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Rapid Reduction of Liver Stiffness Measured by FibroScan After a Novel Deep Needling Technique at Zhongwan (CV12) in Four Cirrhosis Patients: A Case Series

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Abstract: ***Objective:*** ***To report the rapid reduction of liver stiffness measurement (LSM) by FibroScan in four cirrhosis patients after a novel deep needling technique at Zhongwan (CV12), and to explore the possible mechanisms from both Western and Traditional Chinese Medicine perspectives.*** ***Methods:*** ***Four female patients (aged 55–74 years) with compensated (n=2) or decompensated (n=2) cirrhosis who were hospitalized due to worsening of symptoms in April 2025 were included. All received routine integrated inpatient care and conventional acupuncture. In addition, a novel technique was applied: perpendicular deep needling (3 cun, ~75 mm) at CV12, followed by four-direction oblique deep needling at 45°. FibroScan examinations were performed by a single blinded, experienced technician.*** ***Results:*** ***After 2–4 sessions of the novel needling (hospitalization 5–10 days), LSM decreased by 5.5–11.6 kPa (relative reduction 21%–33%). Abdominal distension and tenderness improved dramatically after the first session. Three patients who repeated FibroScan after two sessions showed LSM values already at the discharge level (plateau effect). One patient with previously poor response achieved a measurable decrease for the first time. Liver function tests improved mildly in compensated patients but remained stable in decompensated patients. No adverse events occurred.*** ***Conclusion:*** ***This novel deep needling technique at CV12 rapidly and significantly reduced LSM in four cirrhosis patients, likely by relieving reversible factors such as intrahepatic congestion and intra-abdominal pressure. The effect plateaued after 2–3 sessions. The procedure appears safe and warrants further investigation.***

Keywords: Liver cirrhosis, Liver stiffness measurement, Zhongwan (CV12), Deep needling, Penetrating needling, Case series.

1. Introduction

Liver fibrosis and cirrhosis are end-stage consequences of chronic liver diseases. Accurate assessment of fibrosis severity is essential for treatment decisions. FibroScan provides a non-invasive liver stiffness measurement (LSM) that correlates with the degree of fibrosis; however, LSM can be transiently elevated by reversible factors such as intrahepatic congestion, lymphatic edema, and increased intra-abdominal pressure [1,2].

Acupuncture is commonly used in hepatology departments to relieve symptoms such as abdominal distension and fatigue. A systematic review showed that acupuncture as an adjunctive therapy can improve liver function and alleviate clinical symptoms in cirrhotic patients [3]. Conventional acupuncture points include Ganshu (BL18), Pishu (BL20), Zusanli (ST36), Sanyinjiao (SP6), Hegu (LI4), Shuifen (CV9), and shallow needling at Zhongwan (CV12). Our department is a tertiary TCM hospital hepatology unit that has long applied integrated Chinese-western medicine for cirrhosis. With conventional treatment, some patients experience symptom relief, but LSM usually declines slowly or remains unchanged; in patients with long disease duration and repeated hospitalizations, LSM may even fluctuate upward.

Recently, in addition to routine therapy, we applied a novel deep needling technique at CV12 (perpendicular deep needling + four-direction fan-shaped penetrating needling) to four long-term patients. We observed a rapid and marked decrease in LSM within 5–10 days, accompanied by immediate improvement of abdominal symptoms after the first session. Here we report these four cases and discuss the possible mechanisms from both Western and TCM perspectives.

2. Methods

2.1 Study Design

This was a retrospective case series of four cirrhotic patients hospitalized in our department in April 2025. All patients gave informed consent for the acupuncture procedure. Data collection complied with the Declaration of Helsinki and the hospital ethics committee requirements.

2.2 Routine Treatment

All four patients received standard inpatient care in our department (Hepatology Department, a tertiary TCM hospital), including:

- Medication: Hepatoprotective agents (e.g., glycyrrhizin), diuretics (spironolactone, furosemide), antiviral drugs (entecavir/tenofovir if HBV-related), antihypertensive drugs (nifedipine/irbesartan), and antidiabetic drugs (metformin/insulin) as indicated. The medication regimens were essentially the same as in their previous hospitalizations.

