

Fire Needle Combined Therapy or Surgery Therapy for Carbuncle of Neck? A Case Series

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Background: Skin carbuncle is a suppurative infection of adjacent multiple hair follicles and their surrounding tissues, mostly caused by *Staphylococcus aureus*. Skin carbuncle often occurs in the neck, the back, and other skin thicker parts. It can also spread to the subcutaneous tissue and cause extensive subcutaneous infection. It is especially common in people with low immunity such as diabetes, nephritis, and malnutrition.

Patients and Methods: We reported four cases of carbuncle of the neck, three of which were treated with traditional Chinese medicine therapy based on fire needles combined with topical drugs, and the other one was treated by surgical incision and drainage, debridement, and dressing change.

Results: All four cases achieved good therapeutic effects. The results showed that in the treatment of early carbuncle, compared with surgical treatment, fire needle therapy had less trauma, smaller prognosis scar, less cost, and faster recovery. However, when the carbuncle significantly expands or the deep tissue of the late carbuncle shows erosion necrosis, surgical debridement is necessary.

Conclusion: The traditional Chinese medicine therapy based on the fire needle for the early treatment of carbuncle has important clinical significance, which is worthy of further study.

Keywords: fire needle combined therapy, surgical therapy, clinical effect, carbuncle of the neck

Introduction

Skin carbuncle is a purulent infection of multiple adjacent hair follicles, which can reach deeply into subcutaneous tissue and often occur in thicker areas of the skin, such as the neck, the back, and the thighs. Susceptible factors of skin carbuncle include diabetes, obesity, poor hygiene and immunodeficiency and so on.¹ Due to a large amount of subcutaneous fat in the neck, bacteria easily spread to subcutaneous tissue along the adipose tissue with less resistance, so the neck carbuncle is very common in clinical practice. At the beginning, the skin carbuncle as a diffuse infiltrating erythema with tense, shiny surface and obvious tenderness. After that, multiple pus heads appear locally, with many pus plugs and bloody secretions discharged, accompanied by the formation of tissue necrosis and ulcer. Sinus formation and local lymph node enlargement can also be seen. Clinically, patients feel throb pain, and may be accompanied by systemic symptoms, such as fever, chills, headache, loss of appetite and so on. Systemic antibiotics combined with surgical incision and drainage, debridement, and dressing change are often used in the clinical treatment of carbuncle. In traditional Chinese medicine surgery, fire needles are of great significance in the treatment of skin infectious diseases. Fire needle treatment of carbuncle in the neck can make the cosmetic effect of patients' wounds better and the cost lower, and it can also greatly shorten the course of the disease and improve the curative effect. We reported four cases of carbuncle, three of which were treated with traditional Chinese medicine therapy based on fire needles combined with topical drugs, and the other was treated with surgical incision and drainage, debridement, and dressing change.

Case and Methods

We enrolled patients diagnosed with skin carbuncle in the Second Hospital of Shandong University. Four patients were enrolled. Clinical characteristics and methods of treatment were collected. Informed written consent was obtained from the patients for the publication of this report.

Case 1

A 79-year-old male had a 4-day neck carbuncle with mild itching, no obvious pain, and no fever. Multiple topical antibiotics before treatment, but the effect is poor and skin lesions gradually ulcerated. The patient has a history of diabetes for over 20 years. Before 1 year ago he had cellulitis in his waist, which has been cured. Dermatological examination: the neck carbuncle, about 6.0 cm × 10.0 cm, has a hard texture and high local skin temperature, with central ulceration, purulent exudation, and tenderness. The laboratory examination results showed leukocyte count of 20.78×10^9 cells/L, and C-reactive protein (CRP) of 170.61 mg/L (normal, 0–8 mg/L). The bacterial culture of the tissue was positive for *Staphylococcus aureus*.

