

# Acupuncture Instantly Relieves Right Upper Abdominal Pain in Acute Cholecystitis Patients

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**How to cite this paper:** Zhu, J.M. and Huang, J.P. (2025) Acupuncture Instantly Relieves Right Upper Abdominal Pain in Acute Cholecystitis Patients. *Journal of Biosciences and Medicines*, 13, 342-349. <https://doi.org/10.4236/jbm.2025.139029>

**Received:** July 25, 2025

**Accepted:** September 12, 2025

**Published:** September 15, 2025

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## Abstract

**Purpose:** To observe the pain-relief effect of acupuncture at the acupoints *Yanglingquan* (GB34) and *Zusanli* (ST36) in patients with acute cholecystitis. **Methods:** A total of 81 patients diagnosed with acute calculous cholecystitis were acupunctured for 20 minutes at GB34 and ST36 before medical treatment. Patients were asked to score their pain levels on a visual analog scale (VAS) immediately after acupuncture. If the pain was reduced to a level less than VAS score 6 (not included), we regarded the acupuncture as effective. Patients' clinical characteristics, white blood cell counts, time of onset, concomitance of diabetes, and recurrence of cholecystitis were also recorded for evaluation. **Results:** Most patients experienced a reduction in right upper abdominal pain after acupuncture. A VAS score of less than 6 was recorded by 60 patients, and the total efficacy was 74.07% (95% CI: 64.53% - 83.62%). 7 patients indicated the diminishing of pain during needling, and 8 patients had no experience of pain relief. The pain relief effect of acupuncture was not statistically related to gender, time of onset, concomitance of diabetes, and recurrence of cholecystitis, and was not significantly different between patients with WBC counts less than or more than  $1.5 \times 10^9/L$ . **Conclusion:** Acupuncture at GB34 and ST36 in most patients with acute calculous cholecystitis could instantly and considerably relieve right upper abdominal pain.

## Keywords

Acupuncture, Abdominal Pain, Pain Relief, Acute Cholecystitis, VAS Score

## 1. Introduction

Gallstones blocking the flow of bile in the biliary tree, leading to inflammation of

the gallbladder, result in cholecystitis. Acute calculous cholecystitis (ACC) is one of the most common surgical emergencies worldwide and represents a significant complication of cholelithiasis (gallstone disease). Prompt diagnosis and appropriate management are crucial to prevent serious complications such as gallbladder perforation, peritonitis, or sepsis.

Acute calculous cholecystitis is a common surgical condition requiring a multidisciplinary approach. Ultrasound is diagnostic, and laparoscopic cholecystectomy remains the cornerstone of curative treatment. Tailored management based on severity and patient comorbidities is essential for optimal outcomes.

Right upper abdominal pain is the common symptom of acute cholecystitis and is generally the cause for patients to seek medical treatment [1]. The severity of cholecystitis can be estimated according to measurements of white blood cell counts, fever, and swelling of the gallbladder [2]. Although for most acute cholecystitis the definitive treatment is laparoscopic cholecystectomy, some patients are scared of undergoing surgery unless their clinical manifestations worsen [3]. Thus, pain relief is essential in these patients.

The conventional clinical treatments for pain are physiotherapy, corticosteroid injections, surgery, and analgesic medication [4]. Clinically, anisodamine injections may partially suppress right upper abdominal pain in acute cholecystitis patients, though its side effects are concerning. As an effective treatment for acute or chronic pain, acupuncture has received considerable attention around the world [4]-[6].

An acupoint is the basic element related to acupuncture. *Yanglingquan* (GB34) and *Zusanli* (ST36) are both specific acupoints related to biliary functions. Stimulating each of the two points is considered to ameliorate symptoms of some biliary diseases, especially in the relief of upper abdominal pain [7] [8]. We tried needling both of the acupoints in order to get a more apparent pain-relief effect in acute cholecystitis patients, using a visual analogue scale (VAS) to quantify pain.

## 2. Materials and Methods

### 2.1. Patients and Design

Inpatients in our surgical ward diagnosed with acute calculous cholecystitis between January 2022 and February 2025 were enrolled in our study. The sample size for this study was calculated using General Power Analysis software. Based on the McNemar test, with a significance level of  $\alpha = 0.05$  (two-tailed), a test power of 0.8, and an expected discordant pair proportion of 0.3, the minimum required sample size was determined to be 62 subjects. Accounting for an estimated dropout rate of 10%, we ultimately planned to enroll 81 patients. Since the majority of patients require surgical treatment, while our study focused on those receiving conservative management, the timeline for collecting sufficient cases was consequently extended.