- Conventional acupuncture: Points: BL18, BL20, ST36, SP6, LI4, CV9, and shallow needling at CV12 (insertion depth ~1 cun). Performed once daily, needles retained for 20 minutes. This protocol has been used for many

years in our department.

2.3 Novel Needling Technique

On top of the routine treatment, a hepatology physician with a professional background in acupuncture (first author) added the following novel needling technique at CV12:

- Needle: Disposable sterile acupuncture needle, 3 cun (0.30×75 mm).
- Perpendicular deep needling: With the patient supine, CV12 (4 cun above the umbilicus) was disinfected. The needle was inserted perpendicularly and slowly advanced to a depth of about 3 cun (~70–75 mm) until de qi (local distending or sore sensation reported by the patient and a feeling of tightness around the needle perceived by the practitioner).
- Fan-shaped oblique needling: The needle was withdrawn to the subcutaneous level, then re-inserted at 45° angles in four directions (superior, inferior, left, right), each time to a depth of about 3 cun. At each direction, after de qi a few lifting-thrusting and twirling manipulations were performed, but the needle was not retained. Total procedure time ~5 minutes.
- Frequency: Once every 1–2 days during hospitalization. Each patient received 2–4 sessions of the novel needling.

2.4 Outcome Measures

FibroScan was performed on day 1 (before treatment) and on the day of discharge (after treatment). Some patients voluntarily repeated the examination after the second session of the novel needling. All examinations were done by a single technician with >5 years of experience using the same machine (FibroScan® 502 Touch, Echosens, France). The technician was blinded to the acupuncture protocol. Patients fasted for at least 2 hours before the examination and were examined in the supine position; the right intercostal space at the anterior-to-mid-axillary line (7th–9th intercostal spaces) was used as the measurement window. At least 10 valid shear-wave measurements were obtained (success rate >60%, IQR/M <30%). LSM (kPa) and CAP (dB/m) were recorded.

In addition, routine blood tests (complete blood count including WBC, Hb, PLT; liver function including ALT, AST, ALB, TBil; coagulation function PT) and abdominal ultrasound (portal vein diameter, spleen thickness, ascites) were collected before and after treatment. Clinical symptoms (abdominal distension, abdominal tenderness on palpation) were recorded.

2.5 Follow-up

Telephone follow-up was conducted one month after discharge to assess symptom maintenance and any re-hospitalizations.

3. Case Presentations

3.1 Case 1 (Wu) – Compensated Cirrhosis

Demographics: Female, 69 years. Hospitalization: April 17–22, 2025 (5 days).

History: Fatty liver for 10 years, compensated cirrhosis for 0.5 years. Longstanding hypertension and hyperglycemia controlled with oral medications. Physical examination: mild abdominal distension, abdominal wall tension, mid-upper abdominal tenderness (+), splenomegaly (not palpable below ribs, ultrasound spleen thickness 4.5 cm). Tongue dark red with greasy white coating, pulse wiry and slippery.

Reason for admission: Worsening abdominal distension, fatigue, and poor appetite for 2 weeks.

Laboratory and imaging (pre-/post-treatment):

Parameter	Pre-treatment	Post-treatment	Reference range
WBC ($\times 10^9$/L)	3.8	4	3.5–9.5
Hb (g/L)	102	105	115–150
PLT ($\times 10^9$/L)	72	78	125–350
ALT (U/L)	86	68	7–40
AST (U/L)	94	74	13–35
ALB (g/L)	33	34	35–55
TBil (μmol/L)	22	19	3.4–20.5
PT (s)	13.5	13	11–14
Portal vein diameter (cm)	1.2	1.1	<1.3
Spleen thickness (cm)	4.5	4.4	<4.0
Ascites	None	None	—
CAP (dB/m)	328	297	<240
LSM (kPa)	24.1	15.2	<7.0

Treatment course: Routine hepatoprotective, antidiabetic, and antihypertensive therapy. Conventional acupuncture daily. Novel needling was added on days 2, 4, and 5 (3 sessions). About 2 hours after the first novel session, the patient reported “my belly suddenly feels much looser.” Physical examination showed markedly reduced abdominal tension and tenderness. After the second novel session (4.19), the patient voluntarily requested a repeat FibroScan, which showed LSM 15.8 kPa (a decrease of 8.3 kPa from baseline). At discharge (after the third session), LSM was 15.2 kPa, essentially the same as after the second session. One-month follow-up: no recurrence of distension, general condition good.

