

# Coronary arteriography under acupuncture anesthesia: a case report

## 针刺麻醉下行冠状动脉造影术 1 例临床报道

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### Abstract

Acupuncture anesthesia is a technique by partially or completely replacing anesthetics with acupuncture in surgery based on the traditional acupuncture analgesia mechanism. It emerged in the 1950s, went viral in the 1970s and then gradually fell into decline. In the recent years, this technique has regained attention and further research. Acupuncture anesthesia can be classified as either pure acupuncture anesthesia or acupuncture-medication combined anesthesia. To expand the application of this technique, a patient with non-ST elevation acute coronary syndrome in urgent need of percutaneous coronary intervention (PCI) received pure acupuncture anesthesia because of an allergy to lidocaine, and the operation went successfully. This is the first time that pure acupuncture anesthesia and coronary arteriography were combined, which is of great significance in further study and development of acupuncture anesthesia.

**Keywords:** Acupuncture Therapy; Acupuncture Analgesia; Acute Coronary Syndrome; Non-ST Elevated Myocardial Infarction; Percutaneous Coronary Intervention; Point, Neiguan (PC 6); Point, Lieque (LU 7)

**【摘要】** 针刺麻醉是指利用传统的针刺镇痛原理, 用针刺部分或完全替代麻醉药物进行外科手术的技术, 20 世纪 50 年代开始出现, 盛行于 20 世纪 70 年代, 后发展逐渐衰微, 近年来重新获得重视和深入研究。针刺麻醉主要分为单纯针刺麻醉和针药复合麻醉。为拓展针刺麻醉的应用范围, 对一名非 ST 段抬高型急性冠脉综合征, 需要急性经皮冠状动脉介入治疗(PCI)的患者, 因对利多卡因过敏而给予单纯针刺麻醉, PCI 手术顺利完成。为首次将单纯针刺麻醉技术与冠状动脉造影手术相结合, 对针刺麻醉的深入研究和开展具有重要意义。

**【关键词】** 针刺疗法; 针刺镇痛; 急性冠脉综合征; 非 ST 段抬高型心肌梗死; 经皮冠状动脉介入治疗; 穴, 内关; 穴, 列缺

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Acute coronary syndrome (ACS), including ST elevation myocardial infarction (STEMI), non-ST elevation myocardial infarction (NSTEMI) and unstable angina (UA), is a type of acute ischemic heart disease caused by thrombus formed by the tear or erosion of vulnerable atheromatous plaques<sup>[1]</sup>. In China, the incidence of ACS has been rising every year. When the necessary indicators are determined, a prompt percutaneous coronary intervention (PCI) is crucial to the patient's survival and a better prognosis.

### 1 Introduction

Acupuncture anesthesia is a technique by partially or

completely replacing anesthetics with acupuncture in surgery based on the traditional acupuncture analgesia mechanism. It emerged in the 1950s, flourished in the 1970s, and then gradually fell into decline. In the recent years, this technique has regained attention and further research<sup>[2]</sup>. Acupuncture anesthesia can be classified as either pure acupuncture anesthesia or acupuncture-medication combined anesthesia. Pure acupuncture anesthesia is mainly applied in some minor operations such as tooth extraction<sup>[3]</sup> and tonsillectomy. Acupuncture-medication combined anesthesia is extensively used in thoracotomy<sup>[4-5]</sup>, thyroid surgery<sup>[6]</sup>, subtotal gastrectomy<sup>[7]</sup>, gynecological surgeries<sup>[8-9]</sup>, nasal surgeries<sup>[10]</sup>, and arthroscopic surgeries<sup>[11]</sup>, etc.

Our research group conducted PCI for a patient with NSTEMI in urgent need of intervention under pure acupuncture anesthesia and finally achieved a success. The report is given as follows.

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## 2 Case Study

A 61-year-old female patient came to the Department of Emergency of our hospital at night of May 21, 2018, and was then transferred to the inpatient of Cardiovascular Department.

Chief complaint: Episodic chest pain lasting for 3 d, aggravated for 2 h.