All patients presented with right upper abdominal pain and accepted acupuncture to relieve pain before other medical treatments. Their white blood cell counts

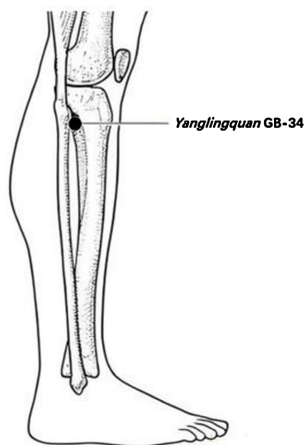
and amylase levels in blood and urine were examined to confirm the diagnosis or to exclude acute pancreatitis. Acupuncture was not performed in patients who presented with evidence of acute obstructive suppurative cholangitis. Patients with severe cardiovascular or pulmonary dysfunction and/or suffering from medical or psychiatric disorders were also excluded from our acupuncture intervention. The acupuncture needles used in this study, with a diameter of 0.25 mm and a length of 75 mm, were stainless steel and disposable.

## 2.2. Needling and Score

Prior to needling, patients were made clear that a score of zero on the VAS scale would be the equivalent of no pain and a score of 10 represented the present pain. The patient was kept in a supine position, and the areas of two acupoints on both lower limbs were sterilized with 75% alcohol. Needling was performed bilaterally. Acupoint *Yanglingquan* was located lateral to the shank and in the depression anterior and inferior to the head of the fibula. The location of *Zusanli* is superior and lateral to the shank, in the depression about 6 cm directly below the small head of the fibula, or the tender point around 6 cm directly below *Yanglingquan*. (Figure 1). To ensure accurate acupoint localization, manual palpation could be performed prior to needling, with the tenderness point (characterized by soreness and distension) indicating the optimal insertion site. Needles were perpendicularly inserted at an approximate depth of 2 cm, following a rapid lifting, thrusting, and twirling until the patient felt soreness and pain, and were then retained for twenty minutes before withdrawal. All patients were informed to specify the level of pain by indicating a position along the VAS scale after removal of the needles. A VAS score of less than 6 (score 6 was not included, i.e., pain reduced by half) after needling was regarded as effective, and data were collected for analysis.

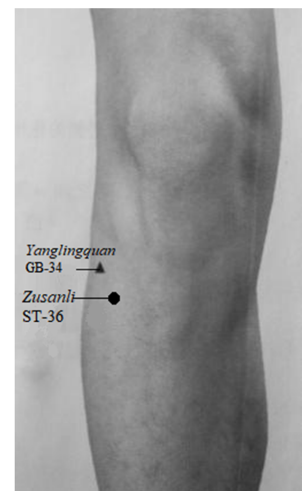
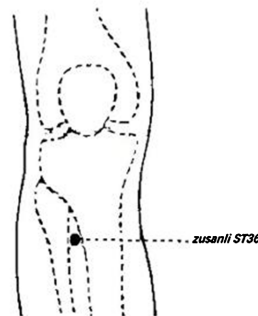
### *Yanglingquan* GB-34

lateral to the shank and in the depression anterior and inferior to the head of fibula.



### *Zusanli* ST-36

superior and lateral to the shank in the depression about 6cm directly below the small head of the fibia



**Figure 1.** Localization of the acupoints *Yanglingquan* and *Zusanli*.

### 3. Statistical Analysis

Demographic, clinical, and pain characteristics of patients were analyzed descriptively. For categorical variables, absolute and relative frequencies were presented using histograms. Data were assessed with Q-Q Plots for normal distribution, calculating 95% confidence intervals. Distributions of gender, age, and clinical variables of categorical nature were compared between groups using the Pearson chi-square test. Statistical tests were two-sided. The IBM SPSS Statistics version 17 was used, and  $p < 0.05$  was considered statistically significant.

