The Use of Acupuncture in Reflex Sympathetic Dystrophy Syndrome

Joan Hester

Summary
Reflex sympathetic dystrophy syndrome, also known as causalgia or algodystrophy, clinically presents with pain, swelling, muscle dysfunction and skin changes to a limb. It is usually the result of trauma to the affected limb, which may be quite minor. Three stages of the syndrome are described, associated with increasingly severe symptoms and deterioration of prognosis. Sympathetic blockade is probably the treatment of choice, although acupuncture can be beneficial in the early stages. To be effective, treatment must be started early as the physical changes may become irreversible.

Key words
Acupuncture, Reflex sympathetic dystrophy syndrome, Sympathetic blockade, Sympathetically mediated pain, TENS.

Introduction
Reflex sympathetic dystrophy syndrome has been known for a long time under different names. "Causalgia" was first described by Weir Mitchell in 1872 from his observation of the burning pain that followed peripheral nerve injury after gunshot wounds (1). A syndrome associated with hypersensitivity of the skin to touch and pinprick, of pain, temperature and colour changes, muscle wasting, atrophy and disuse has been known to follow peripheral trauma (2,3). Sudek described extensive osteoporosis following such injury (4). The syndrome has also been known as "algodystrophy" (5) or "shoulder-hand syndrome". More recently the pain has been known as sympathetically mediated or sympathetically maintained pain (6).

The prevalence is unknown, but is more frequent than generally believed. It is more often seen in females and is reported as being more common in the over 50s, but it can also occur in children and adolescents (7,8).

Presentation
The basic clinical features comprise:
Pain, which is burning in nature
Swelling of the affected part
Diminished motor function
Involuntary muscle spasms which are often painful

Skin changes such as shininess and hair loss
Vasomotor instability with extreme changes of colour and temperature

There are secondary bone changes such as osteoporosis, also shoulder pain, joint tenderness and swelling, and palmar fasciitis. A bilateral syndrome is reported to occur in up to 50% of sufferers. The syndrome may be long in duration and prove to be incurable. It has been described in three stages:

In the first stage the pain is limited to the site of injury and is associated with:
Hyperpathia
Alloodynia
Localised oedema
Muscular changes
Hyperhidrosis

During this stage there may be a rapid response to treatment, or the syndrome may settle spontaneously.

Plate 1. Stage 1 - showing hyperhidrosis and discolouration of the right hand.

In the second stage the pain becomes more severe and diffuse:
Oedema spreads and becomes brawny
Hair and nail changes occur
Spotty osteoporosis in a periarticular distribution
Muscle wasting

This stage may last between three and six months and is more difficult to reverse.
In the third stage the trophic changes become irreversible and the pain intractable, often involving the entire limb. There is:
- Atrophy of the muscles
- Ankylosis of the joints
- Contraction of the flexor tendons
- Deossification becomes marked and diffuse

In this stage the duration is indefinite and the changes irreversible.

There are several theories as to the aetiology of the syndrome (17-20):
1. That trauma and tissue damage releases nociceptive substances in the periphery (prostaglandins, vasoactive peptides, substance P, bradykinins). These are thought to sensitise unmyelinated C fibres, which, via a spinal cord reflex, produce abnormal sympathetic nerve activity.
2. There is increased excitability of noradrenergic nerve endings (20).
3. There may be a neurotoxin release.
4. An artificial synapse has been postulated. Autonomic impulses can be augmented by temperature changes and depression.
5. The central nervous system is also involved. We know that the syndrome can occur without peripheral trauma and also occurs in diseases of the central nervous system. Spread of the pain in the periphery is diffuse and non-specific and can involve motor function. The syndrome can be bilateral and sympathetic blockade is not always effective.
6. Psychological factors play a part. Sufferers are often anxious and may not make an effort to overcome the pain and improve mobility. In some there may be a secondary gain or social advantage by this abnormal pain behaviour.

Diagnosis
The diagnosis is made initially on clinical features. It is important to suspect the syndrome after minor trauma to a limb or after bone fracture. The incidence after Colles fracture is thought to be as high as 25% at 9 weeks and 17% at 6 months (5).

X-rays may be helpful in that they show patchy diffuse osteoporosis, particularly in the peri-articular region, although this is non-specific. Bone scintigraphy is the best diagnostic tool available. Technetium 99 scanning may show patchy increased uptake on the affected side (9,10). A recent paper from Antwerp (11) used a dynamic technetium 99 scan which showed increased blood volume and blood flow in Stage I patients, with decreased blood volume and blood flow in Stage II patients. This is an important finding as it may affect therapy, i.e. calcitonin (vaso constricting) in Stage I and sympathetic blockade in Stage II.