Present history: An episodic sub-xiphoid pain started 3 days ago without obvious triggers. The pain radiated to the mandible and affected teeth, and started to get worse 2 h ago, without difficulty breathing. Therefore, the patient came to the hospital immediately.

Previous history: The patient had a history of hypertension, and the highest record was 180 mmHg/100 mmHg. The patient told that the blood pressure was controlled well ever since she started to take medications and she denied a history of any other chronic internal diseases.

Allergy: Lidocaine.

Physiochemical tests: Cardiac troponin I (cTn I) 2.75 ng/mL; myoglobin (myo) 194.4 µg/L; creatine kinase-MB (CK-MB) 13.26 U/L.

Treatment at the Emergency Department: After the patient received oral administration of ticagrelor 180 mg and bayaspirin 300 mg, the symptoms improved. She was then admitted into the inpatient of Cardiovascular Department to determine the diagnosis.

General condition: The patient was conscious but had a low spirit, the sub-xiphoid pain was intermittent, her appetite was fairly good, urination and defecation were normal, and the sleep quality was good.

Electrocardiogram at the admission: Sinus rhythm.

Physical examination: The patient was conscious, spirit was low, heart rate was 80 beats per minute and the rhythm was normal, pericardial friction sound was not discovered, and other examinations all showed normal.

Diagnosis: NSTEMI.

Interventions and the process: When the blood, urine and feces routine tests, liver and kidney function tests and electrolyte examination were completed, emergency PCI was prescribed. However, the patient had a history of lidocaine allergy during a microinvasive surgery three years ago. After a joint discussion in the hospital and consultation with experts, the patient was informed and agreed to receive coronary arteriography (CAG) and intravascular ultrasound (IVUS) under acupuncture anesthesia with the assistance of the Acupuncture Department.

The protocol of CAG and IVUS under acupuncture anesthesia: Prior to the operation, the patient was well communicated to reduce her tension. With the patient's belief and agreement, acupuncture anesthesia was performed for CAG.

Method: The patient took a supine position and exposed both upper limbs. Acupoints on the left upper limb were selected for acupuncture anesthesia. Firstly, the medial side of the left forearm was pressed along the Pericardium Meridian for 5 min. Then, Neiguan (PC 6) and Lieque (LU 7) on the left arm were selected. After standard sterilization, filiform needles of 0.22 mm in diameter and 40 mm in length were used to perpendicularly puncture the two points. After insertion, the needle bodies were pressed down with the tips pointing toward Ximen (PC 4) and Kongzui (LU 6). Afterwards, the needles were inserted deeper along the subdermal layer. The needles were then connected to electroacupuncture apparatus (type GB6805-2), with continuous wave, frequency at 15 Hz, and comfortable current intensity. Then, a 6F introduce sheath was immediately indwelled via trans-radial artery approach. CAG was conducted by using a 5F multi-functional catheter. CAG showed: the main stem of the left coronary artery was normal; the middle segment of the anterior descending branch had myocardial bridge, and the second obtuse marginal branch of the circumflex coronary narrowed by about 60%; plaques were found in the proximal end of the right coronary artery which narrowed by about 60%. To further determine the cause, IVUS was conducted and it found that the plaque load rate was 64% in the proximal end of the right coronary artery. The acupuncture anesthesia was not finished until the end of the operation. During the operation, there was no obvious bleeding or pain, the heart rate was kept in the range of 60-80 beats per minute and the blood pressure was maintained in the range of 120-130 mmHg/70-90 mmHg. The operation was claimed a success, and the patient was sent back to the ward. After the operation, the patient had a moderate dizziness with sweating. There were no other significant complaints. The patient was discharged from the hospital on May 27, 2018 when her condition was stable.

## 3 Highlight

Studies have shown that acupuncture anesthesia can produce a multi-dimensional and multi-target bilateral regulatory effect, activate the body to release a variety of analgesic endogenous substances<sup>[12]</sup>, reduce and improve the stress reactions induced by surgery, and enhance the safety of the surgery. It's believed that acupuncture stimulation can be transmitted to medulla oblongata by thick fibers to inhibit the surgical pain transmitted by thin fibers<sup>[13]</sup>, which will then lead to a series of changes in chemical materials and produce analgesic effect<sup>[14]</sup>. It concurrently plays a role in both emotional and cognitive aspects of the pain<sup>[15]</sup>.