The treatment plan was as follows: incision and drainage of skin carbuncle (Figure 1A). After local infiltration anesthesia, 1.5 cm × 1.2 cm necrotic tissue was cut along the middle of the neck carbuncle, and the pus cavity was exposed. The pus was drained away, and the necrotic tissue was separated by a vascular clamp. The skin carbuncle was rinsed with hydrogen peroxide and sodium chloride, then placed by a drainage strip and bandaged by clean gauze. A large amount of pus was discharged during the operation, and the drainage strip was placed. The patient had no fever after the operation. Anti-infection by intravenous infusion of ceftriaxone and levofloxacin. After daily routine debridement and dressing change, the operator punctured the wall of the abscess with red-burning fire needles and used the cupping technique to suck out the pus through negative pressure. Then, 0.5 cm thick mupirocin ointment was applied to the skin lesion, and the skin lesion was irradiated with high-energy red light for 20 minutes to play an antibacterial and anti-inflammatory role. Fire needle therapy once a day for 5 days. On the third day after the operation, the oral and external use of Babao Wudan Yaomo began for anti-infective and anti-inflammatory, and compound Huangbai liquid was used for local wet compress. After 20 days of treatment follow-up, the swelling of the neck subsided, no secretions, and the patient felt less pain (Figure 1B).

Case 2

A 41-year-old man presented with a painful carbuncle on his nape for one week. He entered the clinic with his head down because of the swelling and pain in the nape. He had a fever for 3 days with a maximum temperature of 39.5°C. He also had diabetes and poor glycemic control. Dermatological examination: the lesion measured about 9.0 cm × 5.0 cm and extended superiorly to the whole nape (Figure 2A). The laboratory examination results showed leukocyte count of 19.3×10^9 cells/L and fasting glucose of 15.5 mmol/L. The pus from the lesion was cultured for *Staphylococcus aureus* and was sensitive to ceftriaxone and gentamicin.



Figure 1 Patient 1: (A) lesion after debridement. (B) lesion after 20 days of fire needle treatment.



Figure 2 Patient 2: (A) lesion before fire needle treatment. (B) lesion after 21 days of fire needle treatment.

The treatment plan was as follows: intravenous ceftriaxone 2g one time a day was administered for 7 days duration. In light of poor glycemic control, subcutaneous insulin (0.5–0.8 U/kg) was initiated. The wound was managed conservatively with fire needle therapy and cupping therapy, combined with pus drainage and copious irrigation with hydrogen peroxide, saline, and gentamicin solution once a day for 5 days. The pain and body temperature were significantly reduced after the first treatment, and the swelling was reduced. The patient could lift his head. The irrigation with hydrogen peroxide, saline, and gentamicin solution through the pinhole of the fire needle was followed up every two days. The wound had completely healed after 3 weeks and without any scar (Figure 2B). One year later, the patient came because of head folliculitis to undertake fire needle therapy, which revealed that the carbuncle did not recur again.

Case 3

A 54-year-old man accidentally found a neck carbuncle 20 days ago. At first, there was a peanut grain size, which gradually increased. After the implementation of traditional Chinese medicine application and anti-inflammatory treatment outside the hospital, there was no significant relief, and the area of redness and swelling gradually increased. Then the patient underwent abscess incision and drainage, anti-inflammatory and other symptomatic support treatment in the other hospital, and there was no significant improvement. The patient has a history of diabetes. He was admitted to the Department of Burns and Plastic Surgery of our hospital. Physical examination: The lesion measured about 10.0 cm × 15.0 cm, and there is about 10 cm incision with neatly cut edges. Examination showed an obvious large abscess, beyond the margin, and suppurative secretions can be seen inside (Figure 3A). The laboratory examination results showed leukocyte count of 21.2×10^9 cells/L.

