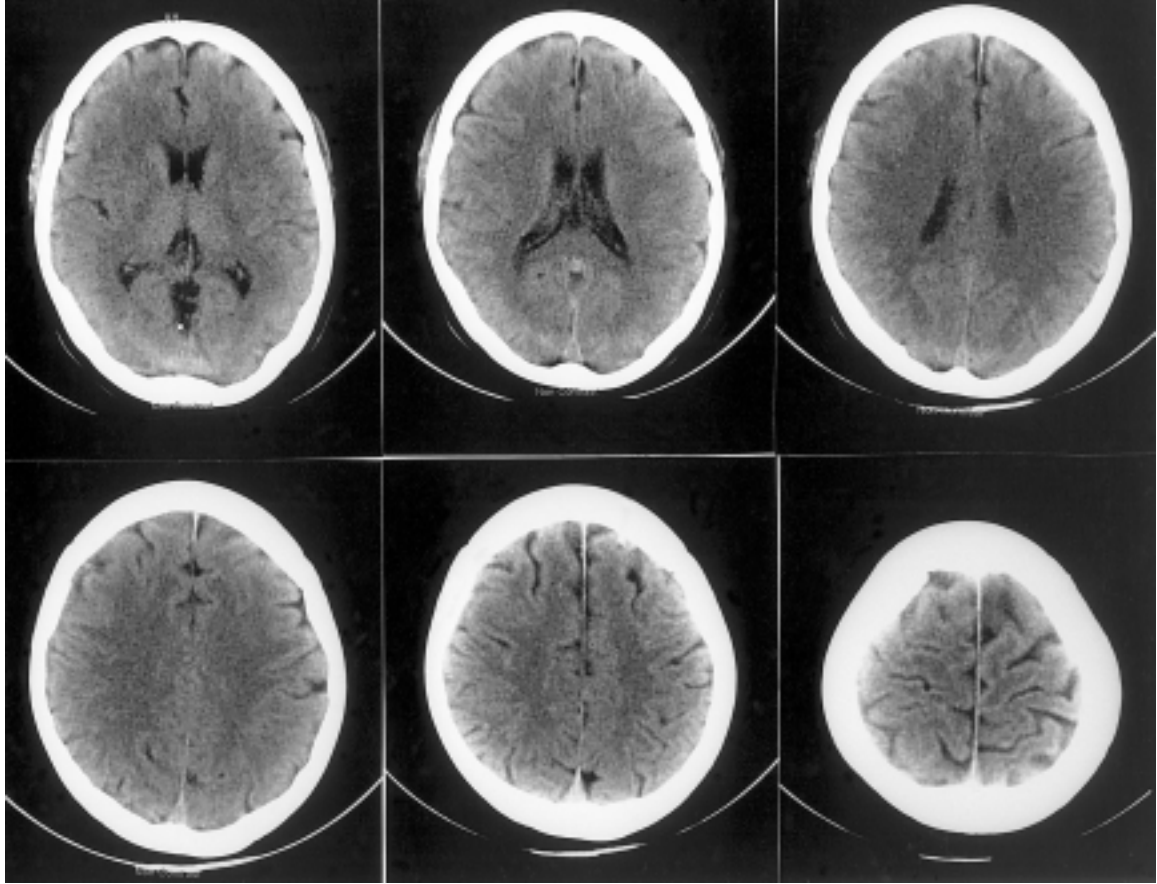


Fig. 2 CT scan of brain without contrast enhancement 2 months after Chinese herbal therapy shows the right fronto-parietal chronic subdural hematoma has disappeared, and the brain swelling subsided without midline shift.

tomography is dependent on its age. Soon after a hemorrhage (acute phase), the hematoma looks hyperdense when compared with the normal brain, due to the presence of fresh blood. Hematomas between 3 days and 3 weeks old are considered to be subacute and appear isodense. After about 3 weeks (chronic phase) it appears hypodense. However repeated microhemorrhaging into a chronic subdural hematoma can increase the density, giving rise to a heterogeneous or a hyperdense picture. The use of intravenous contrast medium during CT scanning may identify the membrane surrounding the hematoma.^(1,10)

Treatment of chronic subdural hematoma is usually by surgical evacuation, although small hematomas may resolve spontaneously. The common surgical procedures include twist-drill craniostomy, burr-hole drainage, or craniotomy. The complications

of surgery are infection, inappropriate secretion of antidiuretic hormone, hematoma reaccumulation, seizures, tension pneumocephalus, intracerebral hemorrhage, and subdural empyema. For more than 40 years, investigators have attempted to treat patients with chronic subdural hematomas using medical means. Various combinations of bed rest, corticosteroids, mannitol, and other hypertonic solutions have been used. Medical management has the highest likelihood of success in those who have small size hematomas, with minimal mass effect, and few neurological symptoms. Patients receiving medical treatment may have more extended periods of bed rest, with the risks of deep venous thrombosis and pulmonary embolism. Prolonged corticosteroid therapy is associated with glucose intolerance, increased infection risk, and gastrointestinal hemorrhage. Mannitol use may result in electrolyte imbal-

ance, dehydration, and renal failure.^(1,3,4)