In the current case, it was the first time to use acupuncture anesthesia alone in CAG, which has further

expanded the application scope of acupuncture anesthesia and is crucial to the further study and development of acupuncture anesthesia.

For acupuncture anesthesia, Lieque (LU 7) was punctured towards Kongzui (LU 6) to modulate the cardio-pulmonary function, regulate qi flow and ease pain; Neiguan (PC 6) was punctured towards Ximen (PC 4) to adjust qi activities, and attenuate spasm and pain. The lung governs skin and hair, connects all vessels, and controls qi and breath. Releasing the pain in skin layer is the key step during operation, so the acupoints of the Lung Meridian were selected to regulate qi flow and ease pain. Lieque (LU 7) is the Luo-Connecting point of the Lung Meridian, and it also connects the Conception Vessel as one of the Confluent Points of the Eight Extraordinary Meridians. The Conception Vessel runs through the anterior side of the body and it is the sea of all yin meridians. Meanwhile, the catheter for CAG was punctured in nearby the right-side Lieque (LU 7). Therefore, the left-side Lieque (LU 7) was selected for acupuncture to accord with the contralateral needling method, which can regulate and unblock meridians and collaterals, soothe the lung and kill pain. As the Xi-Cleft point of the Lung Meridian, Kongzui (LU 6) is often used to treat acute symptoms. Puncturing Lieque (LU 7) towards Kongzui (LU 6) can produce a synergetic effect in modulating cardio-pulmonary function and regulating qi activities, to ensure that the operation could go on successfully. Neiguan (PC 6) is a commonly selected acupoint from the Pericardium Meridian. Originally, pericardium and heart are one, and their qi is connected. Pericardium is the outer sac of the heart, and collaterals are the channels in which qi and blood are running out of the pericardium. The pericardium collaterals are under the control of heart. Therefore, the pericardium will be invaded by pathogens instead of the heart. For mental diseases, and problems caused by qi stagnation in vessels or stagnated heart collaterals, Neiguan (PC 6) should be selected for treatment. Besides, Neiguan (PC 6) also connects the Yin Link Vessel, which connects the three foot yin meridians, converges with the Conception Vessel, and relates to the Yangming meridians. The meridians above all run through the chest, abdomen and hypochondrium. Ximen (PC 4) is the Xi-Cleft point of the Pericardium Meridian and is good at treating acute diseases. Hence, puncturing Neiguan (PC 6) towards Ximen (PC 4) can regulate qi activities, maintain the internal environment and release spasm and pain.

One theory of acupuncture anesthesia holds that the acupuncture stimulation given prior to surgery can reach to the neurons of the brain (majorly the thalamus) and make them excited before the nociceptive signal produced by the surgery. Since it arrives later, the surgical nociceptive signal can no longer activate the sensory neurons inside thalamus, so that the pain

induced by surgery can be curbed. This theory is based on the order of nerve impulse that arrives the center and can partially explains the real-time analgesic effect of acupuncture<sup>[16]</sup>. In the current case, acupuncture anesthesia was performed based on the clinical features and requirements of the patient, and radial artery puncture was conducted immediately after the acupuncture, which displayed the real-time analgesic effect of acupuncture. Besides analgesic effect, acupuncture can also protect internal organs such as heart, brain and kidney, and maintain the stability of the internal environment. Acupuncture can modulate the stress reactions resulting from surgery and anesthetics, regulate immune system, and promote tissue repair, which is the significance in developing acupuncture anesthesia in clinic. Acupuncture-moxibustion therapy has always been considered to be an important part of traditional Chinese medicine. Through years' research, acupuncture has been found to have certain advantages in preventing and treating myocardial ischemia and reperfusion injury. The success of acupuncture anesthesia in this case has provided a foundation for performing cardiac surgeries under acupuncture anesthesia in the near future.

#### Conflict of Interest

The authors declared that there was no potential conflict of interest in this article.

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#### Statement of Informed Consent

Informed consent was obtained from the patient in this study.

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