

CLINICAL STUDY

Effect of ultrasound-guided acupotomy vs electro-acupuncture on knee osteoarthritis: a randomized controlled study

Ding Yu, Wang Yuexiang, Shi Xian, Luo Yun, Gao Yuhong, Pan Jingkun

Ding Yu, Shi Xian, Department of Acupuncture & Moxibustion, General Hospital of Chinese People's Liberation Army, Beijing 100853, China**Wang Yuexiang**, Department of Ultrasound, General Hospital of Chinese People's Liberation Army, Beijing 100853, China**Luo Yun, Gao Yuhong**, Institute of Geriatrics, General Hospital of Chinese People's Liberation Army, Beijing 100853, China**Supported by** Beijing Medical Research Development Fund: the Clinical Study on Ultrasound-guided Needle-knife Treatment of Knee Osteoarthritis (No. SF-2009-46)**Correspondence to: Ding Yu**, Department of Acupuncture & Moxibustion, General Hospital of Chinese People's Liberation Army, Beijing 100853, China. dingdn@sohu.com**Telephone:** +86-10-66937414; +86-15601392560**Accepted:** January 22, 2016

changes in HSS index before and after the therapy ($P < 0.01$). And there was remarkable difference in HSS index variation between the groups ($P < 0.01$). Acupotomy group and EA group showed big difference in pain index before and after treatment ($P < 0.01$). Apparent difference also existed in the comparison among groups ($P < 0.01$). Both acupotomy group and EA group had apparent changes in infrared thermal imaging detection before and after the treatment ($P < 0.01$).

CONCLUSION: Acupotomy and EA both have significant effects in KOA treatment; the former is better than the latter in relieving pain and improving knee functions.

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Abstract

OBJECTIVE: To investigate the effect of acupotomy on knee osteoarthritis (KOA), compared to electro-acupuncture (EA).

METHODS: Sixty KOA patients were randomly divided into 2 groups: ultrasound-guided acupotomy group and EA group; each had 3 weeks' therapy. After the treatment, by contrast before and after therapy, by comparing curative effects among groups, we looked into disease improvement degree through activities of daily living score (ADL), hospital for special surgery index (HSS), visual analogue scales score (VAS) and knee joint's infrared thermal imaging detection.

RESULTS: Graded by ADL, the excellent rate in acupotomy group was much higher than EA group; both acupotomy group and EA group had obvious

Key words: Osteoarthritis, knee; Acupotomy; Infrared thermal imaging; Ultrasound-guided; Randomized controlled trial

INTRODUCTION

Knee osteoarthritis (KOA) is a chronic arthritis caused by multiple reasons triggering joint degeneration, articular cartilage damage and para-knee articular soft tissues degeneration. Patients may suffer from joint pain, swelling, deformity, dysfunction and other symptoms.¹ In the past decades, acupotomy dissolution had been widely used in the treatment of KOA and had achieved sound curative effects in relieving pain and improving joint functions. However, compared with other methods, there hasn't been an objective or rigorous controlled study into its advantages, features and principles. On the other hand, the safety of acupotomy is often questioned because it's a closed surgery which has

strict requirements of the operators. Operators' perception of the disease and their familiarity of anatomical positions are essential to the curative effect as well as operation security. All of above make it difficult to assess acupotomy's application value in treating KOA. In regard of this, our experiment was aimed to investigate the effect of ultrasound-guided acupotomy in the treatment of KOA, compared with electro-acupuncture.

MATERIALS AND METHODS

Materials

All the 60 KOA patients were diagnosed by General Hospital of PLA. Of them, 45 were recruited in this research (35 females and 10 males). Their ages were ranged from 42 to 69 years with the average of 57.3 years. All had 2-15 years of disease course with 7 years' average. There were 30 unilateral knee joint incident cases and 15 cases of double knees. In total, we had 60 knee joints, with 24 left knee joints and 36 right knee joints. All patients had signed informed consent before participating in the study. This research was approved by Medical Ethics Committee of General Hospital of PLA.