3.2 Case 2 (Li) – Decompensated Cirrhosis

Demographics: Female, 74 years. Hospitalization: April 7–16, 2025 (9 days).

History: Decompensated cirrhosis for 8 years, heart failure for 5 years, long-term oral diuretics. On admission: mild ascites, mild lower-limb edema. Physical examination: abdominal distension, high abdominal wall tension, suspicious shifting dullness, splenomegaly (2 cm below costal margin, firm). Tongue pale and swollen with teeth marks, white slippery coating, pulse deep and thin.

Reason for admission: Progressive abdominal distension, worsening edema, and marked fatigue for 1 month.

Laboratory and imaging (pre-/post-treatment):

Parameter	Pre-treatment	Post-treatment	Reference range
WBC (×10⁹/L)	3.2	3.4	3.5–9.5
Hb (g/L)	88	91	115–150
PLT (×10⁹/L)	48	52	125–350
ALT (U/L)	42	38	7–40
AST (U/L)	56	48	13–35
ALB (g/L)	28	29	35–55
TBil (μmol/L)	38	34	3.4–20.5
PT (s)	16.5	15.8	11–14
Portal vein diameter (cm)	1.4	1.3	<1.3
Spleen thickness (cm)	5.2	5	<4.0
Ascites	Mild	Markedly reduced	—
CAP (dB/m)	211	230	<240
LSM (kPa)	35.9	24.3	<7.0

Treatment course: Routine hepatoprotective, diuretic, and anti-heart failure therapy. Conventional acupuncture daily. Novel needling was added on days 2–5 (4 sessions). On the night after the first novel session, the patient reported "my abdominal distension is more than half gone, and I sleep much better." Physical examination showed markedly reduced abdominal wall tension and negative shifting dullness. After the second novel session (4.9), repeat FibroScan showed LSM 25.1 kPa; at discharge, LSM was 24.3 kPa, essentially unchanged from after the second session. One-month follow-up: mild distension, improved quality of life.

3.3 Case 3 (Huang) – Decompensated Cirrhosis (poor prior response)

Demographics: Female, 61 years. Hospitalization: April 18–25, 2025 (7 days).

History: Decompensated cirrhosis for 10 years with ascites. Previous multiple hospitalizations (including conventional acupuncture) resulted in only mild symptom relief, with no objective improvement or even worsening of LSM. The patient had low expectations for treatment. Physical examination: abdominal fullness, moderate abdominal wall tension, no definite tenderness, splenomegaly (1 cm below costal margin). Tongue purple-dark with petechiae, thin white coating, pulse unsmooth.

Reason for admission: Recurrent abdominal distension and fatigue, poor response to previous treatments.

Laboratory and imaging (pre-/post-treatment):

Parameter	Pre-treatment	Post-treatment	Reference range
WBC (×10⁹/L)	3.4	3.6	3.5–9.5
Hb (g/L)	92	95	115–150
PLT (×10⁹/L)	52	58	125–350
ALT (U/L)	38	34	7–40
AST (U/L)	48	42	13–35
ALB (g/L)	30	31	35–55
TBil (μmol/L)	32	28	3.4–20.5
PT (s)	15.8	15	11–14
Portal vein diameter (cm)	1.3	1.2	<1.3
Spleen thickness (cm)	4.8	4.7	<4.0
Ascites	Mild	Slightly reduced	—
CAP (dB/m)	280	232	<240
LSM (kPa)	21.5	16	<7.0

Treatment course: Routine hepatoprotective and diuretic therapy. Conventional acupuncture daily. Novel needling was added on days 2, 4, and 6 (3 sessions). The day after the first novel session, the patient reported "my abdomen feels looser; I haven't felt this comfortable for a long time." Physical examination showed decreased abdominal wall tension. Because of previous poor responses, no repeat FibroScan was done after the second session. At discharge, LSM was 16.0 kPa (a decrease of 5.5 kPa), which surprised the patient and her family. One-month follow-up: general condition good, no re-hospitalization, and the patient gained confidence in further treatment.

