

Clinical reports

Successful use of Shakuyaku-kanzo-to, a traditional herbal medicine, for intractable symptoms of thoracic outlet syndrome: a case report

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Abstract Shakuyaku-kanzo-to (SKT) is a traditional herbal medicine that is widely used for muscular cramp and abdominal pain. We administered SKT for a patient with thoracic outlet syndrome (TOS) complaining of several resting symptoms. A 28-year-old female patient complained of intractable pain in the left arm, shoulder, and back and weakness, numbness, and muscular cramp in the left arm. She was diagnosed as TOS by digital subtraction angiography. Two days after the start of administration of SKT, her severe pain was markedly improved. Although numbness of the left arm was not improved, her overall pain score was reduced by 2 on the 7th day after the start of SKT. SKT has several pharmacological effects including analgesic and antiinflammatory effects, vasodilation, and muscle relaxation. Thus, our report suggests that SKT could be a first-line agent for the conservative treatment of TOS.

Key words Shakuyaku-kanzo-to · Thoracic outlet syndrome

Introduction

Thoracic outlet syndrome (TOS) is characterized by symptoms of pain and paresthesias in the hand, neck, shoulder, and arms. These symptoms are caused by compression of the subclavian vessels and brachial plexus against a cervical rib, an abnormal first thoracic rib, or a putatively abnormal insertion or position of the scalene muscles [1,2]. The pain and sensory changes are usually aggravated by several activities including lifting heavy objects, working with the arms over the head, or repetitive movements of the arm; however, some patients complain of a deep pain without much localization [3]. We report here a patient with TOS manifesting various resting symptoms who was successfully treated

by Shakuyaku-kanzo-to (SKT), a traditional herbal medicine.

Case report

A 28-year-old woman complained of numbness of the left arm and fingers. These symptoms had already been noticed during exercise when she was a junior high school student and had been diagnosed as TOS by a local orthopedist. Recently, she had become aware of several symptoms without much movement of the left arm and came to the orthopedic department in our hospital. She was prescribed roxoprofen 180mg/day, mecobalamin (vitamin B₁₂) 1500µg/day, and etizolam 1.5mg/day. However, she could not continue these medications because of severe daytime sleepiness. Thus, her symptoms were not improved. Furthermore, various resting symptoms including intractable pain in her left arm, shoulder, and back and weakness and hypoesthesia of the left arm emerged. Digital subtraction angiography showed significant compression of the bilateral subclavian arteries with upward positioning of the bilateral arm (Fig. 1). The orthopedist recommended left first rib resection if her symptoms were not improved by any conservative treatment.

She was introduced to our pain clinic department, and stellate ganglion block (SGB) was started three times per week. She felt an improvement of blood flow and pain relief in the left arm after SGB by pain score 4; however, the effects lasted only 2h. On the 9th day after the start of SGB, she complained of severe cramping pain in the left brachioradialis muscle in addition to the other previous symptoms. We prescribed SKT 7.5g/day for the treatment of muscular cramps. Two days after the administration of SKT, her shoulder and back symptoms had almost completely vanished. Further, her left arm pain was markedly improved. Her overall pain score was reduced by 2 on the 7th day after the start of

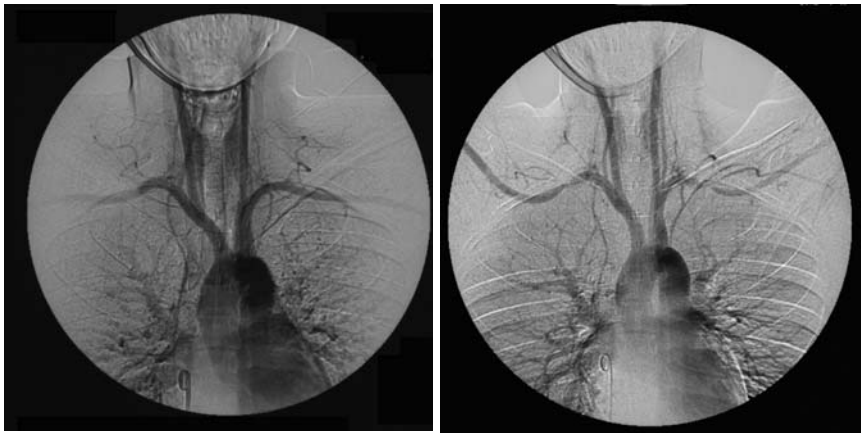


Fig. 1. Angiography of the bilateral subclavian arteries. No significant compression of the bilateral subclavian arteries appeared in the neutral position of the bilateral shoulder (*left*), whereas severe obstruction in the bilateral subclavian arteries was observed by hyperabduction of the bilateral arm (*right*)

SKT. Although numbness of the left arm and ischemic symptoms during work with the left arm over the head slightly persisted, her activities of daily life were considerably improved.