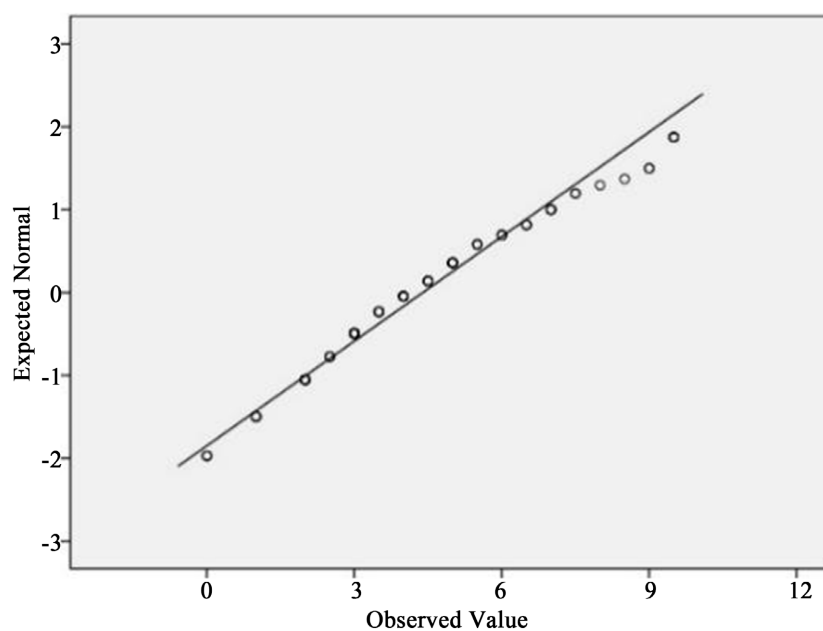
## 4. Results

### 4.1. VAS Score Distribution

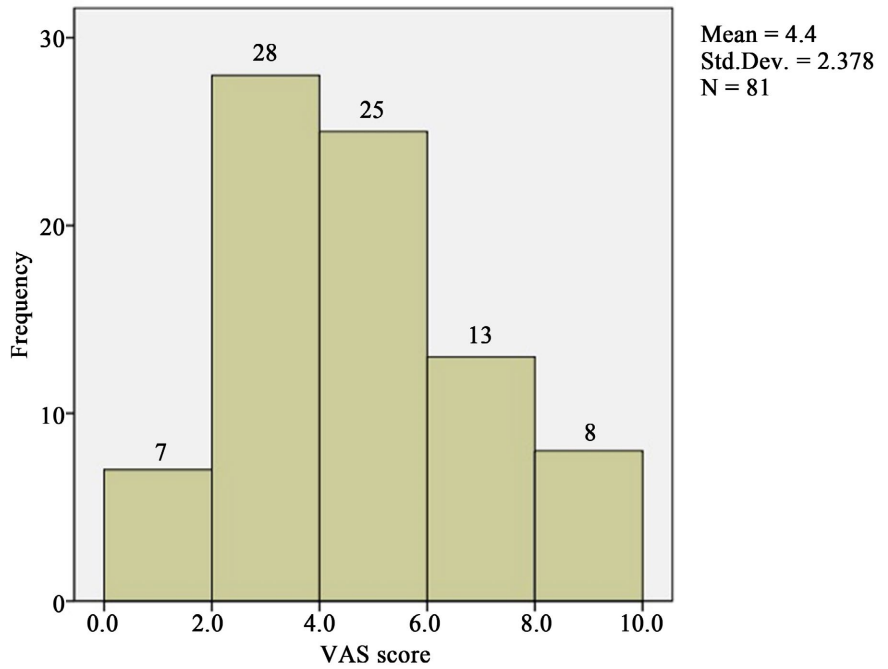
A total of 81 patients aged 23 to 72 were enrolled. All participants tolerated the needling procedures without adverse events. Acupuncture is a widely recognized and accepted modality for pain management in China. No patients in our study refused acupuncture treatment. Our observations confirmed that all participants tolerated the procedure well, with no acupuncture-related adverse effects reported. The VAS scores were categorized, and the distribution was normal (**Figure 2**). Sixty patients graded their pain as less than score 6 after the withdrawal of needles (efficacy  $60/81 = 74.07\%$ , 95% CI 64.53% - 83.62%) (**Figure 3**).

### 4.2. Clinical Characteristics and Pain Relief Effect

**Table 1** presents clinical characteristics of the patients. There were 33 male patients and 48 female patients; the number of patients with increased WBC counts of more than  $1.5 \times 10^9/L$  was 25; 62 patients had onset of abdominal pain for more than 3 hours; diabetes was concomitant in 9 patients and 60 patients were



**Figure 2.** Normal distribution of VAS score.



**Figure 3.** Histogram of score distribution.

**Table 1.** Clinical and characteristics, pain relief effects of the patients.

	Total (n = 81)	Effective (n = 60)	p value
<b>Gender</b>			
Male	33	23 (69.70%)	0.456
Female	48	37 (77.08%)	
<b>Age</b>			
<60 y	59	45 (76.27%)	0.46
>60 y	22	15 (68.18%)	
<b>WBC counts</b>			
<1.5 × 10 <sup>9</sup> /L	56	44 (78.57%)	0.167
>1.5 × 10 <sup>9</sup> /L	25	16 (64.00%)	
<b>Time of onset</b>			
<3 h	19	15 (78.95%)	0.58
>3 h	62	45 (72.58%)	
<b>Diabetes</b>			
Yes	9	5 (55.56%)	0.179
No	72	55 (76.39%)	
<b>Recurrence</b>			
Yes	60	43 (71.67%)	0.403
No	21	17 (80.95%)	

Total = number of all patients enrolled; Effective = number of patients with a VAS score less than 6;  $p < 0.05$  = statistical significance (chi-square test).

diagnosed with recurrent cholecystitis.