Chronic subdural hematoma is described as the blood away from the channel, which means static blood according to the theories of traditional Chinese medicine. Some physicians used *tōng qiào huó xuě tāng* (通竅活血湯, Orifice-Freeing Blood-Quickening Decoction), XZT, or *bǔ yáng huán wǔ tāng* (補陽還五湯, Yang-Supplementing Troop-Marching Decoction) to treat the hematoma by moving the blood and transforming stasis.⁽⁵⁻⁷⁾

XZT is from the writings called *Yī Lín Gǎi Cuò* (醫林改錯, Correction of Medical Errors) by Wáng Qīng-Rèn (王清任, 1768-1831) during the Qing dynasty. The formula is composed of peach kernel (桃仁, *táo rén*, *Persicae Semen*), carthamus (紅花, *hóng huā*, *Carthami Flos*), Chinese angelica (當歸, *dāng guī*, *Angelicae Sinensis Radix*), dried/fresh rehmannia (生地黃, *shēng dì huáng*, *Rehmanniae Radix Exsiccata seu Recens*), ligusticum (川芎, *chuān xiōng*, *Ligustici Rhizoma*), red peony (赤芍藥, *chì sháo yào*, *Paeoniae Radix Rubra*), bupleurum (柴胡, *chái hú*, *Bupleuri Radix*), bitter orange (枳殼, *zhǐ ké*, *Aurantii Fructus*), achyranthes (牛膝, *niú xī*, *Achyranthis Bidentatae Radix*), platycodon (桔梗, *jié gěng*, *Platycodonis Radix*), and licorice (甘草, *gān cǎo*, *Glycyrrhizae Radix*). It was designed to treat blood stasis in the chest and may be expanded to treat all qi stagnation and blood stasis. The clinical applications include cardiovascular (coronary artery disease, myocardial infarction, myocarditis, arrhythmia, cor pulmonale, hypertension, vasculitis), respiratory (asthma, pneumoconiosis), digestive (liver cirrhosis, chronic hepatitis, chronic gastritis), nervous system (migraine, trigeminal neuralgia, facial palsy), gynecological (dysmenorrhea, menstrual irregularity, infertility, climacteric syndrome, fibroadenoma of breast), and surgical (subdural hematoma, epidural hematoma, intracerebral hemorrhage, chest contusion).⁽¹¹⁻¹⁴⁾

The pharmacologic effects of XZT are (1) improving microcirculation, vasodilatation and reducing vascular resistance, (2) regulating coagulation and anticoagulation to prevent thrombosis, (3) enhancing the reticuloendothelial function, (4) regulating the permeability of capillaries to decrease exudation and accelerate absorption of exudate, (5) improving neural metabolism and promoting repair of damaged tissue, (6) inhibiting proliferation of connective tissue and decreasing scar formation and

adhesion, (7) analgesia, (8) inhibiting growth of tumor cells, (9) activating clearance ability of the liver, and (10) lowering blood lipids.⁽¹¹⁻¹³⁾

The mechanisms of XZT to treat chronic subdural hematoma might be (1) regulating the permeability of hematoma capsule to prevent recurrent bleeding, and (2) promoting the microcirculations around the hematoma to accelerate resolution of subdural collection.^(5,6,12)

Our case is a middle-aged female who had history of head injury without neurological symptoms. Her only symptom was menstrual irregularity. We were not certain whether the menstrual irregularity was associated with the head injury. CT scan of the brain 12 weeks after the injury showed a chronic subdural hematoma over right fronto-parietal lobe. The hematoma was heterogeneous due to repeated microhemorrhaging. The right side of the brain was swollen and the midline was slightly shifted to the left. Chinese herbs were given because of the small size of the hematoma, with minimal mass effect, and no neurologic symptoms. The major prescription was XZT for moving the blood and transforming stasis. The addition of frankincense (乳香, *rǔ xiāng*, *Olibanum*) and myrrh (沒藥, *mò yào*, *Myrrha*) in XHY also have the effect of moving the blood and transforming stasis. The chronic subdural hematoma resolved 2 months after beginning Chinese herbal therapy.

There is a question about whether the hematoma resolved spontaneously or due to the effects of herbs? The CT scan of the brain indicated continuous repeated bleeding and provided the evidence that the hematoma had the potential to increase in size. Thus, herbal therapy should be considered helpful in the resolution of the chronic subdural hematomas. However, patient selection (small size hematoma, minimal mass effect, and few neurological symptoms) is the key to nonoperative therapy. The patient should be observed carefully during the course of the herbal therapy. Surgical treatment is recommended if the neurological symptoms deteriorate.

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活血化瘀法治療慢性硬膜下血腫

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一名 44 歲女性，有外傷史，沒有意識變化、頭痛、或神經缺損症狀。外傷 12 週後的腦部電腦斷層掃描發現右額頂葉慢性硬膜下血腫，治療以血府逐瘀湯為主活血化瘀。兩個月後，慢性硬膜下血腫已吸收，沒有併發症。血府逐瘀湯治療慢性硬膜下血腫的機轉可能為：(1) 調節血腫被膜血管的通透性，免於再出血。(2) 增強血腫周圍組織的微循環，促進血腫內積液吸收。(長庚醫誌 2006;29(4 Suppl):47-53)

關鍵詞：慢性硬膜下血腫，血府逐瘀湯，活血化瘀。

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