

Zusanli(ST 36) Acupoint Injection with Neostigmine for Sepsis Acute Gastrointestinal Injury

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Abstract: Sepsis is life-threatening organ dysfunction caused by a dysregulated host response to infection. Acute gastrointestinal injury is a common complication of sepsis and one of the major causes of high mortality in sepsis. However, the treatment of acute gastrointestinal injury is limited and the effect is not ideal. Acupoint injection is a traditional Chinese medicine characteristic therapy that injects liquid or drug into acupoints, which can treat multiple system diseases. Compared with traditional acupuncture or intramuscular injection, Acupoint injection effect is more lasting. We provide a method for the treatment of acute gastrointestinal injury other than intravenous and gastrointestinal routes, which is simple and easy to operate. It may have a positive effect on the treatment of acute gastrointestinal injury in sepsis by injecting neostigmine into the acupoint within Zusanli (ST 36), and provide support for the treatment activities of traditional ethnic medicine entering the intensive care unit (ICU).

Keywords: Acupoint Injection, Zusanli (ST36), Neostigmine, Sepsis AGI.

1. Introduction

Sepsis is a common complication after trauma, burn, shock and major surgery, which can continue to progress to septic shock, multiple organ dysfunction syndrome (MODS) and so on [1]. The gastrointestinal system is a common organ involved in sepsis. The incidence of gastrointestinal dysfunction in patients with sepsis is as high as 46-62% [2-3]. In 2012, The Working Group on Abdominal Problems (WGAP) of the European Society of Intensive Care Medicine (ESICM) developed the definitions for GI dysfunction in intensive care patients as a malfunctioning of the GI tract in intensive care patients due to their acute illness [4]. Since then, researchers have come to realize that AGI is critical in the progression of sepsis and is a 'trigger' for inflammatory damage [5]. With the deepening of research, there is evidence that gastrointestinal dysfunction is associated with a high mortality rate of sepsis [6-7]. Therefore, the key to reducing the mortality of sepsis patients is to prevent and treat gastrointestinal dysfunction. Limited preventive measures against sepsis AGI in modern medicine. Preventive measures for gastrointestinal dysfunction include the use of anti-acids to protect the gastrointestinal mucosal barrier, glutamine supplementation, and agents improving the microbial ecology [8]. When gastrointestinal function is impaired, there are often problems with difficult gastrointestinal administration and low absorption rates, low selectivity and poor efficacy of intravenous drugs [2]. Acupoint injection (a treatment method of traditional Chinese medicine acupuncture) may have a certain effect on the prevention and treatment of sepsis AGI.

2. What is Acupoint Injection?

Acupoint injection therapy is a traditional Chinese medicine characteristic therapy to inject an appropriate amount of liquid or drug to the meridian, acupoint or tender point, and subcutaneous positive reaction point, in order to prevent and cure various diseases [9]. It combines the characteristics of traditional Chinese medicine acupuncture and western medicine intramuscular injection. Acupoint injection requires

certain stimulation in the acupoint area and stimulation of meridian induction. The mechanical stimulation of acupuncture on the meridian tissues and the injection of liquid medicine into the acupoints, because of occupying a certain space to produce pressure on the surrounding tissues and stimulate local receptors to produce acid, numbness, swelling and other "needle-like" effects [10]. Acupoint injection has the synergistic effect of the drug itself and acupoint stimulation, which is thought to produce a more lasting effect than traditional acupuncture or intramuscular injection [11].

Acupuncture morphology believes that there are abundant nerve endings, capillaries and mast cells in the acupoints, which are neurochemical endings or biological braking points. Acupoints are susceptible not only to mechanical stimulation of acupuncture, but also to physical and chemical stimulation of drugs [12]. Recent studies have found that the mechanism of acupuncture on gastrointestinal tract is mainly related to brain-gut axis, visceral hypersensitivity, nerve - endocrine - immune, intestinal movement and so on [13]. The effect of Acupoint injection is good and has the effect of magnifying the efficacy. The effect of intramuscular injection or even intravenous injection can be achieved or exceeded after injection of a small amount of concentration of drugs, and the time is shorter [14]. The reason may be that the diffusion of drugs in the meridians to the outside of the meridians according to the gradient force can be offset by the mass transport caused by the flow of tissue fluid to the meridians. The result is that the drugs are bound in the meridians and do not spread outside the meridians, thus ensuring the concentration of drugs. Coupled with the transport of tissue fluid along the meridians, the drugs can reach the patient's site quickly [15]. Zusanli is one of the most commonly used acupoints, which is a He acupoint of the foot - Yangming - stomach meridian and is located on the lower limbs, where the DPN usually occurred. Acupuncture at Zusanli can regulate gastrointestinal diseases. Zusanli can not only treat the current disease, but also prevent the change of the disease [16].

Neostigmine, an acetylcholinesterase (AChE) inhibitor, is an

effective drug for the treatment of colorectal obstruction. It can promote the recovery of gastrointestinal function by increasing gastrointestinal motility. It is cheap and effective, but there are inevitable adverse reactions such as abdominal pain, vomiting and even bradycardia through intravenous route [17]. According to the former meta-analysis [18], it demonstrated that small doses of neostigmine may promote the recovery of postoperative gastrointestinal function without obvious side effects. You [19] 's study shows that neostigmine Zusanli Acupoint injection is safer and more effective than intramuscular injection in patients with postoperative paralytic ileus. We believe that Zusanli Acupoint injection of neostigmine treatment of sepsis AGI, may benefit in safety and efficacy.

3. Operation Process

3.1 Preparation Before Operation

The bed number, name, gender and age of the patient were checked, and the name, specification, dose and expiration date of the injected drug were checked.

