EFFICACY AND MECHANISM OF HELIUM-NEON LASER ACUPOINT THERAPY IN TREATING GASTROINTESTINAL URTICARIA

Mingbing Dan¹, Caiya Li¹, Nanqing Cheng¹, Cheng Zhu¹, and Changyao Chao²

1: Department of Dermatology the First people's Hospital Chongqing; and 2: Third Military Medical College Chongqing, China

From June 1990 to June 1993, 18 patients with gastrointestinal type urticaria (GU) were treated with helium neon (HeNe) laser acupoint therapy (LAT). As a control group, 17 patients with GU were treated with the corticosteroids cortisol (CT) or dexamethasone (DX) and the results were compared. The patients' ages ranged from 3~59 years, with a mean age of 31 years. In the HeNe laser group, the 'shenque' acupoints were irradiated once daily with 25 mW continuous wave (632.8 nm) for 10~15 minutes per session, at an incident power density of 800 mW/cm² giving an incident energy density of 480~720 J/cm². The results showed that 11 patients were cured and 6 greatly improved. The total effective rate for HeNe LAT was 94.1%. In the CT and DX therapy groups, the drugs were administered by intravenous drip or injected intramuscularly. The results showed 8 patients cured and 7 greatly improved. The total effective rate was 88.2%. In comparison with the two chemotherapeutic groups, the total effective rate of the HeNe group was statistically significantly higher than that of the controls ($p = > 0.05$). Although more controlled experimental work is required to elucidate the LAT mechanisms and pathways, this preliminary study indicates that noninvasive and side effect free HeNe LAT might be more effective for the treatment of GU, especially for those cases with have proved resistant to CT or GX therapy, and for the paediatric patient.

Key words: HeNe laser, laser therapy, gastrointestinal urticaria

Introduction

There are many causes of stomach-intestine urticaria (GU). Apart from the easily apparent skin rash, the other clinical manifestations include nausea, vomiting, severe abdominal pain and diarrhoea. The main component associated with the onset of GU is capillary dilatation seen in the gastrointestinal mucomembrane accompanied by oedema. In the three years from June 1990 to June 1993, we collected a total of 35 typical cases of GU and made comparisons between treatment by HeNe laser acupoint therapy (LAT) and the corticosteroids cortisol (CT) or dexamethasone (DX). The results were rather satisfactory. The current study reports on the authors' experience as follows.

Addressee for Correspondence:

Nanqing Chen:

Professor of Dermatology, Department of Dermatology, First People's Hospital, Chongqing 630011, Sichuan, China.

Patients and Methods

Patients:

All the patients were hospitalized with the exception of 2 cases who had treatment in the out-patient clinic. There were 12 males and 23 females. The course of the disease varied from 1 to 20 years. Ages ranged from 3-59 years old with an average age of 31.7 years. The causes included drug hypersensitivity (2 patients), food hypersensitivity (1 patient), seasonal factors (4 patients), infection (1 patient), mental irritation (1 patient), and unknown causes (24 patients). Diagnostic criteria included the occurrence of oedematous weals on the skin simultaneously accompanied by abdominal pain and diarrhoea, excluding internal or external disorders, and showing absence of infection and indigestion from stool examination. Patients satisfying the

Manuscript received: January, 1995

Accepted for publication: April, 1995

above criteria were identified as the subjects for our study.

The patients were divided into two groups. 18 cases of laser group were given H₁, H₂ receptor antagonists in the usual manner. Some of the patients had used corticosteroids in small doses during the course of disease. They were treated with HeNe laser point irradiation 3-5 days after stopping corticosteroids. For all the patients, 'Shenque' point irradiation was performed once daily, 10-15 minutes per session, continuing treatment until the pain was relieved. Seventeen patients in the corticosteroid group were treated with CX (three patients) and DX (fourteen patients) with H₁, H₂ receptor antagonists. CX was administered intravenously by a drip at a dose of 200-400 mg; DX was injected intramuscularly or given by intravenous drip at a dose of 5-10 mg. The accumulated amounts of the drug for a single patient were 400-1500 mg and 15-35 mg for CX and DX, respectively.

Laser System:

The laser used was a custom designed HeNe system developed by the authors' institute, delivering 25 mW C/W (632.8 nm) applied in light contact mode over the selected acupoint with a spot size of 2 mm in diameter. The incident power density was thus approximately 800 mW/cm². Treatment sessions varied from 10-15 minutes once daily until the pain and other symptoms disappeared. Incident energy densities were thus in the approximate range of from 480 J/cm² to 720 J/cm².

Criteria for Efficacy:

Three grades of efficacy were used. "Cure" was defined as disappearance of symptoms with LAT or corticosteroid therapy in 1-3 days; "excellent" = disappearance of symptoms in 4-6 days; "ineffective" = disappearance of symptoms in over 7 days, or no change.

Results

Of the 18 cases in the LAT group, 11 were cured, 6 had excellent results, and 1 showed no change. The latter patient had previously failed to respond to corticosteroid therapy. The average number of treatment sessions was four. The patients in whom pain was relieved in 1-3 days, 4 days, 5 days, 6 days and 15 days were 11, 1, 1, 4, and 1, respectively. The overall effective rate

Table 1: Time periods for achieving effective results compared for LAT and drug therapy

Group	Time Required for Treatment (in days)		
	1~3	4~6	Average No of Days
LAT Group	11	6	4.1
Drug Group	8	7	4.4

was 94.1%. Of the 17 cases in the drug group, 8 were cured, 7 had excellent results and 2 showed no change with an overall effective rate of 88.2%. The number of the patients in whom the pain eased in 1-3 days, 4 days, 5 days and 12 days were 8, 3, 4, and 2, respectively. Comparison between the two groups are shown in Tables 1 and 2.