The treatment plan was as follows: surgical debridement, exploration along the original incision to see necrotic tissue deep into the fascia and muscle layer, enlarging incision, and completely cutting the necrotic tissue and unhealthy tissue. After washing the wound repeatedly with hydrogen peroxide, normal saline, and metronidazole, the wound was washed twice with gentamicin and normal saline. After complete hemostasis, a negative pressure suction device was placed and the wound was bandaged (Figure 3B). On the day of operation and on the 7th and 12th day after the operation, three negative pressure debridement were performed. Active control of blood glucose and infection is necessary after surgery. The patient took out the stitches 19 days after the operation, and a scar of about 20 cm could be seen in the neck, and the neck carbuncle basically subsided.



Figure 3 Patient 3: (A) lesion on admission. (B) lesion after surgical debridement and drainage.

Case 4

A 43 - year-old male presented with a painful skin mass on the neck four days ago. The pain kept him awake at night. He has no known chronic diseases. He has a history of penicillin allergy. Dermatological examination: the size of the lump was about 5.0 cm × 7.0 cm (Figure 4A), with a pus in the center and it has erythema and swelling around it. Although there was no fever, the laboratory examination results showed leukocyte count of $18.2 \times 10^9 /L$.

The treatment plan was as follows: on the day of treatment in outpatient intravenous infusion of ceftriaxone sodium 1.0 g, then changed to oral cefradine capsules 0.5 g three times a day for 7 days duration. Due to the patient 's unbearable pain, oral paracetamol tramadol tablets 1 tablet one time a day for 1 day of treatment. Conservative treatment of wounds with fire needle therapy, combined with cupping therapy to attract purulent secretions. With a large number of hydrogen peroxide, saline and gentamicin solution to the wound washed once a day. He applied local wet compress of compound Huangbai liquid and mupirocin ointment to the wound after returning home. Case 4 was treated every other day for a total of two courses. After the first treatment, the swelling was reduced. The patient 's pain was significantly reduced, and the sleep was basically not affected. After the second treatment, the patient 's swelling basically subsided. The wound healed completely after 2 weeks without any scar left (Figure 4B).



Figure 4 Patient 4: (A) lesion before fire needle treatment. (B) lesion after 14 days of fire needle treatment.

Discussion

In this paper, we reported four cases of neck carbuncle (Table 1). The first three cases were diabetic patients. Patients 1, 2 and 4 were treated with traditional Chinese medicine therapy based on fire needles combined with antibiotics in our department. Patient 3 was treated by surgical debridement, incision suture, and negative pressure drainage in the Department of Burn and Plastic Surgery of our hospital. The infection was effectively treated in all four cases.

The treatment of patients 1, 2 and 4 was to break the wall of the carbuncle by fire needle, and the negative pressure of pus was sucked out by cupping. The small wound which was pierced by fire needles on the wall of the carbuncle is conducive to the wet compress and penetration of local antibiotics in the later stage. Compared with patients 2 and 4, the center of the carbuncle of patient 1 has ruptured and formed purulent exudation, so incision and drainage should be performed first, and fire needle therapy should be performed later. Our follow-up found that the effect of fire needle therapy in patients 1, 2 and 4 was obvious, and the residual scar in the neck was small. In patient 4, the lump was the smallest and the course of disease was the shortest among the four patients. He achieved remarkable results with only two fire needle combined cupping treatment. This suggests that in the early treatment of skin carbuncle, the traditional Chinese medicine therapy based on fire needle is of great significance. Patient 3 had already undergone abscess incision and drainage in the other hospital, and the abscess cavity was significantly enlarged and there were more purulent secretions. For carbuncles with a large area of necrotic tissue, the effect of simple fire needle treatment is not good. Compared with the other three cases, patient 3 had a larger area of the carbuncle, a longer delay in treatment, and more residual necrotic tissue in the carbuncle. Therefore, it is inevitable for patient 3 to choose surgery to remove internal necrotic tissue. The carbuncle of patient 3 also basically subsided after surgery, but the patient experienced greater trauma, higher costs, and left a scar about 20 cm long.