Different types of disposable sterile syringes and disposable sterile injection needles were selected according to the condition and the needs of the operation site.

Attention should be paid to environmental cleaning and hygiene to avoid pollution.

3.2 Specification of Acupoint

Zusanli (ST 36): On the anterior aspect of the leg, on the line connecting ST35 and ST41, 3 cun inferior to ST35, locate on the tibialis anterior muscle.

nail-pressing location: Press a '+' mark on the acupoint with fingernails to facilitate accurate acupoint selection.

3.3 Specification of Asepsis

Hands were washed with soapy water, rinsed with water, and wiped with a 75% ethanol cotton swab or cotton ball. You can also directly use disinfection gel, hand sanitizer to clean your hands.

A sterile cotton ball with hemostatic forceps or iodophor with sterile cotton swab was used to apply a 5cm×5cm area from the center to the outside according to the sterile principle, leaving no gap.

3.4 Specification of Medicines

The concentration of point injection was the conventional concentration of the drug for intramuscular injection.

The packaging of the drug shall be free of damage, the ampule body shall be free of cracks, and the liquid shall be free of turbidity, discoloration and mold.

3.5 Specification of Advancing the Needle

Remove the syringe from the package and tighten the needle

bevel with the syringe scale to a horizontal plane to check for leakage.

When the air in the syringe is drained, it is recommended to choose the pen type to hold the syringe and enter the needle with one hand.

The needle body was penetrated vertically into the skin so that the needle body was at a 90° Angle to the skin. The forearm drives the force of the wrist to quickly Pierce the needle into the skin of the patient's acupoint.

If the patient is conscious, the patient can be asked whether the patient has "qi", and the patient can be injected after the reaction of "acid and swelling". If the patient is unable to cooperate or is in a coma, it is recommended that the needle be inserted 2-2.5cm straight from the acupuncture point.

The dose of drug was 1 to 2mL

The drug was slowly withdrawn after injection, and the bleeding was stopped by pressing a sterile cotton ball with a hemostatic clamp or a sterile cotton swab.

4. Discussion

On the location of Zusanli, Liu [20] found that the anterior tibial artery has a vascular dense area at 3 inches of the interosseous membrane of the lower leg, that is, Zusanli, and the capillaries on the interosseous membrane are distributed in a certain direction. Parallel arrangement, and this specific distribution will cause changes in the flow pattern of tissue fluid. Zheng [21] showed that the optimal depth of Zusanli Acupoint injection should reach the front of the calf interosseous membrane. Piercing 2-2.5cm is the appropriate depth of acupuncture [22].

Animal experiments [23] have shown that acupuncture at Zusanli can effectively promote intestinal secretion, promote intestinal tissue proliferation, inhibit microvascular reconstruction, and play a protective role in intestinal tissue in septic rats. Studies [24-26] have confirmed that acupuncture at Zusanli can regulate gastric electrical rhythm and GAS and MTL secretion, improve gastrointestinal motility. Wu [27] 's study included 10 RCTs for meta-analysis. The results suggested that stimulating Zusanli had a regulatory effect on human immunity. The specific results were to increase the levels of CD3 +, CD4 +, IgG and IgA in human body, but the effect on CD8 + and IgM was not clear. Other studies have shown that the efficacy of Zusanli Acupoint injection is not related to the integrity of peripheral, central and nerve [28].

In some scenarios, Acupoint injection may be equivalent to intravenous injection in terms of efficacy and plasma concentration, but superior to intravenous route in terms of adverse reactions. With regard to the mechanism of action of Acupoint injection, a number of studies have shown that Acupoint injection can regulate the expression of protein and mRNA, increase angiogenesis and arterial generation to improve blood flow, but the study focused on animal experiments, so the mechanism of action of Acupoint injection still needs further study [29]. In the Acupoint injection of Zusanli, the tissue fluid can transport the drug

along the gastric meridian to the gastrointestinal tract. This drug delivery channel is faster than the systemic diffusion through the blood, and the pharmacological effect is significant, so it has a better therapeutic effect [30]. For severe patients with acute gastrointestinal injury, Jiang [34] 's clinical research shows that neostigmine Zusanli Acupoint injection can promote the recovery of bowel sounds in patients with severe bedridden abdominal distension, reduce intra-abdominal pressure, shorten anal exhaust time and improve patient satisfaction. In clinical practice, Zusanli can be combined with other acupoints such as Tianshu (ST 25) to improve gastrointestinal motility and reduce systemic inflammatory response in patients with severe acute pancreatitis [35]. In addition, neostigmine injection at Zusanli point combined with moxibustion has a good effect on patients with postoperative ileus [33].

Many animal experiments level clinical studies show that Zusanli acupuncture acupoint injection of neostigmine can by reducing inflammation, improve the gastrointestinal blood supply, increase the gastrointestinal peristalsis, eventually improve the internal high pressure, intestinal paralysis, abdominal distension of the clinical outcome, for patients with acute gastrointestinal injury of sepsis, provides a new idea and method of treatment. Experimental studies have proved the advantages of acupoint injection over intravenous or intramuscular injection, but the research on its mechanism is limited, and there is still no breakthrough [34]. Although studies in normal subjects have shown that Acupoint injection can provide stronger needling sensation or stimulation than traditional acupuncture, repeated trials of Acupoint injection are necessary.

5. Conclusion

In the treatment of AGI in sepsis, Zusanli acupoint injection with Neostigmine may be safe and effective, but it still needs to be confirmed by later basic experiments and clinical trials. Even Acupoint injection is a relatively safe method, but there are still some adverse events reported, such as non-standard operation may cause the outbreak of MRSA [35] and extrapulmonary tuberculosis [36], or vasovagal [37] reaction, etc. Hence, the operators must abide by the principles and standards during the operation.

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