Histological changes in synovial tissue may occur but are not specific. Thermography is also non-specific and non-diagnostic, and sympathetic blockade, whilst it may show immediate and definite relief of symptoms, does not always do so (12,13,14).

Aetiology
Reflex sympathetic dystrophy may be precipitated by minor trauma (15). It may also occur in ischaemic heart disease or after myocardial infarction and some diseases of the cervical spine or spinal cord, for example myelopathy (16). It can occur after cerebral vascular accident, infections, or after surgery, but the cause remains unknown in up to one third of sufferers.

Plate 2. Stage III - irreversible trophic changes of the left hand.

Treatment
Treatment of the syndrome is unsatisfactory. Many drugs have been tried including steroids, muscle relaxants, alpha and beta blockers, analgesics, anti-inflammatories, tricyclics, tranquillisers, calcium channel blockers (21) and nitrates (22); unfortunately the success rate is not good with any of these drugs.

Sympathetic blocks have been a mainstay of treatment, performed by stellate ganglion (12,13) or lumbar sympathetic block, or by regional intravenous blockade with guanethidine, an adrenergic neurone blocker (23), reserpine, or latterly, ketanserin (24).

Regional blocks (e.g. brachial plexus block) have also been tried by continuous infusion to make the limb pain-free and thus allow it to be put through a full range of movement (14). Physical treatments, such as mobilisation exercises and occupational therapy, are thought to be very important. Intensive exercises can restore normal function, especially when used in the early stage, or after regional blockade.

TENS and acupuncture have both been tried. TENS has a variable response, but it can enhance sympathetic tone and should therefore be used with caution (25). Dorsal column stimulation is reported as giving excellent results (26) by increasing or modifying peripheral blood flow.

Surgery, such as sympathectomy, has been used. Limbs have sometimes been amputated and morphine pumps inserted.

Psychotherapy and behavioral training can be useful and it is important that patients stop smoking.

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Early treatment is necessary to reverse the syndrome. However the results are poor, 40% of patients are not susceptible to a cure.

**Acupuncture**

Little research has been done into the efficacy of acupuncture in reflex sympathetic dystrophy syndrome.

In 1981, Chan and Show from Hong Kong reported in the British Journal of Anaesthesia the treatment by acupuncture of 20 patients with established post-traumatic sympathetic dystrophy (27). At first assessment, patients had reported symptoms such as pain, tenderness, swelling and stiffness that had persisted in spite of analgesics and intensive physiotherapy. Acupuncture treatment was started at between 1 and 6 months after the precipitating trauma. Four points were used on the affected limb, two pairs along the course of a regional nerve or blood vessel. All the needles were stimulated at 50Hz for 20-30mins. The patients had 5-10 sessions on consecutive or alternate days. The pain was assessed by subjective improvement, observation of the swelling, erythema and tenderness and range of movement.

There was a marked improvement in pain, evident usually after the third session of treatment, in 70% of these patients, with some benefit to muscle power, but an unimpressive improvement in the range of movement.

In the second assessment 3-22 months later, all patients with a marked improvement initially had maintained this improvement or improved further. Regrettably, there was no control group in this study and no mention of vasomotor instability or sweating. However, the authors report that electroacupuncture compares favourably with other methods of treatment.

Acupuncture may also have a sympatholytic effect. Studies in rats have reported a decrease in sympathetic tone in the mesenteric micro circulation following acupuncture (28). In man the effect of acupuncture on sympathetic tone and skin temperature has also been studied. Thermography (29) has shown an increase in skin temperature and sympathetic tone in the mesenteric micro circulation. Studies in fats have reported a decrease in sweating. However, the authors report that electroacupuncture compares favourably with other methods of treatment.

In our experience at the Eastbourne pain clinic, acupuncture may be helpful in early stages of the disease, but is not as effective as sympathetic blockade. It can be beneficial for associated shoulder pain, but should be used with caution in patients where hyperpathia is present. It may be advisable to treat the contralateral limb.

**Conclusion**

It is essential to treat reflex sympathetic dystrophy syndrome early and vigorously at a time when the effects may be reversible (31). Any manoeuvre designed to decrease pain and improve function is advisable, as is early referral to a Pain Clinic. Many problems can be associated with the syndrome, which have a far reaching effect on life, such as family disruption, permanent disability, unemployment, mis-diagnosis, disbelief, improper treatment, multiple operations and unnecessary malpractice suits (32). It is hoped that future research will make treatment of the syndrome more successful.

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**Joan Hester FFARCS**

District General Hospital
Eastbourne, East Sussex
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