Diagnostic criteria

(a) Frequent gonyalgia in the past months; (b) osteophyte detected by bone X-ray; (c) joint fluid inspection conforms to KOA symptoms; (d) 40 years old or over; (e) less than 30 min' morning stiffness; (f) having bone crepitus.

The patient having 1 + 2 or 1 + 3 + 5 + 6 or 1 + 4 + 5 + 6 symptoms, could be diagnosed as KOA.

According to X-ray inspection, we classified the results by Kellgren Grading Standard for KOA X-ray film.²

Inclusion criteria

(a) The case met the above diagnosis standards with the grading level in II and III; (b) no other treatment involved during 2 weeks before the grouping; (c) all patients voluntarily participated and would like to sign informed consent; (d) the patients had clear understanding about the significance of acupotomy research; (e) the disease course exceeded one year.

Exclusion criteria

(a) The patients did not meet the diagnostic criteria or inclusive criteria; (b) those failed to complete the therapy or interrupt the treatment or had other therapy at the same time; (c) those who have serious disease or mentally disorders; (d) patients were over 80 or under 30; (e) pregnant women or lactating women.

Apparatus

Ultrasound coupling agent: 250 g (Beijing Dafu Medical Products Co., Ltd., Beijing, China); Ultrasound coupling agent (sterile): 40 g (Beijing Dafu Medical

Products Co., Ltd., Beijing, China); Pulsing electrotherapeutic apparatus: with the size KWD-808 (Changzhou Wujin Great Wall Medical Instrument Co., Ltd., Changzhou, China); Color Doppler imaging (CDI): with the size Sequoia 512 (Siemens, Berlin, Germany); Medical infrared imaging system: size ATIR-M301B (Chongqing Weilian Technology Co., Ltd., Chongqing, China)

Grouping method

This was an open trial. We made random number table and random assignment card by CHISS program, then the doctor numbered the cases by time order, grouped them randomly according to the allocated number. All the index were assessed independently by specialized doctors (Table 1).

Table 1 Clinical characteristics of acupotomy group and EA control group ($\bar{x} \pm s$)

Group	n	Disease course	HSS grading results	X-ray grade
Acupotomy	30	7.43±2.71	58.22±4.87	2.78±0.31
Electro-acupuncture	30	7.28±2.41	60.12±4.23	2.69±0.26

Notes: acupotomy group was treated with ultrasound-guided acupotomy 3 times for 3 weeks, Electro-acupuncture (EA) group was treated with electro-acupuncture 15 times for 3 weeks.

Therapeutic method

In Acupotomy group, we followed the operating procedures of The Principles of acupotomology.³

EA control group: we conducted the treatment by common acupoint positioning method.

Basic operating regulations for ultrasound-guided acupotomy: (a) finding the lesion location from physical examination and locating the A-shi point to make identification. (b) Conducting ultrasound examination, compare the physical examination results and confirm the operating points with identification. (c) Examining the operating positions by ultrasound for lesion areas, divide the knee joint into front area (supine position, put pad under the popliteal space), interior leaning area (supine position, leaning to the infected knee slightly), exterior leaning area (side-lying position of the opposite infected knee) and the back area (supine position), then inspect them in sequence.⁴ We stained the diseased area by gentian violet and scanned primarily on positive reaction points. Based on ultrasound inspection, physical examination and other image data, we determine the lesions nature and operating positions. (d) Patients in supine position; we elevated the infected knee slightly with pillow to the extent when the patient felt relaxed and comfortable. We took no more than 5 five points each time according to previous fixed points, staining them by gentian violet. Choosing needle-knife (Hanzhang type 1, No. 4) to give routine disinfection with 0.5% iodophor on the selective operation skin, the operators wore sterile gloves with the skin partially iodophor disinfectant, then lift

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