3.4 Case 4 (Zhao) – Compensated Cirrhosis (early stage)

Demographics: Female, 55 years. Hospitalization: April 15–25, 2025 (10 days).

History: Compensated cirrhosis for 0.5 years, etiology related to fatty liver. Slightly elevated blood pressure controlled with oral antihypertensive drugs. Physical examination: flat abdomen, moderate abdominal wall tension, no definite tenderness, splenomegaly (0.5 cm below costal margin). Tongue red, thin yellow coating, pulse wiry.

Reason for admission: New-onset fatigue, right upper quadrant discomfort, and abnormal liver function tests found during routine check-up.

Laboratory and imaging (pre-/post-treatment):

Parameter	Pre-treatment	Post-treatment	Reference range
WBC (×10⁹/L)	4.2	4.5	3.5–9.5
Hb (g/L)	108	112	115–150
PLT (×10⁹/L)	82	88	125–350
ALT (U/L)	72	58	7–40
AST (U/L)	68	52	13–35
ALB (g/L)	34	35	35–55
TBil (μmol/L)	18	16	3.4–20.5
PT (s)	13.2	12.8	11–14
Portal vein diameter (cm)	1.1	1	<1.3
Spleen thickness (cm)	4	3.9	<4.0
Ascites	None	None	—
CAP (dB/m)	260	250	<240
LSM (kPa)	25	15.2	<7.0

Treatment course: Routine hepatoprotective and antihypertensive therapy. Conventional acupuncture daily. Novel needling was added on days 2, 4, 6, and 8 (4 sessions). On the night after the first novel session, the patient reported marked relief of abdominal distension. After the second novel session (4.17), repeat FibroScan showed LSM 15.8 kPa; at discharge, LSM was 15.2 kPa, essentially unchanged from after the second session. One-month follow-up: stable condition, no specific complaints.

4. Results Summary

The core data of the four patients are summarized in Table 1. All patients experienced rapid relief of abdominal distension and tenderness after the first novel needling session, and abdominal palpation became softer. Three patients who repeated FibroScan after two sessions already had LSM values at the discharge level, indicating a plateau effect after 2–3 treatments.

Regarding laboratory parameters: In the two compensated cirrhosis patients (Wu and Zhao), ALT and AST showed moderate improvement (decreases of 18–28 U/L) after 5–10 days of treatment, reflecting reduced hepatocellular injury. In contrast, the two decompensated patients (Li and Huang) had near-normal transaminase levels at baseline (a common finding in end-stage cirrhosis due to reduced hepatocyte mass), and these remained stable during hospitalization. Albumin, bilirubin, platelet count, PT, and hemoglobin showed no significant changes in any patient during the short 5–10 day observation period, which is expected given that these parameters reflect liver synthetic function and portal hypertension, which require much longer to improve.

Abdominal ultrasound showed mild narrowing of the portal vein diameter (from 1.4→1.3 cm in Case 2, and 1.3→1.2 cm in Case 3) and reduction of ascites (Cases 2 and 3), but no significant change in spleen thickness. No adverse events such as fainting during needling, local hematoma, infection, burns, worsening abdominal pain, or intra-abdominal bleeding occurred.