Of the 11 cases adjudged "cured" in the laser group, two responded within one day following the first treatment session and the remaining 11 within three days (three sessions). In the eight "cured" patients in the drug group, relief was first seen after two days (two patients) and the remaining nine patients were fully cured within three days. This indicates that the treatment time with HeNe LAT was short and efficacy was rapidly achieved. The difference between the two groups evaluated with the student's t-test was statistically significant ($p = .05$) in favour of the LAT group.

Discussion

Gastrointestinal type urticaria (GU) is a special case of urticaria. Apart from developing a visible skin rash, abdominal pain is present in nearly all GU patients and some may present with colic in combination with diarrhoea. In our Department of Dermatology, GU is thus considered as an "acute abdominal condition." Treatment of GU with HeNe laser acupoint therapy (LAT) has not yet been reported in either the domestic or international literature. In our experience, the pain relief with this therapy was excellent, with an overall efficacy rate of 94.1%. There was a significant difference comparing the laser therapy group with the drug group, demonstrating that corticosteroids are not the only therapeutic modality offering effective resolution of this uncomfortable ailment. HeNe LAT was easy to

Table 2: Efficacy of LAT and drug treatment compared

Group	Number of Patients	Cured	Excellent	Little or No Effect	Efficacy (%)
LAT Group	18	11	6	1	94.1
Drug Group	17	8	7	2	88.2

apply, well tolerated by the patients, completely non-invasive, painless, athermic, caused no damage to the skin and had no adverse or toxic side effects. The overall results in the laser therapy group were statistically significantly better than the corticosteroid group.

According to the theories of Chinese Traditional Medicine (CTM), the meridian of the *Shenque* points links up all parts of the body; in addition, the areas where these points are located is abundantly vascularized, and they are recognized as having an important role in regulating total-body equilibrium. The HeNe laser has a wavelength of 632.8 nm and it is capable of penetrating viable tissue to a depth of 10–15 mm. Light approaches the dermis through the epidermis and directly stimulates nerve endings. Incident laser energy is believed to adjust the parameters of the electromagnetic field of acupoints in a state of imbalance. Because of this, Plog in Canada suggested very early on in the indication of laser therapy that a 'light beam needle' could replace the silver needle associated with traditional acupuncture treatment. The incident beam of light energy acts as a benign stimulus, and may be transformed to a signal which is then transmitted to the central neural cortex. The reaction time of the K^{++} ion may be prolonged, thus reducing transmission of nociceptive substances while inducing active depolarizing electric potentials in the synaptic junctions and modulating the transmission speed of nerve impulses in the various types of nerve fibres. This may additionally result in the elevation of the individual patient's pain threshold.

Besides the above conditions, HeNe laser acupoint therapy is also believed to induce other biological effects such as vasodilation through median control, accelerating circulation, speeding up cellular and systemic metabolic rates and enhancing phagocytosis. The combination of these effects diminishes the inflammation of the GU influenced stomach-intestine mucomembrane, decreases oedema and relieves pain.

Conventional needle acupuncture is known to work effectively, but may be associated with uncomfortable sensations on insertion of the needles such as tingling, distention, numbness and the so-called 'needling' sensation. It is necessary in conventional acu-

puncture therapy thoroughly to sterilize the areas of interest before inserting the sterilized needles. Needle acupuncture demands pin-point accuracy without errors, otherwise the needle may well penetrate unintended targets such as the pleura and blood vessels. Although needle acupuncture does not require anaesthesia when correctly indicated, the patient may well have an inherent fear of pain and might in extreme cases demonstrate cases of '*yun-zhen*', needle sickness, when the silver needles are inserted into the selected acupoints. In the current state of anxiety regarding AIDS and HIV-related conditions, any physical puncturing of viable tissue may be regarded with fear by the patient as a possible vector of cross-infection. Low incident doses of noninvasive laser energy do not have any of the disadvantages listed above.

The anti-inflammatory, anti-oedematous and anti-allergic effects of corticosteroids are well-recognized. However, corticosteroids have equally well-recognized side effects and contraindications. Laser acupoint therapy has not demonstrated to the present any adverse side effects or toxicity, thereby offering superior therapy to systemic or topical corticosteroids.

Conclusions

Laser acupoint therapy (LAT) was compared with corticosteroid therapy in the treatment of gastrointestinal urticaria (GU), and was found to offer a statistically significantly better result compared with the chemotherapeutic agents used without any of the side effects or contraindications associated with the latter. The authors recognize the limitations imposed by the small number of the patient population but, because of the promising efficacy of laser therapy, present their data as a preliminary study which may inspire others to repeat the experiment with larger and better controlled protocols. The current study was thus a preliminary attempt by the authors to investigate the efficacy of LAT on GU using the well-established precepts of Chinese Traditional Medicine. Although side effect-free efficacy was observed, the authors are aware that the mechanisms and pathways of LAT are still unclear, and require scientific elucidation.