Discussion

We report a case complaining of severe resting symptoms of TOS. In 98% of the cases of TOS, the symptoms are neurological; 15% may have severe concomitant arterial symptoms [4]. The common symptoms of TOS include paresthesia and hyposthesia (95%), diffuse pain in the arm (75%), weakness (35%), and cold sensation (27%) [5]. Conservative treatment is the first choice for the treatment of TOS if frank vascular or major neurological impairment is not present [3]. It has been reported that nonsurgical treatment is successful in 58% of cases [6]. Physical therapy, symptom-based medications, and nerve blocks were indicated for patients with TOS [7]. Although nonsteroidal antiinflammatory drugs, minor tranquilizers, antidepressants, and muscle relaxants can be used for symptom management of TOS, to the best of our knowledge, this is the first report of successful use of SKT for conservative treatment of TOS.

SKT is a traditional pain-relieving Chinese formulation composed of Shakuyaku (peony root) and Kanzo (licorice root). The main components of Shakuyaku and Kanzo are paeoniflorin and glycyrrhizic acid, respectively. It is widely used to relieve abdominal pain [8] and muscular cramps [9,10]. In this case, we administered SKT for the treatment of muscular cramp; however, it also relieved other symptoms beyond our expectation.

SKT is thought to have an inhibitory effect on excessive skeletal muscle contraction. It was experimentally verified that paeoniflorin, another component of peony root, has properties similar to a depolarizing neu-

romuscular blocking agent. It weakly inhibited muscular contractions produced by acetylcholine, strongly blocked twitch response evoked by indirect stimulation, and depolarized the resting membrane potential in frogs and mice [11]. Thus, SKT is useful for the treatment of muscular cramps and cramp-induced muscular pain.

Moreover, SKT suppresses smooth muscle contraction. SKT suppressed neurogenic ileal contraction induced by electrical stimulation *in vitro*. SKT inhibits acetylcholine release from cholinergic nerve terminals and acetylcholine actions on ileum smooth muscle [12]. It is thought to be a mechanism responsible for abdominal pain relief. Paeoniflorin inhibits tonus of smooth muscle and thereby causes vasodilation. It was reported that paeoniflorin showed vasodilation in the coronary vessel and hindlimb of the dog. The potency of vasodilation induced by SKT was 1/100 of papaverine and 1/4500 of nitroglycerin in the hindlimb vessels of the dog [13]. Although the vasodilatory effect of SKT is weak, it might be effective for the improvement of ischemic symptoms in TOS.

SKT also shows antiinflammatory action. It was demonstrated that paeoniflorin significantly inhibited carrageenin-induced edema formation in the rat hind paw [14]. Although the detailed mechanism of SKT in antiinflammatory action remains unclear, it is possible that SKT might suppress prostaglandin synthesis. Imai et al. [15] demonstrated in an *in vitro* experiment that incubation of human endometrial cells with SKT induced an accelerated rate of arachidonic acid incorporation into phospholipids and a significant decrease in prostaglandin levels. This mechanism is thought to be responsible for the significant treatment effect of SKT for dysmenorrhea. Glycyrrhizin and paeoniflorin are possible components suppressing prostaglandin synthesis [15].

An adverse complication of SKT has been reported [16]. Kanzo can cause pseudoaldosteronism, which is

likely to happen in geriatric patients. If hypokalemia, hypertension, edema, and paralysis are observed during SKT medication, we should consider this complication of SKT. Thus, the serum potassium level should be checked periodically, and the dose of SKT should be reduced for long-time use in geriatric patients.

Collectively, SKT could act as an analgesic, vasodilator, and muscle relaxant. These effects are useful to alleviate several symptoms of TOS. Although SKT was not effective to relieve the numbness of the arms in the present case, better conservative treatment would be possible by combination with other agents or nerve blocks.

In conclusion, we report a case of TOS improved by SKT administration. Our present case suggests that SKT could be a first-line medication to relieve the severe symptoms of TOS.

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