Table 1: Summary of clinical characteristics and outcomes of the four patients

Patient	Age	Cirrhosis type	Pre-LSM (kPa)	Post-LSM (kPa)	LSM reduction	CAP change	Key laboratory changes	Novel sessions	Plateau effect
Wu	69	Compensated	24.1	15.2	8.9	328→297	ALT 86→68	3	Yes
Li	74	Decompensated	35.9	24.3	11.6	211→230	ALB 28→29, PT 16.5→15.8	4	Yes
Huang	61	Decompensated	21.5	16	5.5	280→232	ALB 30→31, TBil 32→28	3	Not tested
Zhao	55	Compensated	25	15.2	9.8	260→250	ALT 72→58	4	Yes

5. Discussion

5.1 Main Findings and Clinical Value

This case series shows that adding the CV12 deep needling fan-shaped technique to routine treatment rapidly reduced LSM by 5.5–11.6 kPa (relative reduction 21%–33%) within 5–10 days, accompanied by marked improvement in abdominal distension and tenderness. All four patients were long-term patients in our department; their routine treatment (medication plus conventional acupuncture) was essentially the same as in previous hospitalizations, with the novel needling being the only added variable. Compared with their many previous hospitalizations, all four achieved unprecedented rapid and objective improvement. One patient (Huang) who had previously shown no objective improvement or even worsening of LSM achieved a measurable decrease for the first time. This strongly suggests that the novel technique has a unique effect not provided by conventional therapy.

Previous studies have shown that acupuncture can improve quality of life and some biochemical parameters in cirrhotic patients [3,4], but few have used FibroScan as the primary endpoint and reported such rapid LSM reduction. The innovations of this report are: (1) a unique “perpendicular deep needling + fan-shaped penetrating needling” technique; (2) objective evidence from blinded FibroScan examinations; (3) the first description of a plateau effect after 2–3 sessions, providing a basis for optimizing acupuncture course length.

5.2 Mechanism: Western Medicine Perspective of Neuro-vascular Reflex Hypothesis

The rapid LSM reduction without significant changes in synthetic liver function markers (albumin, PT, bilirubin) and platelet count suggests that the effect is not due to recovery of hepatocyte synthetic function or true reversal of fibrosis (which usually takes months), but rather to the elimination of reversible factors that affect LSM – intrahepatic congestion, lymphatic edema, and increased intra-abdominal pressure [1,2].

The deep layer of CV12 contains the celiac plexus and celiac ganglia. Hao et al. (2004) confirmed by CT scanning that the de qi layer during deep needling at CV12 reaches the celiac ganglia, the lesser curvature of the stomach, the pancreas, and the superior mesenteric vein [5]. This provides the anatomical basis for the neural regulatory effect.

Based on this anatomy, we propose the following hypothesis: Perpendicular deep needling directly stimulates the celiac ganglia and the abdominal branch of the vagus nerve, initiating basic visceral vascular regulation. The four-direction fan-shaped oblique needling may exert targeted effects on the following components:

- Superior oblique (toward the xiphoid): The needle tip approaches the left liver lobe, the abdominal esophagus, and the diaphragm, possibly stimulating the phrenic nerve reflex and reducing intra-abdominal pressure.
- Inferior oblique (toward the pubis): The needle tip points to the superior mesenteric nerve plexus and the superior mesenteric artery, which may excite sympathetic nerves, cause mesenteric vasoconstriction, and reduce portal venous inflow – a key step in lowering portal pressure [7,8].
- Left oblique (toward the left abdomen): The needle tip approaches the splenic hilum and the splenic artery sympathetic plexus, which may constrict the splenic artery, reduce splenic blood outflow, and further lower portal inflow. Given that all four patients had splenomegaly, this effect is particularly important.
- Right oblique (toward the right abdomen): The needle tip points to the portal hepatis (hepatic artery, portal vein, common bile duct) and the hepatic plexus, possibly regulating intrahepatic vascular resistance and improving hepatic microcirculation.

Animal studies have shown that electroacupuncture can lower portal pressure in portal hypertensive rats, involving inhibition of inflammation, reduction of pathological angiogenesis, and regulation of gut microbiota [9]. Clinical

studies have also found that warm needling combined with antiviral therapy can reduce portal vein diameter and splenic vein diameter in cirrhotic patients, possibly by lowering IL-21 and PDGF levels [6]. The observed reduction in ascites and mild narrowing of the portal vein diameter in Cases 2 and 3 are consistent with these reports.