The treatment principles of skin carbuncle include early application of antibiotics and surgical incision. Antibiotic therapy may be effective in preventing further expansion of the carbuncle when the carbuncle is not yet mature.² At present, studies have reported that surgical treatment is mainly divided into two forms: saucerization, and simple incision and drainage.³ Traditional surgical treatment often requires patients to be hospitalized for systematic observation and treatment, which also increases the economic costs borne by patients. Since the carbuncle is located in the neck and exposed to the external environment, the residual scar after surgery is also a major problem.

Fire needle therapy is an acupuncture technique. Skin lesions were disinfected with 75% alcohol and treated with fire needle therapy. A disposable sterile stainless steel needle (0.30×25 mm) was selected. The operator selected the appropriate number of needles to use during treatment based on patient tolerance. Heat the lower part of the needle with an alcohol lamp until the needle is red. Then, a heated needle was used to pierce the skin abscess lesion at a 90-degree angle for about 0.5 s, and it was quickly removed. The length of the needle is about 1–1.6 cm.^{4,5} The needle distance on the lesion should be kept at about 0.5 cm. After piercing the skin with fire needles, the operator holds the pot in one hand and the detector that has been lit on fire in the other hand. The operator quickly shakes the detector on fire in the pot for several times and then pulls out. Then the pot is quickly placed on the site to be treated and the pus is sucked out by the negative pressure suction effect. Fire needle is widely considered to be an effective method for the treatment of chronic gastritis, segmental vitiligo, and other diseases.^{6,7} In recent years, fire needle has been reported to be applied to skin infectious diseases.⁸ The use of fire needles can improve local microcirculation and metabolism, and rapidly improve or eliminate local tissue edema, congestion, exudation, and other pathological condition.^{9,10} In addition to the tingling caused by acupuncture, we found no other side effects. But in the process of literature collection, we found that fire needle therapy may cause allergies, burns, infections, nerve damage, and cold resistance, so the treatment needs to

Table 1 Summary of the Four Cases

	Case 1	Case 2	Case 3	Case 4
Treatment methods	Fire needle	Fire needle	Surgical debridement	Fire needle
Size of carbuncle, cm	6.0×10.0	5.0×9.0	10.0×15.0	5.0×7.0
Leukocyte count on admission (×10 ⁹ /L)	20.78	19.30	21.20	18.20
Therapeutic occupancy time (days)	20	21	31	7
Disease duration before treatment (days)	4	7	20	4
Wound healing after treatment	Healed	Healed	Healed	Healed

be operated by skilled professionals.⁵ The effect of simple fire needle therapy for late skin carbuncle which has more necrotic tissue is not good. Therefore, timely treatment of early carbuncle with fire needle, cupping combined with antibiotics is of great significance for controlling the further development of carbuncle and minimally invasive treatment.¹¹

Conclusion

To sum up, the carbuncle located in the neck is exposed to the external environment and has a great demand for aesthetics. Early systemic application of antibiotics can control the systemic inflammatory response and prevent the rapid development of the disease. Fire needle combined with cupping therapy can make early skin carbuncle patients avoid the discomfort caused by surgical incision. Traditional Chinese medicine characteristic therapy based on fire needle therapy combined with antibiotic therapy can achieve not only the expected clinical effect, but also the cosmetic effect. More importantly, it greatly reduces the patient's pain and interference with daily life and work during hospitalization. Traditional Chinese medicine characteristic therapy based on fire needle therapy also provides a new way for doctors to treat patients who cannot tolerate surgery. Because it has the characteristics of convenience, beauty, economy, and safety for the early treatment of neck carbuncle, we believe that the use of fire needle combined therapy to treat neck carbuncle is worthy of clinical promotion.

Ethics and Dissemination

The four patients provided written informed consent for publication of this study and accompanying images. The case series was approved to publish by The Second Hospital of Shandong University.

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Disclosure

All authors declare no conflicts of interest in this work.

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