In all 81 patients, most felt a reduction in pain level after needling, and some even claimed that their pain had disappeared during needling. Statistically, the effect of pain relief after acupuncture was irrelevant to gender, age, time of onset, diabetes, and recurrence of cholecystitis ( $p > 0.05$ ). The pain relief effect of acupuncture was also not prominent in patients with WBC counts more than  $1.5 \times 10^9/L$ , as compared with the lower WBC patients ( $p = 0.167$ ).

## 5. Discussion

Acute calculus cholecystitis is a commonly encountered disease and usually needs surgical treatment, such as laparoscopic cholecystectomy [2] [3]. Besides fever and increased white blood cell counts, most patients present with right upper abdominal pain due to blockage of the cystic duct by gallstones [1] [2]. Timely and correct pain relief may minimize patients' distress and result in faster recovery.

As a Chinese traditional treatment for different kinds of pain, acupuncture has been getting popular around the world, even in anesthesia during surgery [9]. Though the mechanism remains unclear, its efficacy against pain has been supported by various methods of testing [10].

According to the theory of traditional Chinese medicine, all parts of the body are connected through the meridian system. The gallbladder meridian of foot-shaoyang is one part of the meridian system and is composed of three branches. Acupoint *Yanglingquan* is located on the second branch, which links with the liver and enters the gallbladder, and is believed to be related to hypochondriac pain, jaundice, and pain in the loins and legs [7]. The *Zusanli* acupoint is an extraordinary acupoint that does not pertain to any meridian but can relieve symptoms of cholecystitis, biliary ascariasis, and flaccidity of the lower limbs when needled [8].

Concerning the relationship of the two acupoints with the biliary system, we simultaneously needled them in order to verify pain-suppressing results in acute cholecystitis patients. The results showed that most patients got pain relief according to VAS measurements after needling for 20 min, and the efficacy reached 74.07% (60/81) if a VAS score of less than 6 was used for calculation. We found that the pain relief effect had no relationship with gender, age, concomitance of diabetes, or recurrence of cholecystitis and was not significantly different between patients with severe or light gall bladder inflammation.

Accurately locating acupoints was important and a prerequisite to treatment [11]. To locate *Yanglingquan*, the first step was to locate the head of the fibula, which is an apparent anatomical landmark. Then, find a depressed area below and lateral to this bone signifier. Acupoint *Zusanli* is the point near 6 cm directly below *Yanglingquan*. If the patient felt pain or tenderness after the acupuncturist's finger pressing on the two sites, the locations of *Yanglingquan* and *Zusanli* might be accurately confirmed.

Though variability exists between acupuncture practitioners, twirling-rotating and lifting-thrusting are the two basic manipulations that can be used individually

or in combination [12] [13]. The amplitude of twirling and the scope of lifting-thrusting, as well as the frequency and duration of manipulation, depend upon the patient's constitution and pathological conditions. A patient sensing aching, numbness, heaviness, or distension at the needling point usually means a good manipulation. Acupuncture sensation may play an important role in verifying the effect of acupuncture [14]. Retaining the needles for 20 min may strengthen the pain-relief effect.

The effect of reducing right upper abdominal pain by simultaneously needling in the acupoints *Yanglingquan* and *Zusanli* was apparent. However, acupuncture was not a treatment to inhibit inflammation. Acute cholecystitis patients need further medication if presenting with progressing pain, elevated white blood cell counts, and fever [2]. But needling the two acupoints was a safe and applicable means to relieve right upper abdominal pain. Acupuncture, as an adjunctive analgesic therapy for acute cholecystitis, demonstrates effective symptom control, a favorable safety profile with minimal complications, and the capacity to optimize preoperative patient condition.

### Ethical Approval

Approved (approval number 22012506) by Institutional Review Board of Pudong New District Hospital of Traditional Chinese Medicine, affiliated to Shanghai University of Traditional Chinese Medicine.

### Contributors

Jianming Zhu designed the study, conducted the analyses, data interpretation, and manuscript production. Jianping Huang promoted and guided the study and approved the final submitted manuscript.

### Acknowledgments

The authors are thankful to all research participants for supporting this project.

### Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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