5.3 Mechanism: Traditional Chinese Medicine Perspective of Meridian Penetrating Needling

CV12 (Zhongwan) has a special meridian property in TCM acupuncture. According to the Great Compendium of Acupuncture and Moxibustion, CV12 is "named Tai Cang, the Front-Mu point of the stomach, located 1 cun below Shangwan, midway between the xiphoid and the umbilicus; it is the meeting point of the Hand Taiyang, Hand Shaoyang, Foot Yangming, and Conception Vessel" [10]. Thus, CV12 is simultaneously the Front-Mu point of the stomach, the Hui point of the Fu (hollow organs), and the crossing point of four meridians (SI, TE, ST, CV). This "single point connecting four meridians" gives it the ability to harmonize the spleen and stomach, coordinate the Sanjiao, and regulate the Conception Vessel.

Perpendicular deep needling follows the principle of "deep needling to reach deep pathogens" (Miraculous Pivot). Located at the middle-jiao pivot, deep needling at CV12 directly reaches the deep layer of the Front-Mu point of the stomach, invigorating stomach qi, regulating the six fu-organs, and smoothing middle-jiao qi movement.

Fan-shaped penetrating needling in four directions embodies the wisdom of "one needle penetrating multiple meridians":

- Superior-inferior penetration (longitudinal): Upward penetration into the Conception Vessel to relieve chest and regulate qi; downward penetration into the Conception Vessel to promote intestinal function and resolve dampness. This vertical stimulation along the Conception Vessel affects the whole meridian, which is the "Sea of Yin" and regulates all yin blood, directly targeting the "blood stasis and water retention" pathogenesis of cirrhosis.

- Left-right penetration (transverse): The deep layer of CV12 is distributed over the Stomach Meridian (Foot Yangming), and deeper still reaches the Spleen Meridian (Foot Taiyin). Left and right oblique needling actually penetrates from CV12 (Conception Vessel) to the Stomach Meridian and further to the Spleen Meridian – one needle simultaneously affecting three meridians (CV, ST, SP).

From the perspective of zang-fu pattern differentiation, this needle design directly targets the core pathogenesis of "liver disease affecting the spleen" in cirrhosis. TCM theory holds that liver (Wood) acts on spleen (Earth); in cirrhosis, long-standing liver qi stagnation invades the spleen, causing liver depression and spleen deficiency, which leads to failure of spleen transport, internal retention of water-dampness, and symptoms such as abdominal distension, ascites, and poor appetite – exactly matching the main symptoms of our patients. The penetrating needle design can be summarized as "one needle opens the Conception Vessel, penetrates left-right to the Stomach and Spleen meridians to strengthen the spleen, promote qi circulation, activate blood, and resolve water-dampness, and penetrates superior-inferior along the Conception Vessel to regulate qi ascending and descending." This combination of "straight needling + penetrating needling" performs four therapeutic actions simultaneously – strengthening the spleen, moving qi, invigorating blood, and promoting diuresis – thereby producing rapid symptom relief after the first session.

5.4 Complementary Relationship Between the Two Theoretical Systems

The meridian theory of TCM and the neuro-vascular reflex mechanism of Western medicine are not contradictory; they explain the same clinical phenomenon from different dimensions. Meridian theory focuses on the functional connection between zang-fu and meridians and the regulation of qi and blood, while Western mechanisms provide specific material bases through anatomical structures and physiological effects. In this study, the immediate relief of abdominal distension after the first deep needling session can be interpreted in TCM as a direct result of "smoothing middle-jiao qi movement and regulating the Conception Vessel," and in Western medicine as a neural reflex of "stimulating the celiac plexus → activating gastrointestinal motility → promoting gas expulsion and lowering intra-abdominal pressure." Both interpretations point to the same pathological link – rapid improvement of the intra-abdominal environment in cirrhotic patients – and they complement and reinforce each other.

5.5 Interpretation of Laboratory Changes in This Study

An important observation in this study is the differential response of laboratory parameters between compensated and decompensated patients. In the two compensated patients (Wu and Zhao), ALT and AST showed moderate improvement (decreases of 18–28 U/L) after 5–10 days. This suggests that the novel needling technique may reduce hepatocellular injury in patients with preserved hepatocyte mass, possibly by improving hepatic microcirculation and reducing inflammatory activity.

In contrast, the two decompensated patients (Li and Huang) had near-normal transaminase levels at baseline. This is a well-recognized phenomenon in end-stage cirrhosis: as hepatocyte mass decreases and liver function deteriorates, the ability to release transaminases into the bloodstream is diminished, resulting in "normal" or only mildly elevated transaminases despite severe liver disease [11]. In these patients, transaminases remained stable during hospitalization.

Regarding synthetic function markers (albumin, PT, bilirubin) and platelet count, no significant changes were observed in any patient during the short 5–10 day observation period. This is expected because these parameters reflect liver synthetic capacity and the degree of portal hypertension (splenomegaly, hypersplenism), which typically require weeks to months of effective treatment to improve. The absence of change in these markers actually strengthens our conclusion that the

rapid LSM reduction is due to clearance of reversible factors (congestion, edema, pressure) rather than true structural reversal of fibrosis or improvement in synthetic function.

5.6 Clinical Implication of the Plateau Effect after Two Treatments

In this series, three patients who repeated FibroScan after two novel needling sessions already had LSM values at the discharge level, with no further decrease after additional sessions. This finding has practical clinical implications: for patients whose major problem is reversible factors (congestion, edema, increased abdominal pressure), 2–3 sessions may achieve the maximal effect, and more sessions do not yield additional LSM reduction. This can help optimize resource allocation, shorten unnecessary treatment cycles, and reduce patient burden. Of course, given the small sample size, this "plateau" pattern needs confirmation in larger studies.

5.7 Limitations

This study has several limitations:

- Sample size and control design: Only four cases, no parallel control group. However, all patients served as their own controls (comparing with many previous hospitalizations), and the magnitude of improvement far exceeded the measurement error (repeat measurement error for the same operator is ~±2 kPa), so the findings are still informative.

- Insufficient mechanistic validation: We did not directly measure portal pressure, blood flow velocity, or intra-abdominal pressure before and after treatment, which limits direct confirmation of the "reduced intrahepatic congestion" hypothesis. Future studies should include Doppler ultrasound to assess portal vein diameter and flow velocity.

- Short follow-up for objective outcomes: Although patients reported good symptom maintenance at one month, we did not repeat FibroScan to confirm sustained LSM reduction. Longer follow-up is needed.

- Single operator: The novel needling was performed by the first author, so the results may be operator-dependent. Multi-center studies should evaluate reproducibility among different practitioners.

5.8 Future Research Directions

Based on these preliminary findings, future research should: (1) Mechanistic validation: Prospective studies using Doppler ultrasound to measure portal vein diameter and flow velocity, splenic artery resistance index, etc., directly testing the "portal pressure reduction" hypothesis. (2) Large randomized controlled trials: Rigorously designed RCTs with sham acupuncture controls to confirm the net effect of the novel technique. (3) Dose-response and course optimization: Systematically evaluate the optimal number and frequency of sessions. (4) Long-term follow-up: Extend follow-up to ≥6 months to see whether LSM reduction translates into long-term improvement in liver function and reduced complications. (5) Animal experiments: Establish portal hypertensive cirrhosis models to explore the precise molecular mechanisms of portal pressure reduction.

6. Conclusion

Perpendicular deep needling (3 cun) at Zhongwan (CV12) combined with four-direction fan-shaped penetrating needling can rapidly and significantly reduce liver stiffness measured by FibroScan in cirrhotic patients, with simultaneous improvement of abdominal distension and other abdominal symptoms. The effect appears to plateau after 2–3 sessions. The mechanism is likely related to alleviation of reversible factors such as intrahepatic congestion and portal pressure rather than true reversal of fibrosis. The technique appears safe and has good potential for clinical exploration and dissemination, warranting further prospective studies.

Abbreviations

LSM: Liver Stiffness Measurement
CAP: Controlled Attenuation Parameter
WBC: White Blood Cell
Hb: Hemoglobin
PLT: Platelet
ALT: Alanine Aminotransferase
AST: Aspartate Aminotransferase
ALB: Albumin
TBil: Total Bilirubin
PT: Prothrombin Time
CV12: Zhongwan (Conception Vessel 12)

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